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Editorial

Information Management and Business Review (IMBR) provides a digital forum for researchers to share their knowledge and publish research work in the fields of information management, business, management and related disciplines. The work submitted for publication consideration in IMBR should address empirical and theoretical developments in the subjects related to the scope of the journal in particular and allied theories and practices in general. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal and that all listed authors approve its submission to IMBR. It is IMBR policy to welcome submissions for consideration, which are original, and not under consideration for publication by another journal at the same time. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. The current issue of IMBR comprises papers of scholars from different universities of Malaysia, France, China, England, Thailand, Indonesia, Yemen, Gambia and Turkiye. Factors Influencing Sales Performance, Festival as Catalyst in Community Development, Humanitarian Aid and Economic Growth, Behavioral Intention to Adopt Digital Banking, Factors Influencing Job Satisfaction, Factors Influencing Employee Retention, Factors Influencing Volunteer Motivation, Corporate Social Responsibility, Output Control and Motivation, Causes of Work Stress, Enculturation of Artificial Intelligence, Impulse Purchase Decisions, Impact of Digital Work on Work-Life Balance, Relationship between Role Ambiguity and Burnout, Determinants of University Students' Absenteeism, Green Innovation Drivers, Experiential Green Social Entrepreneurship, Factors of Learning Agility, Entrepreneurial Resilience in SMEs, Leveraging Artificial Intelligence, Impact of Work–Family Conflict, Urban Poverty and Income Inequality, Reimagining Holistic Health Tourism, Immersive Virtual Reality (IVR) and Metaverse Integrated Learning Environment, Market Sentiment and Stock Return Volatility, Mental Health Effects of Excessive Social Media, Impact of Autonomy, Workload and Work Life Balance on Job Performance, Examining the Mediating Role of Social Media Overload, HRM as a Catalyst for Self-Actualization, Tourism Suitability Index, Impact of Workload, Work-Life Balance and Technological Adaptation on Job Satisfaction, Relationship between Organizational Commitment and Job Satisfaction, Corporate Governance and Firm Performance and Educational Disconnect and Empowering Youth are some of the major practices and concepts examined in these studies. All the submitted papers were first assessed by the journal committee and then the external editorial team for relevance and originality of the work and then blindly peer-reviewed by external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance and clarity of the purpose. The special issue will, therefore be a unique proposition, where scholars will be able to appreciate the latest results in their field of expertise and to acquire additional knowledge in other relevant fields.

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PAPERS

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The Effectiveness of Writing an Argumentative Essay Using Google Docs Among Engineering Students

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Abstract: This research study focuses on the effectiveness of using Google Docs in enhancing the writing of argumentative essays among engineering students. The aim is to investigate how the integration of Google Docs as a digital writing tool impacts the development of argumentative writing skills. The study also explores the relationship between the usage of Google Docs and the improvement of key components in argumentative essay writing, including claims, counter-claims, reasons, and evidence. The research adopts a quantitative approach, incorporating pre-tests, post-test 1, and post-test 2 to assess students' writing performance before and after utilising Google Docs. A questionnaire is employed to strengthen the proof of students' understanding and experiences regarding the usage of Google Docs in their writing process. The results will contribute to the existing literature on technology-enhanced writing instruction, particularly in the field of engineering education. The study's implications may inform educators, curriculum designers, and policy-makers in designing effective strategies to enhance students' writing skills and foster their engagement in the writing process.

Keywords: *Argumentative essay, Google Docs, counter-claim, writing, engineering*

1. Introduction and Background

Argumentative essays are the most common type of writing that college students have to do, especially in the arts, humanities, and social sciences (Hewings et al., 2010). Nesi and Gardner (2006, p.108) surveyed how writing was graded in 20 different fields. They found that "the ability to show critical thinking and develop an argument within the context of the curriculum" was a value that most people agreed on. It has been said many times that argumentation should be "the focus of deliberate educational practices" (e.g., Davies, 2008, p. 327; Mitchell & Riddle, 2004). However, this is not part of the curriculum at British universities, where argument is sometimes taught in Critical Thinking courses. But Mitchell and Riddle (2004, p. 27) say that arguments can't be modelled and moved from one situation to another because the "argumentative essay" genre and the way people argue are very discipline-specific and should be taught by "common teaching staff" (Mitchell & Riddle, 2004: p.18). Davies (2008), on the other hand, wants to teach argument through syllogisms and says that you can learn how to make logical inferences outside of the field.

Google Docs is one of Google's tools for learning. It is a free platform for both teachers and students. Through a link, this app lets many small teams or pairs access and change each document right away. The teachers can give quick feedback by making comments and making changes as needed. After the professors post their comments, the students can go back and look at them.

Learners can also look at the work of other groups and the feedback they got, which may help them make their own work better. Google Docs is thought to make it easier for students to work together in real time than programmes like Microsoft Word. Also, Google Docs is a full-featured word processor, which is better than CryptPad, which only lets you edit text and does some other things. So, teachers and students can work together to get their work done even if they are in different places at the same time and can't meet face-to-face (Nguyen & Nguyen, 2025).

This experimental study aims to investigate the effectiveness of using Google Docs in enhancing the writing of argumentative essays among engineering students. Specifically, the study seeks to examine the relationship between the use of Google Docs and improvements in key components of argumentative writing, as observed from pre-test to post-test results. These components include the clarity and strength of claims, the development of counter-claims, the reasoning provided to support arguments, and the use of evidence to substantiate points.

The study is guided by research questions that explore whether there is a significant relationship between Google Docs usage and effectiveness in each of these elements, thereby providing insights into the tool's potential as a collaborative writing platform in the academic context.

2. Literature Review

Writing an Argumentative Essay

It can be hard to get a good idea of how well someone can communicate through text, in part because the context, audience, and purpose of writing tasks vary so much (National Commission on Writing, 2004; Allen, Snow, & McNamara, 2014, 2016). Argumentative writing can be hard for developing writers because they must keep track of a lot of different goals at once. For example, they have to meet the rhetorical needs of the task, address the points of view of the "other side," and use the right criteria to judge their own arguments and evidence (Ferretti & Fan, 2016).

Claim Component

Many engineering students have difficulty properly creating claim statements that are clear and succinct in their argumentative essays, which inhibits their ability to deliver the information they seek to transmit compellingly. This problem brings into question the overall quality as well as the significance of their written output (Kostoulas, 2019).

Counter-Claim Component

Argumentative essays represent substantial obstacles for engineering students, resulting in a lack of full and balanced arguments in their writing. These issues include the successful inclusion of counterclaims and the effective response to those claims. This restriction makes it more difficult for them to conduct a critical analysis of competing points of view, which in turn reduces the overall persuasive power of their articles (Wang, 2018).

Using Google Docs

Several studies have looked at how computers and virtual tools can be used to help higher education students improve their argumentative skills. Even though the use of technology in education has grown in recent years, studies show that technology by itself doesn't change how teaching and learning happen (European Commission, 2013). Boscolo, Arfé and Quarisa (2007), Braasch et al. (2013), De La Paz and Felton (2010) & Nussbaum (2008) have found that guided practice with feedback helps improve writing and argumentation skills.

Students and teachers are expected to have a very high level of interaction when handling argumentative essays. Hence, the chosen communication platform should be able to support this level of interaction. Google Docs are well-known features of Google platforms, and they have been used and proven to be a probable interactive environment for students and teachers alike. Therefore, engineering students would always wish to have their argumentative essays written in Google Docs so that they can easily interact and give their views on the topic of discussion. The interaction between the lecturer and students while handling their essays is one issue that has made Google Docs a very powerful feature of Google. While writing argumentative essays, getting feedback is very necessary, and it should be determined if Google Docs is a very effective platform for engineering students to write their argumentative essays (Sari & Oktaviani, 2021). Therefore, the study aims to identify the effectiveness of Google Docs as a platform where engineering students can write their argumentative essays.

Structural Elements

When it comes to successfully arranging their argumentative essays, many engineering students find it difficult to make efficient use of the structural components that are accessible in Google Docs. Because of this restriction, they are unable to produce written work that is well-structured and cohesive, which may cause them to have difficulty communicating their thoughts in a manner that is logical and well-organized (Kim & Nam, 2019)

Start and Index

When it comes to beginning their argumentative essays and navigating their way through them, engineering students sometimes have issues since they are not aware of or are not familiar with the start and index tools

that are available in Google Docs. Because of this difficulty, they experience a loss of both time and productivity, which impairs their capacity to manage and access the many components of their written work in an effective manner (Liu & Zhan, 2018).

3. Research Methodology

This study employed a quasi-experimental methodology. It utilised a pre-test, treatment, and post-test design for the experimental and control groups. Before administering the intervention in both classes, the teacher administered a writing pre-test to determine the students' past achievement in writing. The experimental group was then treated for six weeks using Google Docs to increase writing abilities, while the control group was given common traditional lectures. The teacher then administered a post-test to determine the pupils' argumentative essay writing proficiency. The data are collected from a sample of 100 students who took the LSP404- Technical and Engineering English course in Universiti Sains Malaysia. The individuals who took part were split into two groups: the control group and the experimental group. The sample size is chosen based on Krejcie & Morgan's (1970) table, in which the total population of students taking LSP404 for the semester is 150, so 100 students as the sample is a suitable.

In this study, the dependent variable is the effectiveness in writing argumentative essays among engineering students, while the independent variable is the usage of Google Docs as a tool for writing argumentative essays. The research aims to explore how the integration of Google Docs influences students' ability to construct effective argumentative texts, focusing on elements such as claims, counter-claims, reasoning, and evidence.

Instruments

Pre-Test and Post-Tests

The writing test is chosen in the form of an argumentative essay because it is the most suitable form to test students' skills as a whole. An argumentative essay is also used as the final exam question for the LSP404-Technical and Engineering English course offered by the School of Languages, Literacies & Translation, USM, which is compulsory to be taken by engineering students. The essay questions are vetted by senior teachers and lecturers before being approved by the course coordinator of the LSP404- Technical and Engineering English course from the School of Languages, Literacies and Translation, USM. The rubric of the writing test is also taken from the one prepared by the School of Languages, Literacies and Translation, USM, in which the maximum score for argumentative essay writing is 15. The rubric, also known as the writing band scale, is included in the appendices.

Survey

The questionnaire which is adapted from Khalil (2018) and Nasrollahi (2024) is designed to assess participants' preferences, perceptions, and experiences regarding the components of argumentative essay writing (claim, counter-claim, reason, evidence) and the features of Google Docs (structural elements, start and index, paragraph structure, text runs) in the teaching and learning context. The responses obtained from the questionnaire will be analyzed using statistical techniques to identify patterns and factor strength within the data.

Pilot Study

For the pilot study, 30 students' results are taken during their pre-test and post-test, where 15 of them belong to the control group and another 15 are from the experimental group. The students are also given a questionnaire, and the reliability of the items is tested to determine the validity of the items in the questionnaire.

Survey Reliability Test

Table 1: reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.935	.942	20

The Cronbach's Alpha coefficient of .935 (p > 0.8) is considered high, suggesting strong internal consistency among the items in the questionnaire.

4. Results

Confirmatory Factor Analysis

Table 2: Confirmatory factor analysis

Communalities		
	Initial	**Extraction**
I agree that it is important to have a clear and concise claim statement in an argumentative essay.	1.000	.742
I believe a well-defined claim statement enhances the persuasiveness of an argumentative essay.	1.000	.861
In my opinion, a clear claim statement helps guide the organization and development of an argumentative essay.	1.000	.760
I agree that having counter-arguments strengthens the credibility of an argumentative essay.	1.000	.756
Believe the inclusion of counterclaims enhances the overall persuasiveness of an argumentative essay.	1.000	.804
I agree that logical reasoning plays a crucial role in developing strong arguments in an essay.	1.000	.767
I think well-reasoned arguments add depth and credibility to an argumentative essay.	1.000	.799
In my opinion, effective use of reasoning supports the overall persuasive impact of an argumentative essay.	1.000	.865
It is important to incorporate relevant and credible evidence in your argumentative essays.	1.000	.785
I believe supporting arguments with evidence makes an argumentative essay more convincing.	1.000	.876
I would use headings and subheadings in Google Docs to facilitate the organization of my argumentative essay.	1.000	.728
I feel that using formatting features like bullet points and numbering enhances the readability and structure of an argumentative essay.	1.000	.556
I enjoyed having the ability to start and access a document easily in Google Docs.	1.000	.728
I believe having an index or table of contents feature in Google Docs helps in quickly locating and referencing different sections of an argumentative essay.	1.000	.781
I agree that the start and index features in Google Docs contribute to better management of an argumentative essay.	1.000	.887
I feel comfortable using the formatting options for paragraph indentation and spacing in Google Docs to write an argumentative essay.	1.000	.744
I feel that utilizing proper paragraph breaks in Google Docs enhances the readability and flow of an argumentative essay.	1.000	.773
I am comfortable utilizing different text runs in Google Docs (e.g., font size, font style) to write an argumentative essay.	1.000	.747
I like the ability to manipulate and modify text runs (e.g., bold, italics, underline) in Google Docs.	1.000	.884
I agree that text run features in Google Docs contribute to the overall clarity and visual appeal of an argumentative essay.	1.000	.777

Extraction Method: Principal Component Analysis.

All the extraction values are>0.5, which confirms that all the components in the factors are understood by the students. The factors are being divided into teaching Google Docs features and the usability of Google Docs by the students. This shows that the intervention using Google Docs is successful.

Control Group Normality Result

Table 3: Tests of normality for the control group

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.084	50	.200*	.967	50	.176
Post-test1	.096	50	.200*	.967	50	.171
Post-test2	.103	50	.200*	.965	50	.138

*.This is a lower bound of the true significance. a.Lilliefors Significance Correction

Based on these results, the data for the Pre-test is .200 (p > 0.05), Post-test 1 is .200 (p > 0.05), and Post-test 2 is .200 (p > 0.05), thus the variables approximate a normal distribution.

Experimental Group Normality Result

Table 4: Tests of normality for the experimental group

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.114	50	.120*	.948	50	.027
Post-test1	.119	50	.073*	.945	50	.022
Post-test2	.103	50	.200*	.947	50	.025

*.This is a lower bound of the true significance. a.Lilliefors Significance Correction

Based on these results, the data for the pre-test is .120 (p > 0.05), post-test 1 is .073 (p > 0.05), and post-test 2 is .200 (p > 0.05), thus the variables approximate a normal distribution.

Pre-Test

Table 5: Pre-Test

Group Statistics					
	Student	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Pretest	Control group	50	7.904	.9300	.1315
	Experimental group	50	7.670	1.1048	.1562

Table 6: Independent samples test

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-sided p	Mean Difference	Std. Error Difference	Lower	Upper
Pretest	Equal	2.071	.153	1.146	98	.127	.255	.2340	.2042	-.1713	.6393

From the table above, it is seen that the significance value is .225 (p > .05), thus meaning that for the pre-test, there is no significant difference in the mean score of the control and experimental group. This is aligned with the fact that the students are from the same level of proficiency group before the intervention is applied.

Post Test 1

Table 8: Post-Test 1

Group Statistics					
	Student	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Pretest	Control group	50	8.300	.9207	.1302
	Experimental group	50	8.750	1.1704	.1655

Table 9: Independent Samples Test

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-sided p	Mean Difference	Std. Error Difference	Lower	Upper
Pretest	Equal variances assumed	3.797	.054	-2.137	98	.018	.035	-.4500	.2106	-.8679	-.0321
	Equal variances not assumed			-2.137	92.85	.018	.035	-.4500	.2106	-.8682	-.318

For post-test 1, the significance value is .035 ($p < .05$), so it means that by post-test 1, there is already a significant difference between the mean marks of the control and experimental group at this time.

POST TEST 2

Table 10: post-test 2

Group Statistics					
	Student	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Pretest	Control group	50	7.978	.9241	.1307
	Experimental group	50	9.830	1.2722	.1799

Table 11: Independent Samples Test 2

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-sided p	Mean Difference	Std. Error Difference	Lower	Upper
Pretest	Equal variances assumed	5.327	.023	-8.328	98	<.001	<.001	-1.8520	.2224	-2.2933	-1.4107
	Equal variances not assumed			-8.328	89.449	<.001	<.001	-1.8520	.2224	-2.2938	-1.4102

For post-test 2, the significance value is < .001 ($p < .05$), which shows a significant difference in the mean marks of the control and experimental groups in the end. The mean marks gap is quite big, in which it is of 7.98 for the control group, while it is 9.83 for the experimental group. It is to be noted that the highest mark for the test is 15.

5. Conclusion

Through the delivery of pre-tests, post-tests 1 and 2, as well as a questionnaire, we have obtained significant information on the influence of Google Docs on the argumentative writing abilities of students. Our findings show several significant insights.

First, the incorporation of Google Docs as a digital writing tool has proven to improve the writing performance of pupils. Analysis of pre- and post-test scores reveals a considerable increase in argumentative essay writing skills after the use of Google Docs. This indicates that Google Docs' collaborative capabilities, formatting options, and simplicity of document management have led to improved writing processes and outcomes.

Moreover, our research identifies the precise aspects of argumentative essay writing that have improved significantly with the usage of Google Docs. Participants' development of clear and succinct arguments, effective counterarguments, logical thinking, and the inclusion of pertinent evidence have all exhibited substantial growth.

In conclusion, this study illuminates the good influence of Google Docs on engineering students' argumentative essay writing. The study has proved the usefulness of introducing technology into writing training and offered educators and academics helpful ideas. In the realm of argumentative essay writing, we anticipate that our research will add to continuing efforts to improve writing abilities and generate meaningful learning experiences for students.

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In An Era Where Travellers are Spoiled for Choice, What Truly Keeps Them Coming Back to the Same Airline

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Abstract: The airline industry is intensely competitive, with companies constantly striving to stand out through their service quality, hospitality, and technological advancements. In this context, particularly within service-based industries such as airlines, fostering long-term customer loyalty is crucial for achieving sustainable success. This research focuses on understanding how service quality and pricing influence customer satisfaction, which in turn drives loyalty toward AirAsia Malaysia Berhad. Using the SERVQUAL, which includes five dimensions: tangibles, reliability, responsiveness, assurance, and empathy, this study examines the extent to which these factors, along with price, contribute to repeated customer preference and commitment. This study adopted a probability sampling approach, specifically using the simple random sampling technique. A total of 250 respondents were selected at random from across Malaysia using a Google Form survey distributed online. Both objectives, service quality (reliability) and price, are accepted for this study. However, other independent variables (tangibility, responsiveness, empathy, and assurance) do not significantly influence satisfaction. The insights gained will help AirAsia strengthen its ability to retain customers by better aligning its services and pricing with customer expectations, fostering deeper brand quality.

Keywords: *Flights, SERVQUAL, Price, Satisfaction, Traveller*

1. Introduction and Background

In the era of intense competition that exists in the aviation sector today, frequent travelers play a crucial part in determining the success and longevity of airline service providers. These travelers, whether they are business professionals, people looking for a vacation, or those traveling internationally for work, make a major contribution to the overall recurrent income of an airline. Regular travelers are considered high-value consumers because their satisfaction may result in long-term profitability, support for the brand, and distinctiveness from other competitors. Frequent flyers are more than simply passengers. The airline industry is well-known for its service, which demands that businesses in the industry ensure continued happiness and satisfaction from their customers. Even if the cost of utilizing flight services is higher when compared to the cost of other modes of transportation, people still choose airlines as their primary mode of travel, whether they are going a short or long distance, since it is a quicker method to travel (Revfine, 2021).

A complex interaction of elements, including consistent service quality, cost, convenience, safety, flight schedules, customer experience, and technical efficiency, is frequently the foundation upon which loyalty among repeat passengers is constructed. When a traveler consistently obtains flights that are on time, interactions with personnel who are pleasant, booking procedures that are smooth, and tailored services, trust and happiness are strengthened. The happiness that a traveler experiences eventually develops into an emotional connection and a preference for a certain brand, which compels them to choose the same airline over others on several occasions, even when there are other options available.

In its most fundamental form, the relationship between frequent travelers and airline carriers may be described as a mutually beneficial one. While passengers look for dependability, comfort, and value, airlines work hard to fulfill and surpass those expectations to keep their most precious customer base. One of the most important differentiators that may ensure long-term success in a market that is becoming more crowded is the ability to comprehend and successfully manage this dynamic aspect.

2. Literature Review

The airline sector is continuously undergoing change, which is being pushed by the development of new

technologies, shifting tastes among customers, and elevated levels of competition. The airline industry faces numerous development challenges related to cultivating customer loyalty and ensuring satisfaction. The successful implementation of strategies focused on service quality, customer engagement, and complaint handling is critical in achieving high levels of customer satisfaction.

In this fast-paced climate, airlines are required to not only create creative tactics to improve their services but also actively interact with passengers to establish long-lasting relationships by establishing meaningful connections. Airline companies are able to personalize their offers, enhance the customer experience, and create loyalty when they have a thorough understanding of the requirements, preferences, and expectations of their passengers. Airlines are able to maintain their competitive edge and continue to prosper in the global aviation scene by monitoring the feelings of passengers and adjusting their services to meet their requirements. This is especially important in a sector where customer retention is essential for ongoing development.

Challenges such as economic fluctuations, evolving customer expectations, and increasing competition exacerbate the difficulties airlines face in retaining customers. During crises, such as the COVID-19 pandemic, the importance of effective complaint resolution mechanisms becomes even more pronounced, as customers expect prompt responses to grievances (Sun et al., 2022; Ravishankar & Christopher, 2023). Airlines that manage to address complaints efficiently not only enhance customer satisfaction but also foster loyalty, as customers are more likely to remain loyal to brands that listen and respond to their concerns (Ahmed et al., 2020; Chonsalasin et al., 2020).

The Standard of Service Quality Within the Airline Industry: The airline industry's ability to maintain high service quality is critical for customer satisfaction. Service quality encompasses various dimensions, including reliability, responsiveness, assurance, empathy, and tangibles, which together create the overall customer experience during air travel (Kılıç & Enginkaya, 2024; Hassan & Salem, 2021). A grounded understanding of these attributes not only helps airlines meet customer expectations but also positions them competitively in a market characterized by intense rivalry.

Service quality in the airline industry can be understood through several dimensions, prominently including safety, reliability, and customer service. Research indicates that safety is frequently cited as a critical concern for passengers when choosing an airline (Riorini & Widayati, 2018). The emphasis on safety provides a foundation for customer satisfaction, as satisfied customers are more likely to develop brand loyalty, particularly in the context of low-cost carriers that face stiff competition (Rady, 2018).

Responsiveness, defined as the ability of airline staff to assist passengers during crises, plays an essential role in customer satisfaction, particularly in situations like flight delays. Kılıç and Enginkaya stated that responsive customer patronage, characterized by well-trained staff and effective communication form, will alleviate customer satisfaction and instill trust in the airline (Kılıç & Enginkaya, 2024). The tangible element of service quality also holds consequences. Aspects such as the cleanliness of the aircraft, the professionalism of the staff, and the overall appearance of the airline contribute to passengers' satisfaction levels. Research exploring customer experiences in Vietnamese airlines discovered that tangible aspects significantly correlate with both customer satisfaction, emphasizing the need for airlines to enhance their service quality in this area (Hoang et al., 2021). Additionally, Prayag et al.(2020) support this notion by demonstrating that tangible service qualities significantly influence customer satisfaction (Rahmat et al., 2023).

Service quality serves as a keystone for customer satisfaction in the airline division, fundamentally impacting customer satisfaction. Research shows a straight positive correlation between perceived service quality and customer satisfaction (Ahmed et al., 2020; Rahim, 2016; Ma, 2023). Airlines that maintain high service standards in various aspects—such as timekeeping, onboard service, and customer support—are more likely to see repeat business from travelers (Chonsalasin et al., 2020; Chanpariyavatevong et al., 2021). For example, studies indicate that passengers who understand high service quality are inclined to maintain their support over time, leading to a reliable customer base that boosts cost-effectiveness and market share (Ravishankar, 2023; Chanarpas, 2022).

H1: Service Quality has a consequential effect on Customer Satisfaction.

How Price Shapes Customer Satisfaction: The relationship between pricing strategies and customer satisfaction in the airline industry is an important topic that integrates various scopes, including service quality, customer hopes, and price sensitivity. Study indicates that ticket pricing pointedly influences customer satisfaction, as customers actively seek value in their travel experiences.

Pricing is one of the most serious elements of customer satisfaction in airlines. Studies reveal that ticket prices are closely tied to customers' purchasing decisions and overall satisfaction with services. Iqbal et al. discuss how price sensitivity moderates the relationship between service quality and customer satisfaction, emphasizing the necessity for airlines to strategically exchange the needs of price-sensitive travelers to enhance loyalty and satisfaction (Iqbal et al., 2023). Furthermore, Sagala provides evidence that price, together with quality perception and corporate reputation, strongly impacts purchasing decisions related to airline services, demonstrating a significant correlation between these factors and customer satisfaction (Sagala, 2019).

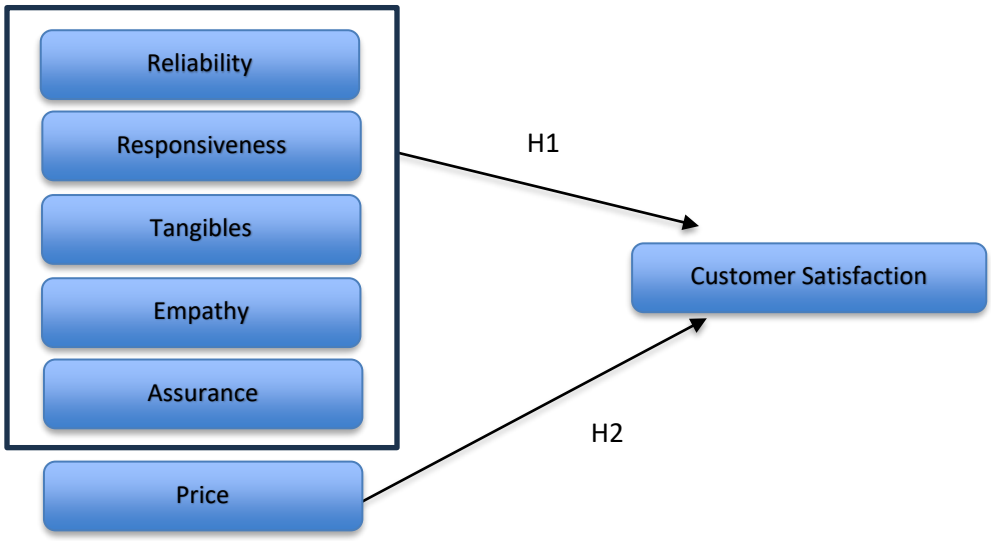
Moreover, the thought of customer satisfaction in the airline context is often associated with perceptions of value for money, with price equality identified as another critical determinant (Pahrudin et al., 2023). Customers weigh service quality against the costs incurred; thus, airlines must balance competitive pricing while offering satisfactory service experiences to retain passengers (Pahrudin et al., 2023; Thapa et al., 2020).

Another viewpoint is presented by Fadli and Rachmawati, who show that both ticket prices and service quality positively influence customer satisfaction. Their findings suggest that satisfactory service quality can sometimes moderate negative sentiments arising from higher ticket prices, highlighting a complex relationship between these variables (Fadli & Rachmawati, 2023). Similarly, Hoang et al. stress that external factors, such as unstable oil prices, compel airlines to adjust ticket prices, which can later affect customer satisfaction (Hoang et al., 2021). Moreover, understanding how customer perceptions of equality in pricing can impact satisfaction levels is vital. Shaliza et al. highlight that fair pricing, combined with high service quality, directly correlates to discriminating customer satisfaction levels (Shaliza et al., 2024). Concurrently, research conducted by Zhang et al. indicates that brand image and perceived quality pointedly affect customer satisfaction, suggesting that effective management of pricing and quality perceptions is vital for airlines aiming to enhance customer satisfaction (Zhang et al., 2023).

Furthermore, the competitive landscape of the airline industry necessitates that airlines engage with both pricing considerations and the all-embracing quality of service offered. The SERVQUAL model, examined by Wilfred et al., illustrates that service quality and pricing play important roles in determining customer satisfaction, especially in a competitive market setting (Wilfred et al., 2024). Their conclusions align with findings from other studies demonstrating a reliable link between service quality, price fairness, and customer retention (Pahrudin et al., 2023).
H2 Price has a significant influence on Customer Satisfaction.

Conceptual Framework: The study focuses on the ways in which customer satisfaction is affected by aspects such as service quality and pricing when it comes to picking their preferred aircraft for travel. This conceptual framework is distinct from the modified conceptual outline of research that was carried out by Hutagaol and Erdiansyah (2020). This difference is based on the data collection and demographic measurement that was completed.

Figure 1: Adapted Conceptual Framework of Research



3. Research Methodology

This study accepted a probability sampling approach, precisely using the simple random sampling technique. A total of 250 respondents were designated at random from across Malaysia using a Google Form survey distributed online. The mark population consisted of frequent travelers of AirAsia Malaysia Berhad, and respondents were chosen without bias to guarantee each individual had an equal chance of being selected. The sample size of 250 was selected to increase accuracy and minimize sampling error. To enhance the representativeness of the figures, the sample included a wide range of demographic backgrounds, such as different age groups, gender, income levels, and education levels. This approach was believed appropriate to reflect the variety of AirAsia passengers and to ensure the results are generalizable to the broader population of Malaysian air travelers. Thus, the researcher definite to choose a variety of age levels to be tested in this study.

The sample size will involve a least 250 respondents, comprising AirAsia travelers, based on the circulation of a questionnaire containing 5 questions for each variable, multiplied by 5, which signifies the number of respondents who will receive and complete the questionnaire. A widely cited recommendation by Roscoe (1975) recommends that for multivariate analysis, including multiple regression, the lowest sample size should be at least ten times the number of variables calculated (Josephine et al., 2024). This is supported by a study that indicates that if four predictor variables are included, a minimum of 40 respondents is recommended to maintain statistical reliability. Additionally, Chen et al. highlight that larger samples enhance the power of statistical tests used, ensuring more robust outcomes (Chen et al., 2014).

Thus, for this study minimum requirement for respondents for multiple regressions should be at least five times more cases than the IVs (Independent variables). The total number of IVs will comprise a minimum of 250 data points. Consequently, this criterion is fulfilled. The questionnaires will be distributed randomly inside the KLIA2 area and Putrajaya.

The foundation of primary data is the survey questionnaire distributed to the respondents. The respondents completed this questionnaire. The data was collected via a questionnaire distributed to AirAsia passengers in Malaysia. The researchers employed a mall intercept strategy to distribute the questionnaire to travelers in the departure and arrival halls of the LCCT. The researchers will disseminate the surveys via Google Forms by email, and passengers will respond to the questionnaires using the forms.

4. Results

Demographic Frequency Data: The profile of the respondents was analyzed in terms of frequency and percentage, as presented in Table 1. There were roughly 162 male respondents and 88 female respondents.

Male respondents constituted 64.7 percent, while female respondents accounted for 35.3 percent.

There are four age categories: individuals aged 18 to 25, those aged 26 to 35, those aged 36 to 45, and those above 46. The results reveal that 112 respondents were aged 18 to 25, 16 respondents were aged 26 to 35, 7 respondents were aged 36 to 45, and 3 respondents were aged 46 and above. The four age categories represented 46.0 percent, 44.8 percent, 6.4 percent, and 2.8 percent of the respondents, respectively.

There exist four distinct racial categories: Malay, Chinese, Indian, and others. There were 179 Malay replies, 55 Chinese, 6 Indian, and 10 categorized as others. The four categories accounted for 71.8 percent, 21.8 percent, 2.4 percent, and 4.0 percent of the total respondents, respectively.

There exist three tiers of education: secondary education (SRP / SPM / STPM / A-Level), tertiary education (Diploma / Bachelor / Master / PhD), and additional categories. The findings reveal that 25 respondents possessed Secondary Education (SRP / SPM / STPM / A-Level), constituting 10 percent of the total, while 222 respondents held Tertiary Education (Diploma / Bachelor / Master / PhD), accounting for 88.8 percent. Additionally, 3 respondents had alternative educational qualifications, representing 1.2 percent of the sample.

There exist five employment classifications: student, government sector, private sector, retiree, and unemployed. A total of 182 respondents were surveyed, comprising 44.9 percent students, 34 respondents or 8.4 percent public sector employees, 153 respondents or 37.8 percent private sector employees, and two retirees, accounting for 0.5 percent, and 34 unemployed individuals, also representing 8.4 percent.

There are five income brackets: individuals earning less than RM1200, those earning between RM1201 and RM3000, those earning between RM3001 and RM5000, and those earning between RM5001 and RM7000. The findings reveal that 39 respondents, constituting 15.6 percent, reported an income below RM1200; 130 respondents, representing 52 percent, had an income ranging from RM1201 to RM3000; 72 respondents, or 28.8 percent, earned between RM3001 and RM5000; 9 respondents, equating to 3.6 percent, received an income between RM5001 and RM7000; and no respondents, or 0 percent, reported an income exceeding RM7001.

Regarding the utilization of Air Asia as the airline service provider, there exist two classifications: Yes or No. The results indicate that 248 respondents utilized Air Asia as their airline service provider, constituting 99.2 percent of the responses, while 2 respondents reported never using Air Asia, or 0.8 percent of the results. The other airlines favored by the respondents are as follows. The results indicate that 55 respondents utilize Malaysia Airlines, accounting for 22 percent; 9 respondents use Malindo/Batik Air, representing 3.6 percent; 8 respondents prefer Firefly, comprising 3.2 percent; and 178 respondents, or 71.2 percent, utilize other airline services.

Finally, regarding the frequency of respondents' travel with Air Asia over the past 12 months, there are three categories: 1-3 times, 4-6 times, and 6 times or more. The results indicate that 199 respondents utilized Air Asia services 1-3 times in the past 12 months, constituting 79.9 percent of the total respondents. Additionally, 44 respondents used Air Asia services between 3-6 times, representing 17.7 percent, while 6 respondents availed themselves of Air Asia services 6 times or more, accounting for 2.4 percent.

Table 1: Demographic Frequency Data

Frequency Distribution **Demographic**	**Categories**	**Frequency**	**Percentage (%)**
Gender	Male	162	64.7
	Female	88	35.3
	Total	**250**	**100**
Age	18 – 25 Years Old	115	46.0
	26 – 35 Years Old	112	44.8
	36 – 45 Years Old	16	06.4
	> 46 Years Old	7	02.8
	Total	**250**	**100**

Race	Malay	179	71.8
	Chinese	55	21.8
	Indian	6	02.4
	Others	10	04.0
	Total	**250**	**100**
Education Level	Secondary Education -	25	10
	(SRP / SPM / STPM/ A-	222	88.8
	Level)	3	1.2
	Tertiary Education -	250	100
	(Diploma / Bachelor /		
	Master / PhD)		
	Others		
	Total		
Employment Status	Student	48	19.2
	Government Sector	123	49.2
	Private Sector	72	28.8
	Retiree	3	01.2
	Unemployed	4	01.6
	Total	250	100
Income	Below RM1200	39	15.6
	RM1201 – RM3000	130	52.0
	RM3001 – RM5000	72	28.8
	RM5001 – RM7000	9	03.6
	Above RM7001	0	0
	Total	250	100
Have you ever used Air	Yes	250	100
Asia as the airline	No	0	0
service provider?	Total	250	100
Based on your answer	Malaysia Airlines	55	22.0
above, which airline	Malindo/Batik Air	9	03.6
service do you prefer	Firefly	8	03.2
the most?	Others	178	71.2
	Total	250	100
How often did you	1-3 times	199	79.9
travel using Air Asia in	4-6 times	44	17.7
the past 12 months?	6 times or above	6	02.4
	Total	250	100

Reliability Test: In comparison with the analyzed reliability statistics that were provided (Table 2), the findings present a contrasting perspective. Using Cronbach's Alpha, it is noticeable that the tangible factor is (α = 0.950), reliability (α = 0.945), responsiveness (α = 0.934), empathy (α = 0.942), assurance (α = 0.946), and price (α = 0.913). This further indicates that the reliability is exceptional. These findings confirm that the measurement scales are highly reliable, offering a precise and credible assessment of the level of satisfaction.

Table 2: Reliability Test

	Total Item	Reliability (α)
Tangible	.950	5
Reliability	.945	5
Responsiveness	.934	5
Empathy	.942	5
Assurance	.946	5
Price	.913	5
Satisfaction	.934	5

Model Summary: According to the R value that is shown in Table 3, which is 0.956, perception and involvement together are responsible for 95.6% of the variation in satisfaction. Despite the fact that the adjusted R Square is somewhat lower than the original value of 0.913, it still illustrates the strong performance of the model while taking into account the number of predictors. These results draw attention to the enormous impact that perception and involvement have on the degrees of pleasure experienced by individuals, which in turn makes a major contribution to the total outcome. The remaining proportion, on the other hand, may be linked to external factors that were not investigated in this study. This highlights possible areas that might benefit from more research and investigation.

Table 3: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.956[a]	0.913	0.911	0.937	2.082

a.Predictors: (Constant), TOTAL_STF, TOTAL_TNG, TOTAL_ASSR, TOTAL_RLB, TOTAL_PRC, TOTAL_RSV, TOTAL_EMP
b.Dependent Variable: TOTAL_STF

Analysis of Variance (ANOVA and multiple comparisons) ANOVA's p-value=0 (F-Stat) in Table 4 indicates the independent variable can be used for variation of Satisfaction. R-square is 0.913, which shows that 91.3% of the satisfaction is affected by the five identified independent variables (Steel and Torrie et. al., 1960).

Table 4: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2240.448	7	320.064	364.551	0.000[b]
	Residual	212.468	242	0.878		
	Total	2452.916	249			

a.Dependent Variable: Satisfaction
b.Predictors: (Constant), Tangible, Assurance, Reliability, Price, Responsiveness, Empathy

Correlations: In this research, Satisfaction showed a positive correlation with r=0.949, which was significant at the 0.01 level. It was followed by Price (r=0.894), Assurance (r=0.875), Empathy (r=0.871), Reliability (r=0.871), Responsiveness (r=0.858), and Tangible (r=0.824), all of which had significant correlations at the 0.01 level. Thus, the findings indicate that there is a significant connection between customer satisfaction and all of the independent factors.

Table 5: Correlations

		Tangible	Reliability	Responsiveness	Empathy	Assurance	Price	Satisfaction	Loyalty
Tangible	Pearson Correlation	1	.844**	.864**	.811**	.828**	.829**	.836**	.824**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Reliability	Pearson Correlation	.844**	.844**	.844**	.844**	.844**	.844**	.844**	.844**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Responsiveness	Pearson Correlation	.864**	.864**	.864**	.864**	.864**	.864**	.864**	.864**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Empathy	Pearson Correlation	.811**	.811**	.811**	.811**	.811**	.811**	.811**	.811**

	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Assurance	Pearson Correlation	.828**	.828**	.828**	.828**	.828**	.828**	.828**	.828**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Price	Pearson Correlation	.829**	.829**	.829**	.829**	.829**	.829**	.829**	.829**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250
Satisfaction	Pearson Correlation	.836**	.836**	.836**	.836**	.836**	.836**	.836**	.836**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	250	250	250	250	250	250	250	250

* Correlation is significant at the 0.05
** Correlation is significant at the 0.01 level (2-tailed).

Coefficients: The value of Tangible is 0.814, which is more than the p-value of 0.05, indicating that it is significant. From this, it is possible to conclude that there is no major connection between the tangible and the satisfaction of the client. A value of 0.007, which is below the p-value of 0.05, is considered to be a significant value of reliability. The conclusion that can be drawn from this is that there is a considerable link between reliability and the satisfaction of customers. A value of 0.323, which is more than the p-value of 0.05, is considered to be a significant value of responsiveness. It is possible to conclude that there is no significant connection between responsiveness and the level of satisfaction experienced by customers. The value of empathy is 0.779, which is more than the p-value of 0.05, indicating that it is significant. It is possible to conclude that there is no substantial connection between empathy and the level of satisfaction experienced by customers. The value of Assurance is 0.056, which is more than the p-value of 0.05, indicating that it is significant. It is possible to conclude that there is no substantial connection between assurance and the level of satisfaction experienced by customers. Price has a significant value of 0.002, which is lower than the p-value of 0.05; hence, it is significant. This leads one to the conclusion that there is a considerable link between pricing and the level of satisfaction experienced by customers.

Table 6: Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	-0.335	0.503		-0.665	0.507		
	Tangible	0.012	0.049	0.010	0.235	0.814	0.203	4.924
	Reliability	0.134	0.050	0.143	2.706	0.007	0.128	7.842
	Responsiveness	-0.053	0.054	-0.051	-0.990	0.323	0.133	7.541
	Empathy	-0.014	0.051	-0.015	-0.281	0.779	0.119	8.379
	Assurance	0.104	0.054	0.098	1.924	0.056	0.138	7.258
	Price	0.168	0.053	0.154	3.155	0.002	0.150	6.683
	Satisfaction	0.661	0.058	0.647	11.340	0.000	0.110	9.105

Discussion

The correlation between dependability and customer happiness is a crucial focus in service quality research. Empirical evidence indicates that reliability, an element of service quality, profoundly affects customer happiness. The findings of H1 (To Investigate the Impact of Service Quality Towards Customer's Satisfaction), reliability is compatible with the study by Tindage et al. (2023) stated that service quality, including reliability,

has a quantifiable and positive correlation with customer satisfaction, emphasizing the necessity for organizations to enhance service performance. The first hypothesis, H1, which was accepted with a mean score of 4.25, investigated the connection between the quality of service provided and the level of satisfaction experienced by customers. The impact of reliability in service quality on customer satisfaction is a critical area of research within the field of service management. Reliability is recognized as one of the fundamental dimensions of service quality, encompassing the capability of a service provider to deliver promised services dependably and accurately. Many studies have recognized a direct association between reliability and customer satisfaction across numerous service industries, suggesting that higher reliability naturally leads to improved levels of customer contentment and loyalty.

Research specifies that reliability significantly affects customer perceptions and satisfaction. For example, Woldemichael emphasizes that reliability plays a vital role in enhancing customer satisfaction, specifically within the Ethiopian Electric Utility framework, confirming that customers respond positively to reliable service distribution (Woldemichael, 2024). Likewise, Shrestha's study demonstrates that reliability is the strongest dimension of service quality impacting customer satisfaction, highlighting its significance as a factor in various service sectors (Shrestha, 2021). This idea is supported further by Muchimba and Sinkala, who recognize reliability as one of the principal attributes that significantly moves customer satisfaction among bank customers in Zambia (Muchimba & Sinkala, 2024). Moreover, Lee et al. back the statement that perceived service quality, through its reliability dimension, leads to better customer satisfaction, signifying that the perception of reliability acts as an antecedent to enhancing customer satisfaction (Lee et al., 2000). Similarly, Narteh found a positive association between various hypotheses of service quality, including reliability, and customer satisfaction in the background of retail banking in Ghana (Narteh, 2018). This correlation highlights the necessity for service providers to rank reliability to support consumer satisfaction.

The consequences extend beyond merely enhancing customer satisfaction; reliable service also affects customer retention and recommendation intentions. Park et al. highlight that service quality surfaces, such as reliability, not only directly affect customer satisfaction but also outline upcoming consumer behaviors, including the likelihood of recommending the service to others (Park et al., 2021). Thus, reliability's contribution to enhancing service quality cannot be overstated, ensuring the sustenance of customer relationships. The necessity for strategic attention towards enhancing reliability is underscored in a study by Nguyen et al., which reveals that service capacity and tangibility, in addition to reliability, significantly correlate with customer satisfaction (Nguyen et al., 2020). This illustrates that while reliability is paramount, it exists within a broader tapestry of service quality dimensions, all contributing to customer perceptions of satisfaction.

The findings of H2 (To Investigate the Impact of Price on Air Asia Customers' Satisfaction) show that Price has a positive effect on Customer Satisfaction. On account of the fact that the price was favorable, with a Mean of 4.39, it is predicted that this tool will be used. AirAsia has a significant association between prices and service. This is because there was a significant association between pricing strategy and the level of satisfaction experienced by AirAsia's customers. The hypothesis H2 was tested to see whether or not there is a correlation between price and satisfaction, and it was found to be true. Consequently, this demonstrates that people choose AirAsia over other airlines because of the reduced pricing that they provide. Nevertheless, respondents had greater expectations for the cost, which was a key factor in their choice to choose AirAsia as the service provider that would enable them to achieve a better level of satisfaction.

An important frame of research designates a direct correlation between price and customer satisfaction. For example, in the context of India's airline sector, the association between price and customer satisfaction was found to be statistically significant ($\beta = 0.425$, $p = 0.000$), signifying that competitive pricing positively affects customer satisfaction levels, eventually influencing airline attractiveness (Wilfred et al., 2024). Likewise, another study established that customer satisfaction is crucial in inducing repurchase purposes, emphasizing the need for airlines to maintain a balance between service quality and pricing to remember customers (Setiawan et al., 2020). Such findings resonate in industries rassling with similar challenges, where price sensitivity plays a perilous role as well (Iqbal et al., 2023). Also, the interaction of service quality with pricing tools underlines its importance in shaping customer perceptions. Airlines that deliver excellent service quality not only boost customer satisfaction but can also validate higher price points. A study designated that ideal

service quality is a deciding factor for customer satisfaction, even in the face of unstable prices due to external economic burdens such as rising oil costs (Hoang et al., 2021). This highlights the dual role of service quality alongside pricing strategies in inducing customer satisfaction (Riorini & Widayati, 2018; Pahrudin et al., 2023). Thus, customers might be willing to pay first-class fares for improved service involvement, highlighting the interaction between perceived value and satisfaction.

Furthermore, the insight of price equality directly impacts customer satisfaction in the airline sector (Setiawan et al., 2020; Artik & Duygun, 2022). When customers trust that prices reflect fair value for services reduced, their overall satisfaction tends to increase. This trust strengthens repeat business, with satisfied customers often acting as brand supporters, further influencing potential customers' decisions (Bilal, 2023). Additionally, the study by Khuzaifah et al. provides insights into how perceived service quality mediates customer satisfaction and purchasing behaviors, highlighting that while price may not directly influence repurchase intentions, it indeed mediates through customer satisfaction (Khuzaifah et al., 2023). Such dynamics complicate the relationship between price and customer satisfaction, suggesting that strategic pricing must be viewed through the lens of overall customer experience.

The independent variables of reliability and pricing exhibit substantial correlations with consumer satisfaction. The correlation coefficients for reliability ($r = .007$, $p < 0.01$), price ($r = .002$, $p < 0.01$), and satisfaction ($r = .00$, $p < 0.01$) are all statistically significant. The multiple regression analysis results suggest that the R-squared value of .913 signifies that 91.3% of the total variance in the dependent variable is accounted for by the independent variables, and the regression model is statistically significant. Consequently, the independent variables in this study (service quality, reliability, and pricing) greatly influence consumer satisfaction. However, other independent variables (tangibility, responsiveness, empathy, and assurance) do not significantly influence satisfaction.

5. Managerial Implications and Recommendations

Research Implications

Negative attitudes—such as AirAsia travelers staying loyal owing to fear of losing privileges or the high cost of switching providers—illustrate customer behavior. Future studies should explore both positive and negative factors on satisfaction and loyalty to better understand and reduce discontent. Additionally, this survey does not differentiate airline service providers. Future studies might examine provider use behaviors for a more targeted analysis. While the present study focuses on business-to-consumer interactions, studying business-to-business dynamics may broaden industry insights. Concerning the inconsistencies between the gender group (i.e., male and female) and customer experience, network operators must stage experiences positively to appeal to the customers' senses.

Theoretical Implications

The results of this research give a theoretical framework that is strengthened and expanded upon by the SERVQUAL model, which was first created by Parasuraman et al. (1988). This was accomplished by using the SERVQUAL model, which is a relatively inexpensive airline service provider. According to the findings of this study, the dimensions of service quality and pricing are important determinants of consumer happiness, which in turn has a substantial impact on customer loyalty. This study reinforces the SERVQUAL model's relevance by demonstrating that service quality dimensions—tangibles, reliability, responsiveness, assurance, and empathy—alongside price, play a crucial role in shaping customer satisfaction and loyalty within the low-cost airline sector. It extends the theoretical framework by highlighting the role of customer satisfaction and suggests that price should be considered a vital complement to service quality in understanding customer satisfaction, especially in price-sensitive industries.

Managerial Implications

Technology has helped AirAsia increase customer happiness and reliability. Affordable cost still drives consumer choices, but today's travelers are pickier about service dependability and value. High-quality service plans boost client happiness and help them understand AirAsia's value. Staying ahead in a competitive market requires this mindset. Few Malaysian airlines understand the value of strategic pricing, but AirAsia has concentrated on quantifiable service quality. However, focusing on intangibles like customer experience and

customer satisfaction might boost its competitiveness. AirAsia should use its physical and intangible assets now to improve dependability and stay ahead of the competition. Excellent customer service and a passenger-focused company approach will develop long-term connections and boost profits. AirAsia may become the top option for budget-conscious and reliable tourists by adopting this method.

Conclusion

The objective for the first hypothesis (To Investigate the Impact of Service Quality Towards Customer's Satisfaction) was not achieved, as there is no connection between the quality of service provided and the level of satisfaction experienced by customers, except for the reliability item. Consequently, the independent variables in this study (service quality, reliability, and pricing) greatly influence consumer satisfaction. However, other independent variables (tangibility, responsiveness, empathy, and assurance) do not significantly influence satisfaction. The objective of the second hypothesis (To Investigate the Impact of Price on Air Asia Customers' Satisfaction) shows that Price has a positive effect on Customer Satisfaction.

Since only specific dimensions of service quality, particularly reliability and pricing, were identified as significantly affecting customer satisfaction, further research should investigate the reasons behind the lack of significant impact from other service quality dimensions, including tangibility, responsiveness, empathy, and assurance.

Overall, the results of this study indicate that there is a significant course of action that should be taken in order to enhance the level of customer satisfaction seen in the airline industry. When it comes to ensuring that airline companies continue to provide a high level of pleasure to their passengers, the findings of the study are very pertinent for the corporate leadership to take into consideration. The researchers explain some ideas for future research and bring out some of the limits that this study has, all with the intention of extending the present knowledge of the topic area that this study focuses on.

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The Review of TOE Factors Influencing Sales Performance Among SMEs and Mediated By The Online Platform Adoption

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Abstract: Sales performance is important for companies to measure their current stability and ability to grow or sustain in the competitive market. In fact, for businesses to continue to face significant challenges in identifying the factors that would affect sales outcomes, technology will be a component of a growing presence. This research aims to explore these trends within retail sectors among Small and Medium-Sized Enterprises (SMEs) in Malaysia. This study uses the Technology-Organization-Environment (T-O-E) framework as a base model; meanwhile Attention-Based View (ABV) provides additional theoretical support. In this conceptual framework, sales performance is positioned as a dependent variable with online platform adoption serving as a mediating factor. Independent variables in this study are perceived compatibility, relative advantage, perceived cost, top management support, and government support, which these components derived from the T-O-E framework. Moreover, this research seeks to identify the technology adoption process and to boost sales performance through digital integration, and deliver practical insight that will be utilized. Quantitative research method applied in this research with a sample of 384 respondents, according to Krejcie and Morgan's sample size table and targeted specifically at retail sectors in Malaysia. SME Corp Malaysia, the Ministry of Entrepreneur Development and Cooperatives (MEDC) and Malaysia Digital Economy Corporation (MDEC) are government agencies sources of data for this paper. The end of this research seeks to emphasize the critical role of online platform adoption by enhancing sales performance and shedding light on the digital transformation of SMEs in Malaysia, thus offering strategic insights for key stakeholders.

Keywords*: Sales Performance, Small and Medium-sized Enterprises (SMEs), Online platforms adoption, Technology-Organization-Environment (T-O-E), Attention-Based View (ABV)*

1. Introduction and Background

One of the metrics that the corporation has measured to show how well its business is doing is sales performance. Sales performance is a crucial metric for assessing small and medium-sized businesses' (SMEs') competitiveness and economic impact. 97% of Malaysian enterprises are SMEs, according to The Star (2023). SMEs serve as the biggest contribution towards Malaysia's economy which significantly contributing towards employment and GDP in Malaysia. Additionally, as technology advances, the business environment is changing, with internet platforms serving as tools for companies looking to improve sales performance. Due to Malaysia's desire to play a major role in the global digital economy, SMEs in the country are unable to implement online platforms into their operations. According to Muzellec et al. (2015), online platforms are crucial, particularly in the age of Industry 4.0, since they give companies the means to reach new clients, grow their market, and achieve long-term viability. For SMEs to enhance sales performance, there are many opportunities, especially the advancement of digital technologies, specifically online platforms, which presents as a trend today. Research by Hanim Abu Bakar et al. (2023) finds that the majority of SME still acknowledge the benefits of implementing an online platform into their business, but SMEs face insufficient resources to adapt online platform. The adoption of online platforms among SME in Malaysia remains limited and inconsistent despite the growing recognition of digital technologies in business operations. Perceived high cost, lack of top management support, and limited awareness of government support incentives are barriers that face SMEs in adopting online platforms in SMEs (SME Corp, 2023). Moreover, by using the Technology-Organization-Environment (T-O-E) framework and interpreted through the Attention-Based View (ABV), this research systematically categorized these variables from these frameworks and theories. Impacts on sales performance among SMEs in Malaysia can be seen through this review systematically examines the literature review.

2. Sales Performance and Online Platforms Adoption in SMEs

Sales Performance: Sales performance in this research investigates how online platforms can influence sales

performance among SMEs in Malaysia. Several studies identify how this factor could affect sales performance. The importance of technology, work-related support, and strategic activities in determining sales for success are factor that could affect sales performance, according to Chawla et al. (2020). Over the past decades, the sales environment has undergone significant involved due to the advancement in technology, increased competition, and shifting consumer preferences. Chawla et al. (2020) suggest that organizational support and market dynamics have shaped sales performance than individual capabilities alone.

In business, sales performance has an impact that can generate revenue, customer satisfaction, and market competitiveness. By increasing revenue streams through strong sales performance, businesses can drive their expansion (Faster Capital, 2024). Furthermore, as businesses become more attuned to customer needs and preferences, they can effectively sell and contribute to customer satisfaction. A study by Yulisa et al. (2022), found that a key role in building brand loyalty is by found that customer satisfaction. By informing marketing strategy and product development, ultimately promoting innovation and long-term business growth, satisfied customers are also more likely to provide valuable feedback.

For Malaysian SMEs, their business can grow and achieve market sustainability by achieving effective sales performance. One of the strategies to enhance sales is to adopt an online platform in the business. The Technology-Organization-Environment (T-O-E) framework and Attention-Based View (ABV) these key factors in this research (perceived compatibility, relative advantage, perceived cost, top management support, and government support) that can drive overall sales performance.

Online Platforms Adoption: The adoption of online platforms has become an essential technological advancement for SMEs today. Enhance operation efficiency, expand market reach, and improve overall business performance, which these platforms can give to businesses. SMEs can also increase their growth potential can tap into an unlimited customer base across wide geographical areas through online platforms. SMEs with leverage with online platforms such as e-commerce and social media can increase visibility and customer engagement, which affects a high volume of sales (Shanmugam et al., 2021).

Furthermore, businesses can improve by adopting online platforms, which leads to business efficiency and cost reduction. The adoption of online platforms can facilitate automation and streamline various businesses, as suggested by Faiz (2023). SMEs can improve resource allocation at the right place if the adoption process is implemented through such areas as inventory management, customer relationship management (CRM), and sales tracking. Studies by Liu et al. (2022) and Balk (2024) suggest that the implementation of online platforms can reduce costs. Different from traditional methods, SMEs use online platforms for digital marketing to promote their business in the market. Online platforms can reach and engage prospects of customers widely, meanwhile traditional methods require a high cost to reach customers.

During the world turned into pandemic, many businesses were affected, which forced this business to turn to digitalization. For SMEs, turning business into digitalization is because to survive and grow in the market. This shift has created opportunities for jobs and business, increasing demand especially in the gig economy and increasing e-commerce activities. E-commerce platforms in Malaysia, such as Lazada, Shopee, and Mudah and social media platforms such as TikTok, Instagram, and Facebook, give unlimited potential customers to merchants. Although, as stated by Elhusseiny & Crispim (2021), SMEs face several challenges to adopt technology into the business, such as limited digital skills and financial constrain. MDEC is one of the government agencies that provides training programs and financial assistance towards SMEs, especially SMEs that are turning into digitalization.

Relative Advantage: Relative advantage can be described as to which the new technology offers better solutions than traditional methods. SMEs in Malaysia realize with potential and benefits such as improved market sales and operational efficiency when they adopt online platforms (Razali et al., 2018; Shanmugam et al., 2021). For example, high sales performance with great accessibility towards customers and streamlined operations that the business can utilize. Studies by Razali et al. (2018), SMEs may be underutilized compared to large companies. These facts may hinder SMEs from utilizing their resources to perform overall business.

Perceived Cost: Perceived cost can be defined as the financial or non-financial implications when someone or an entity wants to use products, services, etc. Finance is one of the barriers that SMEs face in adopting new

technologies due to the high cost that has been surveyed by SME Corp, 2024). The causes that enhance sales performance are due to the perception that implementing technology requires a high cost. As today's technology plays a crucial role in customer engagement and operational efficiency, underinvestment in digital business hinders business growth. The limitation of cost in the business with a tight budget forces SMEs to abandon technology in their business (Kechik et al., 2023). Limitations of worker skills and financial resources to utilize online platforms other issues faced by SMEs when they try to integrate technology into the business. This gap among SMEs shows that there is a need for innovation for SMEs to integrate financial and skills problems.

Top Management Support: Top management support is one indicator to measure technology adoption in the business. For SMEs to contribute to innovation and embrace online platforms, leadership and commitment to adopt online platforms are also important. SMEs in Malaysia still lack to implement adoption of online platforms, which affects their ability to implement online sales strategies (SME Corp, 2023). Leaders are the people who influence to adoption of online platforms into organizations by determining resources in the company, as a study conducted by Amoah et al. (2023). This study found inconsistent support for gaps in this variable which there are not all SMEs have consistent support from top management to adopt online platforms into the business.

Government Support: Government support is important for SMEs to adopt online platforms into their business. Under the Government, several initiatives for SMEs have been introduced to help SMEs in terms of the cost of implementing technology adoption. Government also helps in terms of skill and development under agencies such as Malaysia Digital Economy Corporation (MDEC), which this agency helps SMEs in terms of empowerment for digital business and helps Malaysia with a model of digital economy. However, with grants and initiatives by the government to help SMEs in digitalizing their business, there is research by Priya Terumalay (2024), which indicates that only 32% of respondents are aware of this initiative by the government.

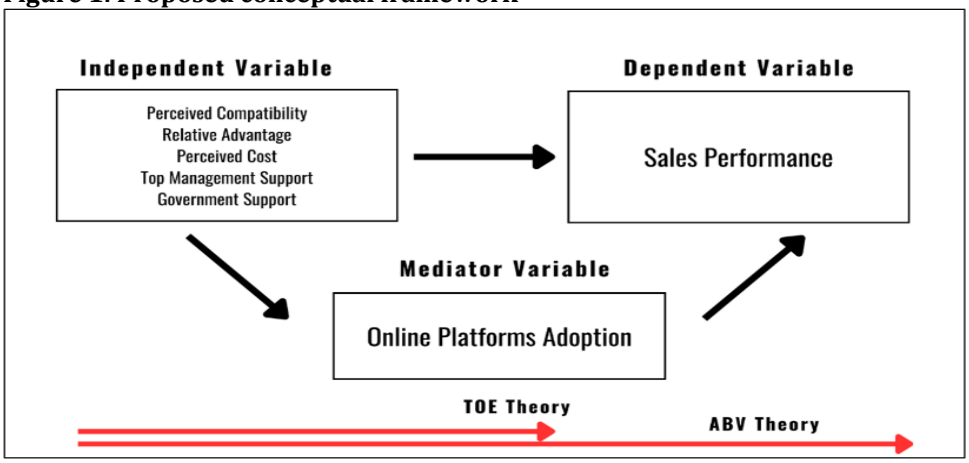
T-O-E Framework: The T-O-E framework has been widely utilized to comprehend the elements that impact an organization's adoption of technology. T-O-E was employed in this study to identify the variables influencing Malaysian SMEs' adoption of online platforms for sales. T-O-E is divided into three categories: environment, organization, and technology.

T-O-E frameworks offer SMEs in Malaysia a thorough lens that takes into account both internal and external factors influencing the adoption of online platforms. Government support was used in this study's context, which is pertinent to Malaysian SMEs. Financial assistants and government programs that support digital literacy under MDEC can have a considerable influence on SMEs' adoption of online platforms. T-O-E was also in line with the study's research goal, which was to assess sales performance and perceived compatibility, analyze relative advantage in relation to technology variables, look at top management support in relation to organizational dimensions, and align the environment with government support. Technology, Organization, and Environment (T-O-E) factors enable thorough analysis. T-O-E is in line with these aspects when it decides to utilize online platforms.

Attention-Based View: According to Brielmaier& Friesl (2023), the Attention-Based View (ABV) is a concept theory that focuses on a thorough analysis of organizational behavior and its approach to include it. The notions of ABV should be viewed as limited resources, as individuals or organizations have limited capacity to process information. Effective management of competitive advantages requires decision-makers to concentrate on particular problems and options. According to BAĞIŞ et al. (2020), ABV doctrines emphasize that the organization and external environment receive more attention than the individual. The ABV idea places a strong emphasis on structure and culture to influence decision-makers' distribution.

As explained by Angelshaug (2022), ABV frameworks comprehend how leaders' attention affects the business model, and they may be applied to business model innovation (BMI). Managerial priorities can have a significant impact on a company's strategic orientation. ABV can also be used to measure an organization's performance, which is what this study is aiming for. ABV focuses on how behaviors and resource investment can be driven by attentional concentration to satisfy performance standards.

Figure 1: Proposed conceptual framework



3. Development of Hypothesis

Perceived compatibility and Sales Performance: The degree to which online platforms mesh nicely with company operations or processes is known as perceived compatibility. Technology is appropriate for company practices and procedures when SMEs are compatible with online platforms and existing systems. When SMEs switch from traditional methods to new technology for their operations and company, compatibility is a key factor. According to Shanmugam et al. (2021), SMEs that experiment with integrating new technology into their operations see gains of 26% to 60%. According to Shanmugam et al. (2021) and Alkateeb et al. (2021), perceived compatibility has a significant impact on how online platforms are adopted and how well sales performance is affected. As a result, the hypothesis
can be expanded by:
H1: There is a significant positive relationship between perceived compatibility on adoption online platforms and sales performance among SMEs in Malaysia.

Relative Advantage and Sales Performance: Relative advantage refers to the new technology that replaced traditional or already technology to improve business. When SMEs adopted online platforms, new technologies offer an increase in market reach, an increase in sales performance, and streamlined operations by Razali et al., 2018; Shanmugam et al., 2021). By utilizing online platforms such as e-commerce, SMEs can gain higher sales volume, better engagement with customers, and maximize operational efficiency according to Razali et al. (2018). Nevertheless, the evolution of a hypothesis could resemble this:
H2: There is a significant positive relationship between perceived relative advantage and sales performance among SMEs in Malaysia.

Perceived Cost and Sales Performance: The financial burden that SMEs should bear while implementing new technology is known as perceived cost. According to SME Corp (2023), one of the things that prevents SMEs from embracing new technology, particularly online platforms, is cost. SMEs may find it difficult to afford the high costs of adopting an online platform, particularly if they lack the resources necessary to run their operations. According to Kechik et al. (2023), SMEs' low financial resources, inability to invest in skilled labor, and technological infrastructure are factors that contribute to the greater cost of implementing an online platform in their operations. According to Kechik et al. (2023), SMEs' insufficient investment restricts their capacity to integrate internet platforms into their operations. The following hypothesis will be developed:
H3: There is a significant relationship between perceived cost and sales performance among SMEs in Malaysia.

Top Management Support and Sales Performance: One definition of top management support is an organization's dedication to assisting and participating in the integration of new technology into the company. The adoption process is greatly aided by top management, whose job it is to distribute resources and develop business-use strategies. According to research by SME Corp (2023), a lack of support from upper management prevented many Malaysians, particularly SMEs, from implementing online platforms. According to earlier

research by Amoah et al. (2023), senior management is essential to facilitating, allocating, and maximizing resources. Amoah et al. (2023) also discovered that senior management is inconsistent in providing their resources, which makes it difficult for the company to adopt and benefit from online platforms by increasing sales performance. According to studies by Prokop & Hajek (2023) and Scott Stiver (2021), senior management has a significant impact on sales performance. Therefore, the following hypothesis will be developed:
H4: Strong support from top management positively influences sales performances in Malaysian SMEs.

Government Support and Sales Performance: Support from the government might take the shape of initiatives, grants, and programs designed to encourage and assist SMEs in implementing online platforms. The government typically provides infrastructure, training programs, and financial assistance to SMEs. Organizations that assist and encourage SMEs to digitize their businesses include the Malaysia Digital Economy Corporation (MDEC). Additionally, MDEC helps SMEs take the lead in Malaysia's digital economy. According to SME Corp (2024), only 32% of respondents are aware of government programs and assistance. Less exposure to SMEs on the adoption of online platforms and, ultimately, sales success, as well as a lack of understanding, particularly among SMEs, may prevent them from taking advantage of government assistance. Government support may be helpful in terms of policies, incentives, and training, according to a number of studies (e.g., Ismail & Othman, 2014; Mary Hall, 2024; Songling et al., 2018). To formulate the hypothesis:
H5: Government support significantly enhances sales performance among SMEs in Malaysia.

T-O-E and Sales Performance: Support from the government might take the shape of initiatives, grants, and programs designed to encourage and assist SMEs in implementing online platforms. The government typically provides infrastructure, training programs, and financial assistance to SMEs. Organizations that assist and encourage SMEs to digitize their businesses include the Malaysia Digital Economy Corporation (MDEC). Additionally, MDEC helps SMEs take the lead in Malaysia's digital economy. According to SME Corp (2024), only 32% of respondents are aware of government programs and assistance. Less exposure to SMEs on the adoption of online platforms and, ultimately, sales success, as well as a lack of understanding, particularly among SMEs, may prevent them from taking advantage of government assistance. To formulate the hypothesis:
H6: T-O-E has a positive association with sales performance mediated by online platforms adoption.

4. Proposed Method

This research used a quantitative research method by using a survey questionnaire to collect data from SMEs in Malaysia. Through the lens of the T-O-E framework and ABV, this research seeks to examine the relationship between online platform adoption and sales performance. Quantitative often focuses on broader aspects of digital transformation or limited technological variables without integrating organizational attention factors like ABV, which previous studies, such as Razali et al. (2018) and Shanmugam et al. (2021), approach same way. However, these studies primarily focused on external and technical variables such as the benefits of technology, perceived ease of use, or technological readiness. These approaches did not integrate models or frameworks that explain how organizational attention and decision-making priorities influence adoption outcomes. Cross sectional survey will be applied in this study to collect data in a single period. A poll of the population is SMEs that use online platforms as their business operation. With a total number of SMEs 382 based on Krejcie and Morgan table, this research aims to broader context and valuable insights into SMEs in Malaysia.

5. Conclusion

This study used two theories, which are T-O-E and ABV, with the purpose of investigating the factors influencing sales performance by adopting online platforms among SMEs in Malaysia. This study proposed three dimensions of T-O-E which Technology, perceived compatibility, and relative advantage; Organization, perceived cost, and top management support; and Environment, government support. This study also examines how these factors influence the adoption of online platforms and their impact on SMEs' sales performance as a foundation for the subsequent empirical analysis. Finally, a well-developed literature review enhances academic discourse, linking past insights with contemporary inquiries to advance scholarly understanding in the field.

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Determinant Factors Influencing Intention to Use IoT Among Academics

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Abstract: The adaptation and adoption of IoT devices in education have gathered a lot of interest, especially with the ongoing transformation of teaching and learning processes into the digital world. The pandemic period has boosted the need for digital solutions in education, further marking the role of IoT remodel towards achieving educational goals. This research focuses on the factors that impact lecturers' intention to use IoT at the Universiti Teknologi MARA (UiTM), Selangor Campus. This study has categorized the factors that define lecturers' acceptance of IoT using the UTAUT model. A structured questionnaire was used to collect data from 140 lecturers at UiTM Selangor as part of a survey. The study investigates the linkage between Social Influence, Facilitating Conditions, Knowledge and Skills, Effort Expectancy, and IT capability with IoT adoption intentions. The results help in understanding interrelations among variables included in this study and provide educational leaders with important information needed to create policies that support instructors adopting IoT-based instruction. This research is aimed at addressing the gaps identified through studies in post post-COVID-19 era and provides ways to improve the learning experience and the level of education achieved in the post-pandemic academic landscape.

Keywords: *Internet of Things, Unified Theory of Acceptance and Technology (UTAUT), social influence, facilitating conditions, IT capability.*

1. Introduction

The adoption of the Internet of Things is transforming education into a more sophisticated and streamlined process (Ghashim & Arshad, 2023; Tripathi & Ahad, 2018). As we have seen, IoT is already enhancing academics and school-related activities by automating routine processes and enabling real-time monitoring and communication (Das, 2025). The Articles on AI and Education Pdf (n.d.) and Daniela (2021) cited the rush towards the adaptation of digital technologies for maintaining quality education during the COVID-19 pandemic, explaining how the IoT adoption accelerated due to the pandemic.

Professors can enhance courses and deliver immediate personalized responses for interactive displays and sensors. Through Mowade (2024), we see the IoT has a positive impact on effective resource allocation, refining institutional security measures, advanced teaching, and overall helping create a more inclusive adaptive environment. This has led to a growing recognition of IoT's potential to improve educational experiences for lecturers and students alike (Ghashim & Arshad, 2023). Concerning the increasing number of IoT devices in the teaching sector, it brings along the challenge in the management of security, transparency, and data associated with the new opportunities of vast amounts of information being generated (Mowade, 2024).

Despite the potential, the introduction of the IoT in the field of education also presents quite a few challenges. One of the main issues is the absence of clear frameworks to guide IoT adoption in many countries, which makes it difficult to achieve smooth integration across devices and platforms. This issue is exacerbated by the absence of standards and governance for interoperability, which complicates things further (Noura et al., 2018). Financial limitations are also an obstacle, as utilization of IoT always involves heavy investment in infrastructure and retraining of lecturers (Al-Emran, 2020). Privacy and security continue to be major concerns, as IoT applications often deal with sensitive information. This highlights the need for clear and robust policies that safeguard data and promote ethical use (Yang et al., 2017).

To better understand the factors influencing IoT adoption in education, the Unified Theory of Acceptance and Use of Technology (UTAUT) provides a useful lens. UTAUT highlights constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions, all of which play an important role in shaping lecturers' willingness to adopt IoT (Mukherjee, 2021). Although the model offers flexibility, it does

not fully capture the educational and cultural contexts of institutions like Universiti Teknologi MARA (UiTM), nor does it adequately represent Malaysia's distinctive teaching and learning practices (Nain et al., 2021). This indicates the need for further research to explore the development of IoT adoption in higher education and to identify practical strategies that can support lecturers in addressing these challenges.

2. Literature Review

Lecturers spend a substantial amount of their time within the workplace, the surrounding environment has a significant impact on their overall productivity (Hafee et al., 2019). In a higher education setting, a lecturer's willingness to adopt the Internet of Things (IoT) may be shaped by various factors such as social influence, available support and resources, individual knowledge and skills, perceived ease of use, and the institution's IT capability. In this study, these five aspects are treated as the independent variables, whereas the intention to utilize IoT serves as the dependent variable.

Social Influence

Unified Theory of Acceptance and Use of Technology (UTAUT), social influence is defined as the extent to which an individual's decision to adopt IoT is shaped by organizational and external pressures (Venkatesh et al., 2003). This perspective emphasizes that adoption is not solely determined by personal interest but is also influenced by the opinions of others, prior positive experiences, and compliance with regulatory or legal requirements (Jaradat et al., 2020). In an organizational context, leadership support and peer encouragement are important in fostering adoption. Institutions that position IoT as a strategic priority, while providing adequate resources, training, and incentives, tend to achieve higher levels of implementation (Ane et al., 2020). Supportive institutional culture fosters innovation, encourages knowledge exchange, and strengthens the integration of IoT into academic practices (Tobarra et al., 2021). Thus, social influence captures the degree to which surrounding groups shape an individual's perception and acceptance of technology (Venkatesh et al., 2003).

H1: There is a positive impact of social influence and how the Internet of Things helps teaching and learning skills among academics.

Facilitating Conditions

Facilitating conditions are defined to which individuals believe that sufficient organizational and technical infrastructure exist to support system usage (Venkatesh et al., 2003). In addition, these conditions influence a lecturer's willingness to adopt IoT when reliable support mechanisms, such as prompt assistance in addressing technical difficulties (Daud Mahande, n.d.). On the other hand, Venkatesh et al. (2003) argued that facilitating conditions do not directly influence behavioral intention; they can significantly affect actual system use, particularly when factors such as age and prior experience are considered.

Organizational and technical structures, therefore, serve as a critical foundation for IoT adoption. This involves ensuring that lecturers have access to the necessary resources, offering effective technical support, and developing institutional policies that encourage technological advancement. Moreover, creating a collaborative teaching environment that encourages knowledge sharing can improve lecturers' readiness to integrate IoT into their practice (Dachyar et al., 2019). Such as enabling conditions are essential to ensure that lecturers are well-equipped to effectively use IoT in teaching and learning.

H2: There is a positive impact of facilitating conditions on intention to use the Internet of Things (IoT).

Knowledge and Skills

Knowledge and skills are important in the adoption of IoT technologies, as users' ability to operate IoT applications and their understanding of the technology directly shape their behavior and intention to adopt it (Ronoh et al., 2021). Prior studies indicate that individuals who feel confident and comfortable in using IoT devices are more likely to embrace the technology (Ganiyu, 2019). The importance of designing IoT systems with simple, intuitive interfaces to enhance usability and encourage adoption. Hence, context of teaching and learning, this perspective supports the assumption that lecturers with stronger knowledge and technical skills are more inclined to integrate IoT into their practices.

H3: There is a positive impact of knowledge and skills, and the intention to use the Internet of Things (IoT) in teaching and learning.

Effort Expectancy

In the Unified Theory of Acceptance and Use of Technology (UTAUT), effort expectancy can be defined as the perceived ease of using a particular technology, which strongly influences the likelihood of its adoption. The simpler a technology appears to learn and apply, the greater the probability that individuals will accept and engage with it (Venkatesh et al., 2003). A lower level of perceived effort increases the likelihood of adoption, as effort expectancy refers to the point at which users believe they must exert effort to use the technology effectively (Im et al., 2011). This construct is therefore essential in understanding how perceptions of usability affect an individual's readiness to integrate technology into daily tasks or professional practices.

In the context of higher education, effort expectancy has been shown to positively affect lecturers' intention to use IoT in teaching and learning (Madzamba, 2023). Perceptions of ease of use are influenced by several factors such as accessibility, prior familiarity, training opportunities, integration with pedagogical practices, and the availability of technical support (Riad et al., 2020). When lecturers perceive IoT as user-friendly and easy to integrate, their intention to adopt it in teaching increases considerably. On the other hand, this is consistent with prior findings that highlight the central role of perceived ease of use in technology adoption (Dachyar et al., 2019). The convenience and simplicity of using IoT are key factors influencing lecturers' behavioral intentions to adopt the technology at UiTM (Selangor Campus).

H4: There is a positive impact of effort expectancy and intention to use the Internet of Things (IoT) in teaching and learning.

IT Capability

IT capability refers to the ability, whether at the organizational or individual level, that leads to acquire and effectively utilizing technology to achieve specific objectives (Tobarra et al., 2021). In the context of IoT, this capability is important in enhancing lecturers' performance. For example, IoT can support the development of smart classrooms, where interconnected devices become more efficient, engaging, and interactive teaching and learning experiences. It can also assist in monitoring classroom environments, enabling lecturers to adjust teaching strategies and resources for better outcomes (Ganiyu, 2019). Furthermore, IoT facilitates the use of adaptive learning platforms and smart educational devices, while promoting collaboration that also allows lecturers and students to share resources and work together even when in different locations. These applications have the potential to improve both the reach and quality of teaching and learning.

However, successful integration of IoT depends not only on access to the technology but also on adequate pedagogical training and support for lecturers (Attuquayefio, 2014). Based on the drawing in Unified Theory of Acceptance and Use of Technology (UTAUT), IT capability is the main important determinant of technology adoption. This includes competencies such as computer literacy, prior IT experience, training received, confidence in carrying out IT-related tasks, willingness to learn, and access to proper support and infrastructure (Venkatesh et al., 2003). On the other hand, additional aspects such as IT compatibility, social interaction, and the ability to overcome technical barriers further influence the likelihood of IoT adoption.

H5: There is a positive impact of IT capability and the intention to use the Internet of Things (IoT).

Intention to Use IoT

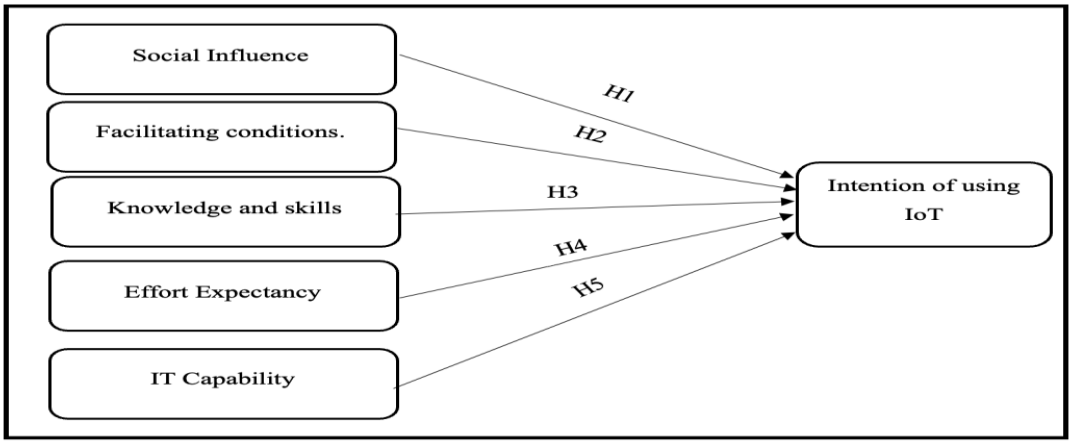
The Internet of Things (IoT) has great potential to transform education by creating more interactive and technology-driven learning experiences that bring benefits for both students and educators. Not only within their advantages, but challenges can also be seen in balancing technological transformation with educators' readiness. Many educators may not yet feel fully equipped to integrate IoT into their teaching practices or in daily tasks. This highlights the need for stronger efforts to increase educators' intention and confidence in adopting IoT as part of their instructional methods (Goubeaud & Yan, 2024).

Educator preparedness is a central factor influencing the intention to adopt IoT. Educators can integrate existing technologies into their work, their openness or willingness to change, and their capacity to adapt to new technological tools (Aloufi et al., 2024). When teachers possess these qualities, they are more likely to embrace and explore IoT, thereby facilitating the effective integration into pedagogy. In turn, this readiness can accelerate the adoption of more advanced IoT applications in education and support the ongoing digital transformation of teaching and learning.

Conceptual Framework

Based on the literature, the conceptual framework for this study is presented in Figure 1.

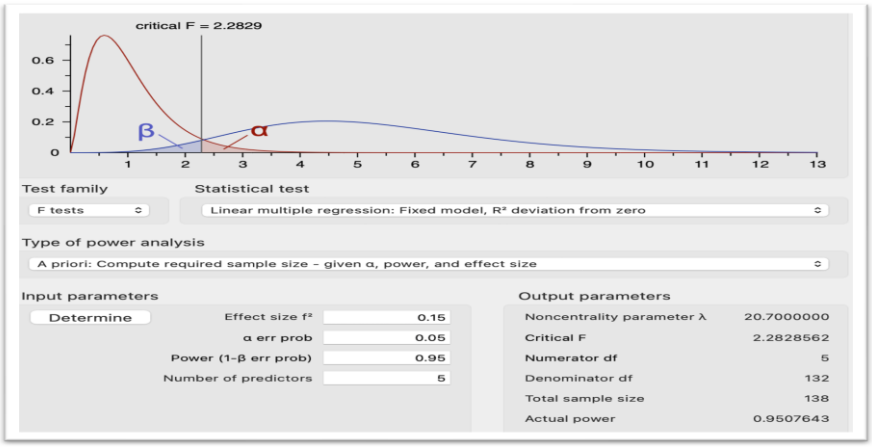
Figure 1: Conceptual Framework



3. Methodology

This study applies the quantitative approach to determine factors influencing the intention to use IoT among academics in UiTM Selangor Campus. This research's sampling frame comprises all campuses in Selangor, which are 6 branches, including Shah Alam Campus, Puncak Alam Campus, Selayang Campus, Dengkil Campus, Sungai Buloh Campus and Puncak Perdana Campus. Sample size can be determined as a technique of selecting a few members from the population characteristic. f define a sample as a subset of the population. Hence, this study utilizes a sample size calculator provided by G*Power software to estimate the minimal sample size required for this investigation. G*Power software is a program that assists in computing effect sizes and graphically displaying power analysis results. F test with multiple linear regression and Fixed model R2 deviation from zero were carried out on the G*Power. Assuming a data error of 0.05 and a power of 0.95, with a maximum of 5 predictors, the result indicates that a total of 138 respondents must be collected as a minimum sample size in this study.

Figure 2: G*Power for sample size



Based on Figure 2, the sample for the study is 140 lecturers. Selected respondents are chosen by the simple Random Sampling Technique. The data collection of this research is via Questionnaires that were also distributed via email and WhatsApp. The researcher employed a structured questionnaire adapted from past studies, designed to align with the research objectives. The questionnaire utilized closed-ended questions in English. It was structured into three sections: Section A focused on demographic details such as gender, age,

teaching experience, campus, and experience of using the Internet of Things. Section B examined independent variables (social influence, facilitating conditions, skills and knowledge, effort expectancy, and IT capability); Section C evaluated intention to use IoT (dependent variable).

Data analysis, defined as the process of inspecting, cleaning, and modelling data to discover useful information, draw conclusions, and support decision-making, was conducted using Statistical Package for the Social Sciences (SPSS) version 28.0. The first step involved addressing issues such as blank responses, straight-lining, and outliers. Blank responses were removed, while participants exhibiting straight-lining behaviors were excluded. Outliers were identified and handled to ensure the data remained within reasonable bounds. After the data is cleaned, it undergoes several stages of analysis, including descriptive statistics, normality testing, correlation, and regression analysis. The conclusion provided a summary of the overall research design, which encompassed the sampling approach and data analysis procedures. The methodology is both rigorous and reliable, allowing the collected data to effectively address the research objectives (Sekaran, 2016).

4. Findings and Results

For the actual study, a total of 150 survey responses were collected. In order to ensure accuracy and reliability, the dataset underwent a rigorous cleaning process, which involved applying predefined criteria and eliminating incomplete or inconsistent responses. Following the flow of the step, 140 valid responses were retained for analysis. The final sample size (n = 140) exceeds the minimum required sample of 128, confirming that the dataset is adequate for producing meaningful and reliable conclusions.

Respondents' Profile and Characteristics

The table below shows a summary of the demographic characteristics of the respondents, which also highlights their gender, age, teaching experience, campus affiliation, and prior exposure to the Internet of Things (IoT). In terms of gender, 70.7% (n = 99) of the respondents were female, while 29.3% (n = 41) were male, indicating a greater level of female participation in the survey. With respect to age, the largest proportion of respondents (50%, n = 70) fell within the 36–45 years category, followed by 30% (n = 42) who were aged 46 years and above, and 20% (n = 28) who were between 25–35 years old. This distribution reflects a predominance of middle-aged participants. Regarding teaching experience, the largest group consisted of respondents with 11–15 years of experience (27.9%, n = 39), closely followed by those with more than 16 years of experience (27.1%, n = 38). Meanwhile, 23.6% (n = 33) reported having 1–5 years of teaching experience, and 21.4% (n = 30) had 6–10 years, suggesting that the sample represents a well-balanced spread of teaching expertise across different career stages.

Campus-wise, the majority of respondents were from Shah Alam (42.9%, n=60) and Puncak Alam (30.7%, n=43). Smaller proportions represented Dengkil (9.3%, n=13), Selayang (6.4%, n=9), Sungai Buloh (5.7%, n=8), and Puncak Perdana (5%, n=7), with Shah Alam and Puncak Alam contributing significantly to the survey results. In terms of IoT usage, the data reveal a high engagement, with 89.3% (n=125) of respondents using IoT technology daily.

A smaller percentage (6.4%, n=9) reported using IoT once a week, while 2.1% (n=3) indicated usage once a month, and another 2.1% (n=3) stated they never used it. This illustrates a strong reliance on IoT technology in their daily activities and highlights its importance to the respondents. Overall, the demographic profile provides a comprehensive overview of the respondents and their attributes, which are essential for interpreting the study's findings.

Table 1: The Respondents' Profile and Characteristics

Frequency Analysis	Category	Percentage (%)	Frequency
Gender	Male Female	29.3 %	**41**
		70.7 %	**99**
Age	25-35 Years Old	20 %	**28**
	36-45 Years Old	50 %	**70**
	46 Years Old and Above	30 %	**42**
Teaching Experience	1-5 years	23.6 %	**33**
	6-10 years	21.4 %	**30**
	11 – 15 years More than 16	27.9 %	**39**
	years	27.1 %	**38**
Campus	Shah Alam	42.9 %	**60**
	Puncak Alam	30.7 %	**43**
	Puncak Perdana	5 %	**7**
	Dengkil	9.3 %	**13**
	Selayang	6.4 %	**9**
	Sungai Buloh	5.7 %	**8**
Experience using the Internet of Things	**Once a week, every day**	**6.4 %**	**9**
	Once a month, never	**89.3 %**	**125**
		2.1 %	**3**
		2.1 %	**3**

Descriptive Analysis

Table 2 shows descriptive analysis of factors influencing IoT adoption among lecturers at UiTM (Selangor Campus), revealing positive findings. The mean score for Social Influence was 4.08 (SD = 0.640), indicating a significant influence from peers and the institutional environment on IoT adoption. Facilitating Conditions received a mean of 3.85 (SD = 0.637), suggesting that while resources and support are moderately favorable, improvements are still needed. Skills and Knowledge had the highest mean at 4.41 (SD = 0.489), showing that lecturers feel confident in their understanding and ability to implement IoT. Effort Expectancy scored 4.20 (SD = 0.532), reflecting that IoT systems are seen as easy to operate and integrate with existing systems. IT Capability was rated at 4.37 (SD = 0.569), indicating that the technological infrastructure at UiTM is viewed positively. Finally, the intention to use IoT recorded a mean score of 4.32 (SD = 0.598), which indicates a strong willingness among lecturers to incorporate IoT into their teaching practices. From the table shown, overall, the findings suggest that lecturers exhibit a high level of readiness and confidence in adopting IoT. The results also highlight the need to strengthen facilitating conditions to further support and streamline the adoption process.

Table 2: Means and Standard Deviations

Variables	N	Mean	Std. Deviation
Social Influence	140	4.08	**.640**
Facilitating Conditions	140	3.85	**.637**
Skills and Knowledge	140	4.41	**.489**
Effort Expectancy	140	4.20	**.532**
IT Capability	140	4.37	**.569**
Intention to use IoT	**140**	**4.32**	**.598**

Correlation Analysis

Correlation is a statistical technique used to measure the strength and direction of the relationship between two variables that indicating how changes in one variable are associated with changes in the other. The

correlation coefficient ranges from −1 to +1. A value of +1 reflects a perfect positive relationship, where are increase in one variable corresponds directly with an increase in the other. In contrast, a value of −1 indicates a perfect negative relationship, meaning that as one variable increases, the other decreases proportionally. A correlation of 0 suggests no linear relationship between the variables, implying that changes in one do not predict changes in the other. Pearson's correlation coefficient is one of the widely applied methods for examining linear relationships between continuous variables that offering useful insights for statistical modeling, hypothesis testing, and predictive analysis.

Table 3: Correlation Analysis

Variables	1	2	3	4	5	6
Social Influence	**1**	.419**	.453**	.462**	.355**	**.530****
Facilitating Conditions		**1**	.503**	.656**	.566**	**.633****
Skills and Knowledge			**1**	.690**	.663**	**.688****
Effort Expectancy				**1**	.720**	**.737****
IT Capability					**1**	**.767****
Intention to use IoT						**1**

The results of the correlation analysis offer important insights into the relationships between the independent variables, which are Social Influence, Facilitating Conditions, Skills and Knowledge, Effort Expectancy, and IT Capability and the dependent variable, Intention to Use IoT. All five independent variables were found to have statistically significant positive correlations with the dependent variable, indicating that these factors meaningfully contribute to shaping individuals' intention to adopt IoT.

Social Influence showed a moderate positive correlation with Intention to Use IoT ($r = 0.530$, $p < 0.01$), suggesting that peer expectations, organizational norms, and external encouragement play a considerable role in influencing lecturers' adoption behaviour. Next, Facilitating Conditions exhibited a stronger correlation ($r = 0.633$, $p < 0.01$), which emphasizes that the availability of infrastructure, resources, and institutional support substantially increases the likelihood of lecturers adopting IoT in their teaching practices.

Similarly, Skills and Knowledge exhibit a strong positive correlation ($r = 0.688$, $p < 0.01$), indicating that individuals who are more knowledgeable and skilled in IoT-related technologies are more inclined to adopt them. Next, Effort Expectancy indicates an even stronger positive correlation ($r = 0.737$, $p < 0.01$), showing that when IoT systems are perceived as easy to use means individuals' intention to adopt them increases significantly. Among all the variables, IT Capability has the strongest relationship with Intention to Use IoT ($r = 0.767$, $p < 0.01$). It indicates that advanced technological infrastructure and expertise are the most important variables in driving IoT adoption.

Multiple Regression Analysis

The multiple regression analysis revealed that $R^2 = 0.722$, indicating that 72.2% of the variance in the Intention to Use IoT can be explained by the independent variables. The Adjusted R^2 value was 0.712, and the F-value was 69.651 ($p < 0.001$), showing that the model is statistically significant. Among the predictors, IT Capability emerged as the strongest predictor with a standardized coefficient (ß) of 0.400, $t = 5.676$ ($p < 0.001$). Social Influence also significantly impacted IoT adoption with ß = 0.182, $t = 3.421$ ($p < 0.001$). Facilitating Conditions had a significant relationship with IoT adoption (ß = 0.145, $t = 2.332$, $p = 0.021$), as did Skills and Knowledge (ß = 1.54, $t = 2.265$, $p = 0.025$). Lastly, Effort Expectancy contributed moderately to IoT adoption with ß = 0.163, $t = 2.066$ ($p = 0.041$).

These results suggest that while IT Capability and Social Influence are the strongest predictors, Facilitating Conditions, Skills and Knowledge, and Effort Expectancy also play important roles in the adoption of IoT.

Table 4: Multiple Regression Analysis

Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.343	.264		-1.300	**.196**
Social Influence	.170	.050	.182	3.421	**<.001**
Facilitating Conditions	.136	.058	.145	2.332	**.021**
Skills and Knowledge	.189	.083	1.54	2.265	**.025**
Effort Expectancy	.183	0.89	.163	2.066	**.041**
IT Capability	**.421**	**.074**	**.400**	**5.676**	**<.001**
F value			***69.651***		
Sig			*<.001b*		
Adjusted R2			*.712*		
R2			***.722***		

Discussion

The findings suggest that lecturers' willingness to integrate IoT into their teaching is strongly influenced by the support they receive from colleagues and their institution (Hassan et al., 2020). The results above clearly show that the more encouragement and endorsement lecturers feel, the more likely they are to adopt IoT. This process can be compared to a team effort, in which lecturers become more motivated and confident to use IoT when they know they have the support of peers and leaders. This aligns with previous studies that emphasize that a positive and collaborative environment is important for successful technology adoption. The present analysis further confirms that social influence plays a key role, meaning the greater support directly increases the likelihood of IoT adoption (Hashim & Al-Sulami, 2020). Therefore, increasing teamwork and creating a supportive atmosphere is important for encouraging educators to embrace new technologies and building smarter can lead to more efficient learning environments.

These results also highlight the importance of institutional initiatives such as peer-sharing seminars, training sessions, and leadership-driven promotion of IoT usage, which these activities can strengthen adoption rates. Social factors such as particularly teamwork, peer encouragement, and leadership endorsement will remain central in motivating lecturers to incorporate IoT into teaching practices.

Analysis for facilitating conditions shows more refined details. Facilitating conditions refer to the resources, infrastructure, and institutional support that lead lecturers to adopt IoT. Although the results indicate a positive correlation between facilitating conditions and intention to adopt IoT, the regression analysis and hypothesis testing (H2) show that neither condition has a statistically significant effect on lecturers' behavioral intentions. This outcome also suggests that while resources and infrastructure are necessary, they are not sufficient on their own to drive adoption. Consistent with earlier studies, performance expectancy, perceived usefulness, enjoyment, and social influence appear to play a greater role in shaping intention compared to support conditions.

This outcome finding indicated that lecturers perceive enabling conditions as a baseline requirement rather than a motivating factor. In other words, adequate infrastructure and support must be in place; they may not be enough to encourage adoption unless lecturers also possess strong IT skills, interpersonal competencies, and confidence in their ability to use IoT effectively.

In summary, facilitating conditions are important for creating an environment where IoT can function; they do not directly determine adoption. For effective IoT integration in higher education, institutions should not only provide resources and infrastructure but also focus on enhancing lecturers' IT capabilities, strengthening social influence, and building confidence and motivation to use the technology.

The analysis examined the relationship between lecturers' knowledge and skills and their intention to adopt IoT in teaching. The findings show a strong positive correlation, indicating that as lecturers' expertise in IoT increases, so does their intention to integrate it into their teaching practices. To go deeper, this highlights the importance of technical competence and confidence in overcoming barriers to IoT adoption. However, both the literature review and regression analysis suggest that knowledge and skills alone do not serve as strong predictors of adoption. While they are necessary, lecturers with sufficient technological expertise may not view them as primary motivators. Instead, other factors such as perceived usefulness, enjoyment, and social influence appear to exert a stronger influence on adoption behavior (Aziz et al., 2023). Consequently, Hypothesis H3, which proposed that knowledge and skills have a positive impact on IoT adoption, was not supported. These results imply that knowledge and skills, though essential, are not sufficient on their own to drive adoption. A supportive environment that comprises institutional infrastructure, peer encouragement, and social influence, which is equally important in fostering lecturers' willingness to fully embrace IoT in their teaching practices.

Although these studies have consistently shown that effort expectancy significantly influences lecturers' intention to adopt IoT in teaching, the results of this study present a different perspective. Hypothesis H4, which proposed that effort expectancy positively influences IoT adoption, was not supported. This suggests that while effort expectancy correlates with adoption, its independent effect is not strong enough to drive it. Lecturers appear to regard ease of use as a fundamental expectation rather than a motivating factor. In other words, they assume that IoT tools should naturally be user-friendly and thus do not view this attribute as a compelling reason to adopt them. Instead, other factors such as institutional support, perceived usefulness, and social influence. Therefore, effort expectancy should be seen as a facilitating condition rather than a primary driver. To strengthen IoT adoption, institutions must ensure that IoT technologies are simple and intuitive, while also providing sufficient resources, boosting technical confidence, and cultivating a supportive teaching culture.

In contrast, the findings highlight IT capability as the most significant predictor of IoT adoption. IT capability, which encompasses access to technological infrastructure, resources, and technical expertise, demonstrates a strong positive correlation with lecturers' intention to adopt IoT in their teaching. On the other hand, regression analysis further supports this result, showing that IT capability has a greater influence on adoption than any other factor. Lecturers who feel good in their IT skills are more likely to perceive IoT as both useful and manageable, reducing hesitation and increasing adoption rates. Hypothesis H5, which stated that IT capability positively influences IoT adoption, was fully supported.

These results underscore the important role of IT infrastructure and technical support in educational institutions. Without adequate resources and expertise, integrating IoT into teaching becomes challenging, even for motivated lecturers. Conversely, when strong IT capability is in place, lecturers are empowered to use IoT effectively, aligning with prior studies that identify IT competence as a key driver of adoption (Bahari et al., 2024).

5. Conclusion and Recommendations

In conclusion, those lecturers who successfully adopt IoT in teaching, universities need to focus on the key elements identified in the UTAUT model (Almetere et al., 2020). This clearly shows how IoT can improve teaching performance, making sure the technologies are easy to use, encouraging collaboration among peers, and providing the right resources and technical support. At the same time, ethical and security issues should not be overlooked, as building trust is important for long-term adoption. Ultimately, what makes the difference is a proactive and open attitude toward technology that is supported by institutions that are ready to guide and equip their lecturers. It can be seen, through this combination, that IoT has the potential to truly transform the teaching and learning environment into something more dynamic, engaging, and efficient.

Based on the findings, several practical may can help lecturers make a move to embrace IoT in their teaching. One of the most important is strengthening IT skills and confidence through continuous professional development. It can start from a simple thing, such as training or workshops. By doing so, lecturers not only expand their technical knowledge but also feel more prepared to experiment with new teaching methods. It is important for lecturers to make use of institutional support systems such as IT teams and technology resources since these can help troubleshoot issues and recommend the most suitable IoT tools. Peer collaboration adds another layer of support; learning from colleagues who have already experimented with IoT can provide valuable insights and encouragement. A gradual approach is also helpful, starting with simpler, user-friendly applications before moving on to more advanced tools ensures that confidence builds steadily over time. Above all, maintaining an open and proactive mindset is key. When lecturers embrace technology with curiosity and a willingness to adapt, IoT becomes less of a challenge and more of an opportunity to enhance the classroom experience for both educators and students.

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Festival as Catalyst in Community Development in Malaysia: A Conceptual Review

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Abstract: This paper presents a festival-based approach to community development, analyzing social capital, economic revitalization, and environmental sustainability. It attempts to build a comprehensive framework aimed at promoting social cohesion, stimulating local economies, and sustainable practices, as well as community wellbeing, through strategic festival integration into community planning, drawing from diverse literatures. Despite the literature acknowledging the benefits of festivals, there are several gaps. These gaps indicate a need for more systematic approaches to festival design and evaluation, particularly regarding inclusivity, associated economic impacts, and insufficient eco-friendly practices. In the diverse contexts of Malaysia, this study seeks to build a conceptual framework for empirical investigations that would ascertain the developmental impacts of festivals. In doing so, the paper aims to enhance community development theory by integrating festivals as tools for community advancement, thereby serving a broad spectrum of event industry stakeholders from policymakers to local government officials and event planners. It is underscored that the underlying objectives should combine social, economic, and environmental dimensions to ensure holistic long-term benefits derived from the festivals. The research helps to address the literature gap and provides a basis for further investigation, which aims to reshape Malaysian festivals into more inclusive, transformative, and sustainable assets for communities.

Keywords: *Festivals, community development, social capital, economic revitalization, environmental sustainability*

1. Introduction and Background

The role of festivals in Malaysia extends beyond showcasing cultures. Festivals are important for community building, social capital, and economic development. Malaysia's cultural mosaic, comprising the Malays, Chinese, and Indians, is reflected in its festivals, which symbolize social harmony, unity, and heritage. The enriched cultural diversity serves as a great avenue for economic development through tourism, local businesses, and job creation (Hidayah, Ilmawan, & Yudhanto, 2023). For example, community-based festivals aid sustainable tourism while highlighting local culture and promoting care for the environment, as discussed in the analysis of community-based festivals and sustainable tourism. Though festivals have been attributed with positive impacts, there are still some challenges in understanding their impacts, especially in the context of community development. Although it has gained more attention, the relationship between social capital, economic revitalisation, and the sustainability of festivals has not been sufficiently examined (Stevenson, 2016; Hidayah et al., 2023). For example, festivals may encourage social differences at grassroots events even as they build and strengthen social networks and promote cohesiveness (Akbar, 2022). Furthermore, further research is needed to understand the connection between a festival's sociocultural effects and its long-term community benefits, particularly with regard to how these events can be made sustainable (Suharto & Jamali, 2023).

In addition, recent research points to a lack of study into the organisational limitations of a festival, and the resultant potential for negative impact on the environment and community involvement (Adha, Dasim, Nugroho & Mollison, 2021; Sholihah et al., 2019). There is a clear need for a systematic review of the role of festivals as catalysts for multi-dimensional development by addressing socio-economic disparities, fostering community attachment, and promoting care for the environment. This paper addresses the gap by analyzing the impact of festivals as tools of community development in Malaysia with respect to social capital, economic revitalization and environmental sustainability.

2. Literature Review

Festival and Community development

The relationship between festivals and community development is gaining attention from researchers, highlighting the diverse positive impacts such events have on local people. Most festivals or events serve as important tools towards increased community participation and engagement, economic development, and, at the same time, contribute to the preservation of culture. This review discusses the recent literature regarding the role of festivals in community development on social, economic, and cultural fronts. To begin with, it is well documented that festivals promote greater community participation and cohesion because of the opportunities they provide for cultural expression and social interaction among residents. For example, Brownett (2018) articulates the positive impact of community arts festivals on social capital and well-being, arguing that these events foster cultural participation among isolated individuals. Supporting this idea, Ahn (2020) maintains that local festivals bear a significant and positive relationship with an individual's well-being because they promote social interaction and a sense of community. In addition, it is said that festivals, being inclusive, can nurture emotional solidarity within communities, which improves residents' quality of life and attachment to their culture (Yozukma, Bertan & Alkaya, 2020).

Moreover, the economic impacts associated with festival activities boost business and tourism in the region where the festival is held. Bakas et al. (2019) studied some small-scale art festivals in Portugal and found that they fostered creative tourism and yielded economic advantages for local stakeholders. This indicates that community involvement during the design phase could enhance these benefits (Bakas, Duxbury, Remoaldo & Matos, 2019). To support this perspective, Altun et al. (2024) noted that festivals serve as significant platforms for local entrepreneurs to advertise and sell their products, which contributes to the economic development of the region. The economic impacts of festivals were confirmed to be positive by Jani and Mwakyusa (2021), who reported that residents' satisfaction in Zanzibar is strongly influenced by the economic benefits of the festivals, which highlights community development.

Furthermore, festivals have the potential to aid in the safeguarding of cultural heritage as well as foster community development. Mahon and Hyyrylainen (2019) illustrate the impact of art festivals on rural community resilience and development through active participation and local heritage preservation. This is further reinforced by the findings of Pereira et al. (2021), who documented the image enhancement impact of festivals on tourism and sustainable development in host communities. As noted by Perry et al. (2019), festivals are now increasingly perceived as events that converge both tangible and intangible elements of heritage critical for holistic, sustainable urban development. While recognizing the significance of festivals, it is crucial to understand the tensions and challenges they may impose on the communities. Erdem (2024) notes that community members' perceptions and satisfaction towards festivals tend to diverge, especially regarding festival components if they see themselves as overlooked stakeholders. This strengthens the call for responsive practices to community needs and addresses the issue of over-festivalization, which strives to make practitioners invisible and the obligations to celebrate.

Festival and Social Capital

The significance of social capital and community development illustrates the importance of festivals. Analyzing festivals helps to understand the interconnections of social capital, community health, culture, and development at the local level. Evidence shows that participation in festivals enhances social bonds and aids in the formation of both bonding and bridging social capital, which is essential for resilience and cohesion within the community (Fiedler & Wickham, 2022; Walters et al., 2021; Brownett, 2018). In the case of Malaysia, festivals transcend mere celebrations; they serve as vehicles for cultural engagement and community participation while fostering goodwill and volunteerism among the citizens (Prest, 2019). For instance, Tan et al. (2020) analyze the Miri Country Music Festival and its significance in celebrating local culture, reinforcing community bonds, and fostering a shared collective identity through lived experiences. These types of events promote active citizenship and emotional connection to places, making it possible for social capital to be built (Brownett, 2018). The impact of cultural festivals on education and awareness in Malaysia demonstrates how they achieve broader objectives. By integrating community engagement with sustainable development, festivals serve a wider purpose.

As emphasized by Hidayah et al. (2023) notes that community-based festivals enrich social capital while also enhancing local competitiveness and sustainable development. Cultural festivals advance artisan entrepreneurship as well as tourism, which, besides being significant economic drivers, creates avenues for education and community resilience building. Such functions help the community to better manage socio-cultural and economic stresses (Li et al., 2021; Bitušíková, 2022). Moreover, festivals are often crafted with certain approaches in mind to engage residents and heighten their perspectives, thus fostering social cohesion as well as a collective identity within a community (Robertson et al., 2018). Efficient festival management that involves locals and promotes their active participation fosters local structural and cognitive social capital, as shown by Australia's Cygnet Folk Festival (Fiedler & Wickham, 2022). This illustrates a global pattern regarding the leveraging of local festivals across diverse contexts as tools for social capital accumulation. While Malaysia is developing new festivals, these studies should be integrated to maximize festival utility. Understanding festivals as vital instruments for community building enables their strategic use to enhance social capital, thereby strengthening community resilience, togetherness, and multiculturalism. Ultimately, the incorporation of social capital through festivals enhances life quality and fosters sustainable community development.

H1: There is a significant relationship between Social Capital and Community Development

Festival and Economic Revitalization

Festivals are not only expressions of culture, but they are also an important means of stimulating economic activity and enhancing social cohesion within the community. This overview consolidates recent reviews regarding the role festivals play in economic renewal. Literature suggests that festivals greatly impact the local economy through job creation and increased activity of small-scale enterprises. Small-scale enterprises. Solo entrepreneurs and local businesses are helped through the coordinated marketing provided at festivals in order to promote the culture of the region. For example, Wangdi, Dorji, and Wangchuck (2021) argue that festivals are embodiments of a community's sense of place and identity and thus foster local cultural heritage while providing rural development opportunities. Doe et al. (2021) also illustrate the impact of local festivals on the socio-economic stagnation of rural areas; the inflow of tourists enhances the economy through the purchase of accommodation, food and local crafts. In Malaysia, festivals like the Rainforest World Music Festival and the Georgetown Festival play a crucial role in developing cultural tourism. These events generate economic development by increasing spending from both local and foreign tourists. Bakas et al. (2019) noted that thematic elements of festivals are important to the local society, thereby making the festivals more attractive to tourists. This connection helps encourage community participation, which is important for the success of festivals as described in Hidayah et al. (2023). Additionally, community-based festivals are vital for the sustainable development of tourism, stressing the need for active local involvement in their design and execution. Hidayah et al. (2023) argue that festivals improve the competitive advantage of a locality and demonstrate sustainable development through community engagement.

The strong association of participation and successful festival outcomes suggests that meaningful involvement provides the community with more than just economic benefits, in this case, social and cultural pride combined with resilience. Moreover, the intrinsic values during festivals, including local heritage, play a vital role in nurturing community participation and belonging. Khuong and Uyen (2018) illustrate how the commemoration of cultural heritage through festivals not only boosts tourism but also highlights the socio-economic benefits resulting from cultural celebrations. In the same thoughts, Jarman (2018) explains that festivals help in transformative place-making, strengthening local identity and improving community relations simultaneously.

Commercialisation of festivals is also an area of concern that has been noted in literature. Brownett and Evans (2020) discuss the positive role that festivals may have on community inclusion but note that there are tensions that may arise due to commercial interests, which undermine genuine community values. Many regions struggle with the problem of balancing cultural integrity and economic revitalisation. Thus, community festivals should be researched further in order to ensure that the negative effects of commercialisation are mitigated while social and economic benefits are maximised.

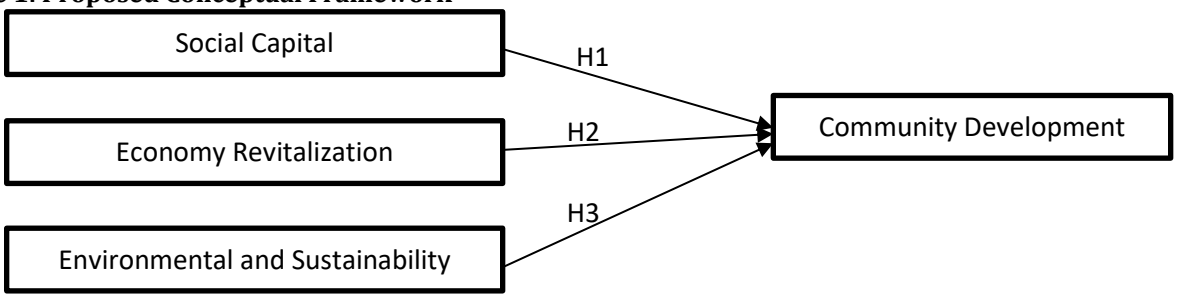
H2: There is a significant relationship between Economic Revitalization and Community Development

Festival and Environmental and Sustainability

Researchers are increasingly aware of the environmental impacts of festivals along with their potential to promote sustainability and community engagement. Festivals can encourage positive behaviour towards sustainability, generate economic activity, and aid in the preservation of culture. As highlighted by Jamali & Suharto (2023), sustainable community festival practices can alleviate some community issues by balancing environmental concerns with social well-being. This study emphasizes the need to adopt festival practices that reduce environmental damage, especially due to the large gatherings that such events foster. Importantly, Yan, Shen, and Hu (2021) also support this argument by studying the impact of communications from hosts during festivals on environmental care and waste management, illustrating that festivals offer opportunities for experiential learning. Moreover, some local cultural events in Malaysia, such as the Borneo International Festival of Arts (BIFA), have been recorded to support cultural revitalization and sustainable development. Jitman (2025) noted that BIFA is more than just a festival of the arts; it is associated with more holistic development initiatives such as Sarawak's Post-COVID Development Strategy 2030 and the United Nations Sustainable Development Goals (SDGs). These initiatives further enhance community engagement and influence the socio-economic structure of the region, demonstrating cultural activities interwoven with sustainable development ideals.

On-site sustainability practices, as mentioned by Kim and Kim (2018), are fuelled by the beliefs and values of the festival-goers. As they point out, personal beliefs and social norms shape behaviour at eco-friendly food festivals. Thus, attendees may transform their actions after attending educational components incorporated into festivals, which foster a culture of sustainability, along the lines of Borley, Wale, and Robinson (2013). Research conducted by Hidayah et al. (2023) emphasises the role of community-based festivals in the context of sustainable tourism. It appears that tourism festivals of Karimunjawa greatly aid in the sustainable tourism drive, thus fostering conservation at the local level. A similar concern is the greening of festivals discussed by Yamagishi and Ocampo (2022). This concept tackles the issue of festival tourism's impact on the environment through careful planning and collaboration with various stakeholders, especially in areas that attract a high number of tourists. The incorporation of sustainability within the festival's planning phase ensures enduring effects. The significance of sustainable event management is illustrated by Koenig-Lewis, Palmer, and Asaad (2021), who detail how visitor participation in cultural festivals can foster long-lasting socio-cultural legacies.
H3: There is a significant relationship between Environmental and Sustainability and Community Development

Figure 1: Proposed Conceptual Framework



3. Research Methodology

This study is based on a conceptual framework developed from past research on how festivals can help grow and improve communities. The study will use a quantitative research method, which means it will collect data in the form of numbers to test certain ideas or hypotheses. The research will be done in real community settings, especially in places where festivals are held. This helps ensure the findings are based on real experiences. To gather primary data, this research will utilize a survey-based approach using structured questionnaires. This method is particularly effective for collecting data from a large population, especially when targeting residents, local entrepreneurs (SMEs), and community leaders involved in or affected by festivals. The questionnaire will be designed to measure multiple constructs, including social capital, economic revitalization, cultural preservation, and environmental sustainability, which serve as independent variables, with community development as the dependent variable. In terms of sample size, the study will aim for a minimum of 300 valid responses, aligning with the recommendation of Wai et al. (2019) to ensure measurement reliability and validity in multivariate analysis. Additionally, Memon et al. (2020) support that a

sample size ranging from 160 to 300 observations is generally sufficient for the application of multivariate statistical techniques, such as Structural Equation Modeling (SEM) or multiple regression analysis, both of which will be considered for hypothesis testing and model validation.

4. Discussion

This conceptual paper emphasizes the growing concern regarding festivals in Malaysia beyond cultural showcases. It positions festivals within literature as purposeful instruments towards holistic community development through social capital, socioeconomic revitalization, and ecological sustainability. These core dimensions, framed from previous literature, illuminate how festivals can serve broader developmental objectives. Social capital accrued through civic participation helps promote stronger bonds and trust among people in a community. In addition, community-based festivals, in particular, provide opportunities for active participatory inclusion where community members can take part in the organizing and implementing activities (Hidayah et.al, 2023). It is also highlighted by the literature about the potential for social exclusion or tension due to poor participation. This implies that there is a need for more empirical studies on how diversity and inclusivity are managed in and across festivals in Malaysia, in the context of multi-ethnic or rural areas. Concerning economic revitalization, the literature review indicates that festivals are advantageous to the local economy as they promote tourism, cultivate small and medium enterprises (SMEs), and stimulate new business initiatives. However, there seems to be less empirical evidence on the distribution of these benefits, particularly about small towns, informal traders, or marginalized populations. More needs to be done to examine the economic ripple effects of festivals across diverse regions and sectors, using robust methods to capture not only the direct impacts but also the indirect effects. Finally, with the sustainability narrative gaining traction globally, the reviewed literature suggests there are gaps in the application of environmental sustainability for festivals in Malaysia. Despite the fact that a few festivals have incorporated sustainable practices, green policies are still lacking for most of them. This points to the need for further empirical research examining the awareness or actions taken towards the environment by festival organizers and attendees. In addition, it is still necessary to determine the best parameters for the celebration of culture while ensuring a minimal ecological footprint. Taken together, these insights illustrate the need for interdisciplinary and empirical research to validate and test the outlined frameworks in this paper. Such research could include quantitative surveys, relevant stakeholder interviews, and case studies to evaluate the performance of festivals within social, economic and environmental contexts.

5. Managerial Implications and Recommendations

The conceptual insights within this paper provide a number of event management strategic implications for organizers, policymakers, and stakeholders in the Malaysian events sector. To improve social capital, the more inclusive community-wide participatory planning approaches through local committees and volunteer initiatives should be adopted at the festival level. With regards to economic revitalization, festivals should be used to foster local entrepreneurial activity, especially among SMEs, by providing structured, subsidized vendor space opportunities and local business showcase events. To achieve a broader-based economic impact, selection criteria must be justifiable and non-discriminatory. Additionally, festival operations must incorporate environmental sustainability, such as through waste minimization, digital ticketing, and collaboration with environmental advocacy groups. Managers must set concrete, measurable sustainability targets, or else risk undertaking meaningless efforts that do not foster true ecological stewardship. Managers should also employ evidence-based frameworks for ongoing refinement through tools like post-event surveys and impact evaluations to enhance decision-making, thereby capturing relevant data aligned with predefined goals. As a last recommendation, these models should be complemented by institutional frameworks, policy incentives, and awards that encourage inclusivity and sustainable paradigm shifts in festival governance by tourism and government authorities. Implementing these approaches can enable the event sector to use festivals as tools for community development that drive sustained change.

Conclusion

This paper aims to provide a conceptual framework for understanding the impact of festivals on community development in Malaysia. It synthesises existing literature to argue that festivals help enhance social capital, stimulate local economic development, and promote environmental sustainability. However, these ideas need empirical support. Thus, this paper attempts to spur future empirical investigations and undertake research

that explores these relationships across various contexts, for example, urban and rural, contemporary and traditional. Such research is critical not only for scholarly advancement but also for its practical relevance. There exists an immense opportunity for the Malaysian event industry to benefit from well-researched, evidence-based approaches designed to optimally leverage the developmental impacts of festivals, while grappling with issues around inclusivity, equity, and sustainability. In framing a comprehensive research agenda and providing a theoretical underpinning, this paper aims to instruct policymakers, festival and event planners, and tourism officials on the tactical importance of such gatherings. Later studies based on this framework could yield the robust evidence and insights required to design national frameworks, funding strategies, and community participation models that enable festivals to drive meaningful change in the communities in which they are celebrated in Malaysia.

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Humanitarian Aid and Economic Growth: A Panel Data Analysis of ASEAN, China and India

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Abstract: This study investigates the relationship between humanitarian aid and economic growth, guided by economic theory, using panel data analysis. Humanitarian aid, which refers to voluntary and unpaid assistance aimed at improving societal welfare, has gained significant attention from both academics and policymakers. Economic theory offers conceptual frameworks for understanding the driving forces, incentives, and outcomes of human actions, including voluntary efforts. The study employs a panel dataset that includes five ASEAN countries, Malaysia, Indonesia, Singapore, Thailand, and the Philippines, along with two significant regional players, China and India, spanning from 1991 to 2023. These countries, while not members of ASEAN, are pivotal to the broader Southeast Asian region's economic and humanitarian landscape, which justifies their inclusion in this analysis. The relationship between humanitarian aid and economic growth is examined through the Pooled Mean Group (PMG) estimation technique. Key findings suggest that humanitarian aid has a positive impact on economic growth, with variations across different countries within the region. The results also highlight areas of agreement and disagreement within the academic research on the intersection of humanitarian efforts and economic development, pointing to opportunities for further exploration. This study enhances understanding of the role of voluntary contributions in economic systems, offering valuable insights for policymakers, practitioners, and researchers seeking to leverage humanitarian aid to foster societal well-being and economic growth.

Keywords: *Humanitarian, Economic, Community development, Social capital.*

1. Introduction

Humanitarian refers to voluntary and unpaid assistance aimed at improving societal welfare. It has been recognized as a crucial component of societal development to foster social cohesion, community engagement, and individual empowerment. In the context of economic development, the potential impact of humanitarian aid remains an area of scholarly interest and debate. The Association of Southeast Asian Nations (ASEAN) region, with its diverse economies and cultural landscapes, presents a compelling case for exploring the relationship between humanitarian aid and economic growth.

While previous studies have examined the role of humanitarian aid in developed economies, the impact of such aid on economic growth in emerging and developing nations, particularly in the ASEAN context, remains underexplored. Studies focusing on the ASEAN region are sparse, and those that do exist often fail to capture the region's diversity in terms of socio-economic conditions and cultural landscapes (Smith & Brewis, 2017). Furthermore, the heterogeneity among ASEAN member states highlights the need for a comprehensive and region-specific analysis that can account for variations in the impact of humanitarian aid on economic development across the region. Recent studies have shown that while social capital and human capital development play significant roles in economic growth, their specific relationship with humanitarian aid remains under-examined (Putnam, 2000; Becker, 1994).

This study aims to fill this gap by investigating the impact of humanitarian aid on economic growth in the ASEAN region, employing a pooled mean group (PMG) panel data analysis approach. The PMG estimator, developed by Pesaran et al. (1999), allows for the estimation of heterogeneous short-run dynamics while imposing homogeneous long-run coefficients across cross-sectional units. This methodology is well-suited for

examining the diverse economic and social contexts within ASEAN, providing a clearer understanding of the role humanitarian aid plays in fostering economic development.

The research also explores the potential mediating role of social capital and human capital development in the relationship between humanitarian aid and economic growth. Social capital, which includes trust, norms, and networks, has been recognized as a critical factor in promoting economic development (Putnam, 2000). Similarly, human capital, through education and skills training, is a well-established driver of growth (Becker, 1994). By examining these mediating factors, the study seeks to provide a deeper understanding of how humanitarian aid contributes to sustainable economic development within the ASEAN context.

Additionally, this study will assess variations in the impact of humanitarian aid across different ASEAN member states, accounting for socio-economic and cultural differences. This will offer valuable insights into the contextual factors that influence the relationship between humanitarian aid and economic growth, informing policies and strategic initiatives aimed at fostering regional development.

The research objectives are clearly focused on examining the effects of humanitarian aid on economic growth, considering the potential mediating roles of social and human capital. By utilizing a robust econometric approach and focusing on the ASEAN region's specific characteristics, this study will contribute to the existing body of literature on humanitarian aid and its economic impacts. The findings will inform policymakers, development agencies, and civil society organizations on how best to harness humanitarian aid for promoting sustainable economic growth in the region.

The paper is organized as follows: Section 2 provides a literature review, highlighting the relationship between humanitarian aid and economic growth. Section 3 describes the data used and the econometric methodology. Section 4 presents the empirical results and sensitivity tests, followed by Section 5, which outlines policy recommendations based on the study's findings.

2. Literature Review

Theoretical Review

Humanitarianism and its role in fostering economic growth have been explored through various theoretical lenses. The human capital theory posits that investment in human resources, including education, training, and skill development, contributes to increased productivity and economic growth (Becker, 1964; Schultz, 1961). Humanitarian can be considered a form of human capital investment, as it provides opportunities for individuals to acquire new skills, knowledge, and experiences that can enhance their employability and productivity (Wilson, 2000; Putnam, 2000).

The social capital theory, on the other hand, emphasizes the importance of social networks, norms, and trust in facilitating collective action and cooperation (Coleman, 1988; Putnam, 1995). Humanitarians can foster social capital by strengthening community ties, promoting civic engagement, and facilitating the exchange of information and resources (Taniguchi, 2012; Enjolras, 2015). Strong social capital has been linked to improved economic outcomes, such as higher levels of trust, reduced transaction costs, and increased innovation (Knack and Keefer, 1997; Zak and Knack, 2001).

Furthermore, the nonprofit sector theory suggests that voluntary organizations can play a crucial role in addressing market and government failures by providing public goods and services more efficiently and effectively (Weisbrod, 1975; Hansmann, 1980). Humanitarian supports the operations and sustainability of nonprofit organizations, which can contribute to economic growth by addressing unmet societal needs and fostering social and economic development (Salamon and Anheier, 1998; Anheier and Salamon, 2006).

Empirical Review

Several empirical studies have examined the relationship between humanitarian and economic growth, with mixed findings. Mayer (2003) analyzed data from 37 countries and found a positive association between volunteer work and economic growth, suggesting that humanitarian contributions contribute to the accumulation of human and social capital. Similarly, Meier and Stutzer (2008) utilized data from Swiss cantons

and observed a positive correlation between volunteering and income levels, indicating a potential link between humanitarian and economic prosperity.

However, other studies have reported mixed or insignificant results. Algan et al. (2013) investigated the relationship between various measures of social capital, including volunteering, and economic growth across European regions. While they found a positive association between certain aspects of social capital and economic performance, the link between volunteering and economic growth was weak or insignificant.

In the context of developing countries, Alesina and La Ferrara (2000) analyzed data from the World Values Survey and found that participation in associational activities, including volunteering, was positively correlated with economic growth in lower-income countries. Conversely, Helliwell et al. (2014) examined the relationship between social trust and economic growth across countries and found that the positive effect of social trust diminished as income levels increased, suggesting that the impact of social capital on economic growth may vary across different stages of development.

3. Data and Methodology

Data

An annual time series data was used in this study, where the data from 1991 to 2023 was collected (33 years) for five chosen ASEAN countries, namely Malaysia, Singapore, Thailand, Indonesia, and the Philippines. The countries mentioned were chosen, and the time taken for the study was decided based on the availability of data for all variables needed in this study. The dependent variables were defined as follows: GDP growth (annual %). Meanwhile, the explanatory or independent variables were defined as time spent volunteering (% of population). All variables in this study were made in natural log form, thus generated from the World Development Indicator World Bank Online Database (2024).

The estimation of the pooled mean group

The long-run cointegration vector test could be performed after the establishment of the panel cointegration, and there are numerous approaches to it, for example, the panel's fully modified ordinary least squares (FMOLS) and panel dynamic ordinary least squares (DOLS). However, a panel ARDL model, or Pooled Mean Group (PMG) estimation, which was introduced by Pesaran et al. (1999), was chosen instead, and this restricts the similarities between the long-run coefficients, although the short-run coefficients and error variances are allowed to differ across groups. It was noted that the long-run and short-run relationship among the variables of interest and the convergence parameter (adjustment coefficient) could be grasped through this estimation framework. Besides, the panel analysis on unlimited requirements for the Pooled Mean Group (PMG) model for time periods t=1,2,…, T and groups i=1,2,…, N; and the dependent variable is:

$$y_{it} = \sum_{j=0}^{p} \partial_{ij}\ y_{i,t-j} + \sum_{j=0}^{q} \gamma'_{ij} x_{i,t-j} + \mu_i + \varepsilon_{it} \quad (1)$$

Based on this formula, y_{it} It is a scalar dependent variable that represents economic growth. Meanwhile, $x_{i,t}$ refers to the k x 1 vector of the independent variables for the group i, which are humanitarian aids. Furthermore, μ_i represents the fixed effects (country-specific effects), while $\lambda_{ij}{}'s$ Represents the scalar coefficients of lagged dependent variables. Last but not least, y'_{ij} Refers to the k x 1 coefficient vectors.
The re-parameterized form of Equation (2) was formulated as follows:

$$\Delta y_{it} = \theta_i\left(y_{i,t-1} + \beta_i x_{i,t-1}\right) + \sum_{j=1}^{p-1} \partial_{ij}\ lH_{i,t-j} + \sum_{j=0}^{q-1} lH_{ij} x_{i,t-j} + \mu_i + \mu_i \quad (2)$$

This is where θ_i represents a scalar coefficient of the lagged dependent variable, while represents the k x 1 vector of coefficients on explanatory variables (Net ODA received per capita (current US$) as a proxy for humanitarian). Furthermore, partial ∂_{ij}'s refers to scalar coefficients on lagged first differences of dependent variables. Ten, lV_{ij} and y's are k x 1 coefficient vectors on the first-difference of explanatory variables and their lagged values. Trade openness can affect economic growth and should be included as a control variable.

4. Results and Discussion

The statistics obtained from the panel unit root tests are displayed in Table 1 below. The variables are labelled as follows: LY represents economic growth, while the ones labelled as LV represent GDP per capita, and LPE is referred to as public expenditure. Based on the test statistics, all variables are at a non-stationary level. However, the IPS panel unit root shows that only LFDI (with trend) and LPE (without trend) are stationary at 1% and 5% significance levels, respectively. LY variables are only stationary at first difference, with a one percent significance level. Therefore, it can be concluded that panel variables are separately categorized as level I(0) and order one, I(1).

Table 1: Panel unit root test

Series	LY		LH		LTO	
	No Trend	Trend	No Trend	Trend	No Trend	Trend
			Level			
IPS	0.670	-3.381***	3.299	0.003	-1.917**	0.430
	(0.6674)	(0.0004)	(0.9995)	(0.5012)	(0.0276)	(0.6664)
ADF-Fisher	11.234	35.506***	3.774	14.525	22.481*	9.450
	(0.7550)	(0.0008)	(0.9967)	(0.4113)	(0.0693)	(0.8011)
PP-ADF	21.623	46.075***	4.263	6.355	17.755	6.414
	(0.0348)	(0.0000)	(0.9937)	(0.9567)	(0.2181)	(0.9549)
			First Different			
IPS	-12.031***		-5.066***		-5.358***	
	(0.0000)		(0.0000)		(0.0000)	
ADF-Fisher	111.789***		62.312***		53.725***	
	(0.0000)		(0.0000)		(0.0000)	
PP-ADF	176.635***		73.6412***		96.876***	
	(0.0000)		(0.0000)		(0.0000)	

*Notes: the numbers in parentheses are estimated values. ***, **, and * indicate the rejection of the null value of non-stationary levels, with 1%, 5%, and 10% level of significance, respectively. In addition, Schwarz's Bayesian Information Criterion (SBC) determines the maximum number of lag selection.*

The result of Pedroni's panel cointegration test, which aimed to prove the existence of a long-run relationship between humanitarian aid and economic growth, is displayed in Table 2. The result indicated that the null hypothesis of no cointegration, which was under the level of Pedroni cointegration, was rejected by four of seven test statistics without trend. Meanwhile, three of the test statistics rejected the null hypothesis at a one percent level of significance, and one test rejected the null hypothesis at a five percent level of significance. On the other hand, five out of seven test statistics rejected the null hypothesis of no cointegration, which was under the level of Pedroni cointegration with trend. Besides, four of the tests rejected the null hypothesis with a one percent significance level, and one test rejected the null hypothesis with a five percent significance level. Overall, based on the results, it could be suggested that cointegration exists, and it was expected that the series would move together in the long run.

Table 2: Pedroni panel cointegration

Pedroni Cointegration	Without trend	With trend
Panel v-Statistic	-2.2835	-3.5735
Panel rho-Statistic	-5.1134***	-2.4856**
Panel PP-Statistic	-11.734***	-36.345**
Panel ADF-Statistic	-7.345***	-10.245***
Group rho-Statistic	-1.746**	-0.1221
Group PP-Statistic	-5.566	-9.3963***
Group ADF-Statistic	-3.8433	-4.3215***

*Notes: ** and *** indicate significance level at 5 and 1 percent levels, respectively. Number of countries (N) = 7, and periods (T) = 31. The Maximum number of lags on the Schwarz Information Criterion (SIC) is 2.*

Table 3 shows the regression findings that came from the PMGE approach. Moreover, a report comparing the outcomes of the Mean Group Estimator (MGE) and Dynamic Fixed Effect (DFE) was written. Higher standard errors and adjustment speeds had resulted from the limitations in the common long-run coefficients of MGE and DFE. With the less stringent protocols in MGE and DFE, which led to the effectiveness of these techniques, this result was expected. A further test for the slope homogeneity hypothesis was the Hausman (1978) test. There was no rejection of the long-run homogeneity restriction hypothesis, and the Hausman test for PMGE and MGE was linked with p-values greater than 0.05. The error correction process speed showed negative values, which for all three estimates were statistically significant.

Table 3: Mean Group Estimation (MGE), Pooled Mean Group Estimation (PMGE), and Dynamic Fixed Effect (DFE).

Dependent variable (ly)	MGE	PMGE	DFE
	Long-run result		
$ln\ H$	1.81***	1.58***	1.67***
	(0.47)	(0.10)	(0.27)
$ln\ TO$	1.66	0.59**	3.04***
	(2.10)	(0.29)	(1.00)
	Short-run result		
Speed of adjustment	-0.66***	-0.44***	-0.93***
	[0.00]	[0.00]	[0.00]
$\Delta ln\ H$	-1.309	1.839**	0.566
	(2.82)	(0.83)	(3.04)
$\Delta ln\ TO$	-0.992	-0.480	-1.807
	(1.10)	(0.32)	(1.79)
Maximized log likelihood	-29.4179		
Hausman test	0.19		
	[0.908]		
Number of countries	7		
Number of observations	217		

*Notes: All variables are displayed in natural algorithms. The standard errors in brackets; * denote significance level at 10%; ** significance level at 5%; *** significance level at 1%. Hausman is a test for pool ability, which is conducted for the equivalence of PMGE and MGE. The null hypothesis will be accepted (i.e., p-value greater than 0.05) if the homogeneity of cross-sectional long-run can be accepted. P-values are included in square brackets.*

Based on the PMGE model, the predicted signs (positive) and statistically significant level were shown by the coefficients of the ly variables. Meanwhile, a one percent significance level was for the long run, and a five percent significance level was for the short run. However, due to the Hausman test's failure in rejecting the null hypothesis, there was a vast difference between the PMGE and the consistent MGE. It was found in this study that the long-run coefficient of humanitarian aid (ln H) showed significance at the five percent level, which resulted in positive economic growth in the long run. Based on this coefficient, it was implied that humanitarian aid inflows will increase by 0.59 per cent, with every one per cent increase in public expenditure. Besides, the significantly negative error correction term was proof of the long-run relationship between economic growth and humanitarian aid inflows.

However, it was also noticed that the short-run coefficients are positive but not significant. This result mainly represents the lack of a short-run relationship between economic growth and humanitarian aid inflows. In general, short-run coefficients reflect the adjustment of the economy. Therefore, the results in this study indicated that the contemporaneous co-movement of economic growth and humanitarian aid inflows showed less to no reaction to past shocks. It was suggested by the size of the average coefficient, which was 0.44, that the estimated speed of adjustment to the long-term relationship was approximately 44 percent per year. Last but not least, in order to obtain equilibrium within three years, the system was reversed.

From all the results discussed above, it can be concluded that humanitarian aid has provided positive outcomes to economic growth in the long run, and the results obtained from this study displayed the same findings in

both Table 3 and Table 4. The findings from the Pooled Mean Group (PMG) estimation indicate a positive relationship between humanitarian and economic growth in the ASEAN region. This result is consistent with the theoretical perspectives and empirical evidence from previous studies that highlight the potential contribution of humanitarian to economic development. From a theoretical standpoint, the positive association between humanitarian and economic growth can be explained through the lens of human capital theory (Becker, 1964; Schultz, 1961). Humanitarian provides individuals with opportunities to acquire new skills, knowledge, and experiences, which can enhance their productivity and employability. As volunteers engage in various activities, they develop transferable skills such as teamwork, problem-solving, communication, and leadership, which are highly valued in the labor market (Wilson, 2000). By improving the human capital of individuals, humanitarian can contribute to increased productivity and economic growth.

Moreover, the social capital theory (Coleman, 1988; Putnam, 1995) supports the positive relationship between humanitarian and economic growth. Humanitarian fosters social capital by strengthening community ties, promoting civic engagement, and facilitating the exchange of information and resources (Taniguchi, 2012; Enjolras, 2015). Strong social capital can lead to improved economic outcomes, such as increased trust, reduced transaction costs, and enhanced innovation (Knack and Keefer, 1997; Zak and Knack, 2001). These factors can collectively contribute to a more favorable environment for economic growth. The findings of this study are in line with previous empirical research that has documented a positive association between humanitarian and economic growth. Mayer (2003) found that volunteer work contributes to the accumulation of human and social capital, which in turn fosters economic growth across 37 countries. Similarly, Meier and Stutzer (2008) observed a positive correlation between volunteering and income levels in Swiss cantons, suggesting a potential link between humanitarian and economic prosperity.

Furthermore, the positive relationship between humanitarian and economic growth in the ASEAN region can be attributed to the role of nonprofit organizations. As suggested by the nonprofit sector theory (Weisbrod, 1975; Hansmann, 1980), voluntary organizations can address market and government failures by providing public goods and services more efficiently and effectively. Humanitarian supports the operations and sustainability of these organizations, which can contribute to economic growth by addressing societal needs and fostering social and economic development (Salamon and Anheier, 1998; Anheier and Salamon, 2006).

It is important to note that while the PMG estimation reveals a positive relationship between humanitarian and economic growth, the strength and magnitude of this relationship may vary across different ASEAN countries and contexts. Factors such as the level of economic development, cultural norms and institutional frameworks can influence the extent to which humanitarian contributes to economic growth. Additionally, the quality and impact of volunteer activities may play a role in determining their economic benefits.

Overall, the positive association between humanitarian and economic growth in the ASEAN region aligns with theoretical perspectives and empirical evidence from previous studies. By fostering human capital, social capital, and supporting the nonprofit sector, humanitarian organizations can contribute to increased productivity, innovation, and the efficient provision of public goods and services, ultimately fostering economic growth and development.

5. Conclusion

The findings of this study provide empirical evidence for the positive role of humanitarian in fostering economic growth in the ASEAN region. By leveraging data from multiple countries and employing the Pooled Mean Group

(PMG) estimation technique, this research contributes to the growing body of literature examining the economic implications of volunteering activities. The positive relationship between humanitarian and economic growth can be attributed to several factors. Humanitarian facilitates the development of human capital by providing individuals with opportunities to acquire new skills, knowledge, and experiences, thereby enhancing their productivity and employability. Additionally, volunteer activities strengthen social capital by promoting civic engagement, community ties, and the exchange of information and resources, which can lead to improved economic outcomes through increased trust, reduced transaction costs, and enhanced innovation.

Furthermore, the nonprofit sector, which relies heavily on volunteer support, plays a crucial role in addressing market and government failures by providing public goods and services more efficiently and effectively. By supporting the operations and sustainability of these organizations, humanitarian contributions contribute to economic growth by addressing societal needs and fostering social and economic development.

Based on these findings, several policy recommendations can be made to harness the potential of humanitarian for economic growth in the ASEAN region: (1) Promote and facilitate humanitarian: Governments and policymakers should implement initiatives and programs that encourage and support humanitarian among citizens. This can include public awareness campaigns, tax incentives, and the establishment of volunteer centers or platforms to connect individuals with suitable volunteer opportunities. (2) Invest in capacity-building for nonprofit organizations: Strengthening the capacity of nonprofit organizations through training, resource allocation, and infrastructure development can enhance their ability to effectively leverage volunteer efforts and contribute to economic growth. (3) Foster partnerships and collaboration: Encouraging partnerships between the public, private and nonprofit sectors can facilitate the exchange of knowledge, resources, and best practices, ultimately enhancing the impact of volunteer initiatives on economic development. (4) Promote corporate volunteering: Encouraging corporate volunteering programs can not only benefit communities but also contribute to employee development, skill acquisition, and organizational performance, thereby supporting economic growth. (5) Facilitate cross-border and regional collaboration: Promoting cross-border and regional collaboration in volunteer initiatives can foster knowledge sharing, cultural exchange, and the transfer of best practices, potentially amplifying the economic benefits of humanitarian efforts across the ASEAN region.

Future research should explore the specific mechanisms through which humanitarian contributions contribute to economic growth in different contexts and sectors. Additionally, investigating the potential variations in the impact of humanitarian interventions based on factors such as the level of economic development, cultural norms, and institutional frameworks can provide valuable insights for policymakers and practitioners. Furthermore, future studies could explore the potential synergies between humanitarian and other drivers of economic growth, such as innovation, entrepreneurship, and sustainable development practices. By adopting a holistic approach and considering the interplay between various factors, researchers can develop a more comprehensive understanding of the role of humanitarian in fostering long-term, inclusive, and sustainable economic growth.

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Determining Factors of Behavioral Intention to Adopt Digital Banking: A Pilot Study on Youngsters in Malaysia

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Abstract: Some consumers continue to prefer traditional banks due to confusion or a lack of understanding about digital banking. Conventional methods of consumer profiling, which rely on past behavior and existing assets, are unlikely to drive the future success of digital banking. To achieve effective digital transformation, it is crucial to understand the behavior, preferences, and decision-making patterns of today's digital consumers. This study explores the influence of performance expectancy, effort expectancy, social influence, and facilitating conditions on young people's intention to use digital banking, using the Unified Theory of Acceptance and Use of Technology (UTAUT) as a framework. Data were collected from 55 respondents through non-probability sampling and analyzed using reliability and regression analysis. The findings revealed a significant positive relationship between behavioral intention and both performance expectancy and facilitating conditions. These insights can help digital banking providers develop better strategies to encourage wider adoption of their services.

Keywords: *Digital Banking, UTAUT, Behavioral Intention, Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition.*

1. Introduction and Background

Digital technologies have progressed swiftly, bringing profound changes across multiple industries, with the banking sector being notably impacted. GXBank, which commenced operations in late 2023, rapidly attracted close to one million users, positioning itself as an early leader in the digital banking space (Rowena, 2025). However, the emergence of new entrants such as Ryt Bank is expected to disrupt the existing market dynamics. Ryt Bank which is a collaboration between YTL Digital Capital and Sea Limited has recently secured regulatory endorsement to begin the service. The bank plans to integrate advanced artificial intelligence capabilities through Ryt AI to provide inclusive, goal-oriented financial services aimed at enhancing customer engagement. As competition among digital banks intensifies, conventional financial institutions may encounter growing pressure to accelerate their digital transformation efforts.

In 2025, approximately 8.4 million Malaysian adults which is equivalent to 37% of the adult population will hold digital bank accounts (Asian Banking & Finance, 2021). Malaysia ranks fourth behind Germany and Brazil in terms of digital banking adoption, where approximately 28% of the population reported having digital banking accounts. In Malaysia, Generation Z (individuals born between 1997 and 2012) represents a substantial proportion of digital banking users. Digital engagement patterns, particularly among the younger demographic (aged 21-39), show a relatively higher preference for 'digital first' and 'multi-channel' banking approaches which is 35% compared to 31% in other age groups (Suhaidi, 2021). Generation Z and Millennials are the most active users of mobile banking applications, with strong expectations for rapid QR-based transactions and user-friendly interface designs.

In 2021, Malaysia Digital Economy Blueprint (MyDIGITAL) was launched to highlight the national agenda in order to position Malaysia to lead the digital economy in the region by harnessing digital technologies to drive economic growth, enhance public sector efficiency, and promote digital inclusivity (MDEC, 2021). This strategic framework is to encourage more youngsters to adopt digital banking services as their behavioral patterns are increasingly aligned with digital banking innovations. Understanding the key determinants in adopting digital banking is critical for financial institutions aiming to expand market reach and effectively engage with this digitally native segment. Digital banking involves a wide array of technology-based financial services enabling users to perform transactions, oversee their accounts, and utilize financial products through internet platforms and mobile apps. More people are using digital banking because people feel it increases convenience,

operational efficiency, and round-the-clock accessibility (Tiong, 2020). Additional advantages include lower transaction costs and improved convenience. Despite these benefits, adoption rates among Malaysian youth remain varied. Accordingly, examining the primary factors that influence the adoption intentions of digital banking among Malaysian youth by offering insights that may inform strategic decisions by financial institutions and policymakers is the main focus of this study.

This study gains importance due to the rising reliance on digital financial services (DFS) among the youth population in Malaysia. The COVID-19 pandemic has notably increased the transition towards digital payment platforms. Digital wallet adoption among 18- to 24-year-olds (Generation Y) reached 66% by the third quarter of 2021. This growing trend underscores the necessity to examine the factors that youngsters consider in adopting digital banking services. Accordingly, the present study aims to examine how performance expectancy, effort expectancy, social influence, and facilitating conditions affect the intention of youngsters to adopt digital banking services. This investigation is using the Unified Theory of Acceptance and Use of Technology (UTAUT). Subsequent parts will review further on these variables, outline the research methodology, present the findings, and offer an inclusive summary of the conclusions.

2. Literature Review

Behavioral Intention: This study determines the primary factors affecting behavioral intention using the Unified Theory of Acceptance and Use of Technology (UTAUT) as the theoretical framework. The framework posits that individuals form behavioral intentions based on four primary constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). These theories contributed to the formation of a unified framework that effectively captures user intention and subsequent usage behavior. In this study, all four UTAUT dimensions are utilized as predictors to assess the Malaysian youngsters' behavior to adopt digital banking.

Performance Expectancy: Performance expectancy is the degree to which individuals believe that specific technology will be adopted when it increases their task functioning. For this study, it is about users' perceptions of the potential benefits derived from adopting digital banking services. This construct is parallel with perceived usefulness, as originally introduced by Davis et al. (1989), emphasizing the value a system provides in enhancing efficiency and effectiveness. According to Venkatesh et al. (2003), performance expectancy is a key determinant of users' acceptance of digital technologies, including online banking. Users benefit from the convenience and cost savings of being able to access banking services remotely, around the clock, which enhances both ease of use and financial efficiency. Numerous recent studies have reaffirmed the positive and significant relationship between performance expectancy and behavioral intention to adopt financial technologies, such as mobile payments and online banking services (Alalwan et al., 2018; Farzin et al., 2021; Gupta & Arora, 2020; Venkatesh et al., 2003). Empirical evidence continues to support this association. For example, a study done by Mohd Rashid et al. (2023) shows a significant relationship between performance expectancy and the adoption of digital banking among Malaysian consumers. Likewise, Rahi and Abd.Ghani (2019) underscored the importance of performance expectancy in shaping users' intentions to utilize internet banking platforms.
H1: Performance expectancy has a significant positive relationship with behavioral intention to adopt digital banking among Malaysian youngsters.

Effort Expectancy: Effort expectancy is when people feel easy to use the technology. This study pertains to the users' views on the platform's simplicity and ease of navigation to use digital banking. Studies consistently show that effort expectancy positively influences intentions to adopt digital banking services. When users find mobile banking applications intuitive and easy to use, the possibility of adoption increases (Mustika & Puspita, 2021). This relationship has been further substantiated in recent studies. Meiranto et al. (2024) found a significant relationship between effort expectancy, which drives the adoption of digital banking. Similarly, Mangini et al. (2021) found that people are more likely to adopt financial technologies when they find the interface to be user-friendly. Mustika and Puspita (2021) emphasized that usability is the most important factor to increase the intention to adopt mobile banking applications. Additionally, Mohd Rashid et al. (2023) reported a significant positive influence between effort expectancy and adoption intention of digital banking among Malaysian consumers. These findings collectively suggest that an important factor that most influences the

adoption of digital banking services is effort expectancy. Based on this understanding, the hypothesis of the present study is:
H2: Effort expectancy has a significant positive effect on behavioral intention to adopt digital banking among Malaysian youngsters.

Social Influence: Social influence is the degree to which the adoption of the technology is influenced by the people around us. Within digital banking, this concept reflects how the intention to adopt the service will be influenced by people around them. Empirical studies have consistently shown that social influence is the main factor in determining the adoption intention to adopt digital financial technologies. For instance, Mohd Rashid et al. (2023) found a positive and significant relationship between social influence and the intention to adopt digital banking among Malaysian consumers. This suggests that adoption of digital banking services will increase when people think that those around them endorse or expect such behavior. Similarly, Safira and Baridwan (2018) highlighted that social power substantially shapes behavioral intentions in adopting mobile banking. In addition, a study done by Kumari et al. (2023) reported a comparable relationship of social influence on the adoption of cryptocurrency. While a study done by Sivathanu (2019) confirmed the relevance of social influence in the context of digital payment systems. Based on this, the present study proposes the following hypothesis:
H3: Social influence has a significant positive effect on behavioral intention to adopt digital banking among Malaysian youngsters.

Facilitating Condition: Facilitating conditions are the extent to which individuals believe organizational and technical support is in place to encourage the adoption of a given technology (Venkatesh et al., 2003). Factors such as internet access, customer support availability, and compatibility of devices or platforms are included in facilitating conditions. Existing research has consistently shown a significant relationship between facilitating conditions and behavioral intention to adopt digital financial services.. For example, studies by Nur and Panggabean (2021) and Seesuk (2020) found a positive and significant influence between facilitating conditions and intentions to adopt mobile banking. This is similar to the study done by Paraskevi et al. (2023) who highlighted the importance of adequate support systems in encouraging users to interact with digital chatbots. This effect extends beyond banking, as shown by Rahim et al. (2023), who emphasized the relevance of infrastructural readiness in the broader fintech ecosystem. Additionally, Sivathanu (2019) reported that reliable technological and infrastructural facility plays an important role in increasing users' willingness to adopt digital payment solutions. Based on these findings, the hypothesis for facilitating conditions is as follows:
H4: Facilitating condition has a significantly positive influence on behavioral intention to adopt digital banking among Malaysian youngsters.

3. Research Methodology

The population for this study consisted of Malaysian youngsters aged between 18 to 30 years old who have access to and experience in using mobile banking apps and online banking services as part of the digital banking platforms. Non-probability convenience sampling approach was used in selecting the participants which targeting individuals who satisfied the inclusion criteria: falling within the designated age bracket, residing in Malaysia, and being active users of at least one digital banking channel. Self-administered online survey developed via Google Forms was used in collecting the data resulting in 55 valid responses used for the pilot study. The survey was structured into two main parts. The first part gathered demographic data such as gender, age, marital status, monthly income, educational attainment, and how frequently participants visited a physical bank branch each month. The second part assessed the key dimensions under investigation. The dependent variable of this study is behavioral intention to adopt digital banking while performance expectancy, effort expectancy, social influence, and facilitating conditions served as independent variables. This study adopts a quantitative research methodology to empirically test the hypotheses using the Unified Theory of Acceptance and Use of Technology (UTAUT). The measurement items are 28 in total which were adapted from the validated scales used in Duarte and Pinho (2019). Seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used in collecting the responses. Data analysis, including hypothesis testing, was performed using SPSS software, with a significance threshold set at 10% ($\alpha = 0.10$) to evaluate the statistical robustness of the findings.

4. Findings

Data analysis of this section explained descriptive statistics, reliability analysis, and regression analysis. Initially, descriptive finding is provided to summarize respondents' demographic profiles and their behavioral intention toward adopting digital banking. The sample comprised predominantly male respondents, which aligns with demographic trends reported by the Department of Statistics Malaysia (2024), indicating a national sex ratio of 103 males per 100 females. All respondents are between the ages of 18 and 30 years old, who are the youngsters as defined by Awang (2023). Regarding marital status, the majority of participants were single, accounting for 48 respondents (87.3%), followed by 6 respondents (10.9%) who reported being married.

The data also revealed six income categories defined by the researcher. The most frequently reported monthly income category was below RM1,000, with 27 respondents (49.1%), followed by the RM1,001–RM2,000 range with 10 respondents (18.2%). At the higher end of the income spectrum, only one respondent (1.8%) reported earning RM5,001–RM6,000 monthly. The majority of the respondents were 41 individuals (74.5%), held a bachelor's degree. Followed by those with diploma or pre-diploma qualifications (9 respondents or 16.4%), and a smaller group holding master's degrees (5 respondents or 9.1%). Lastly, the frequency of physical visits to bank branches showed that 25 respondents (45.5%) reported visiting once per month—the highest recorded frequency. This was followed by 14 respondents (25.5%) who indicated they did not visit a bank branch at all within a typical month.

Profile of Respondents: Table 1 displays a summary of the descriptions of the total number of youngsters who contributed to the study.

Table 1: Demographic and Geographic Information Pertaining to Youngsters

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Males	18	32.7%
Females	37	67.3%
Total	**55**	**100%**
AGE		
18-30	55	100%
Total	**55**	**100%**
MARITAL STATUS		
Single	48	87.3%
Married	6	10.9%
Divorced	1	1.8%
Total	**55**	**100%**
MONTHLY INCOME		
Less than RM1,000	27	49.1%
RM1,001-RM2,000	10	18.2%
RM2,001-RM3,000	6	10.9%
RM3,001-RM4,000	9	16.4%
RM4,001-RM5,000	2	3.6%
RM5,001-RM6,000	1	1.8%
Total	**55**	**100%**
EDUCATION		
Diploma/Pre-Diploma	9	16.4%
Bachelor's Degree	41	74.5%
Master's Degree	5	9.1%
Total	**55**	**100%**
VISIT A BANK BRANCH A MONTH		
Once	25	45.5%
2 to 3 times	12	21.8%
4 to 5 times	4	7.3%
None	14	25.5%
Total	**55**	**100%**

Descriptive Statistics: As presented in Table 2, effort expectancy is the highest mean score among the studied variables with a value of 5.338. In contrast, social influence yielded the lowest mean score at 4.829. Despite these differences, the mean values for all variables were relatively close hovering around 4.800 or higher, suggesting a general tendency among respondents to agree with the statements across all constructs. The relatively high mean scores indicate that, while opinions varied, respondents generally leaned toward agreement, particularly in relation to effort expectancy. This suggests that most participants feel that it is easy for them to conduct the transaction when using the digital banking services and believe this shaped their behavioral intention to adopt such services. Conversely, the lower mean score for social influence implies that peer or societal pressure played a less substantial role in influencing respondents' adoption decisions.

With regard to variability, performance expectancy demonstrated the highest standard deviation (SD = 1.334), indicating greater dispersion in responses. On the other hand, effort expectancy showed the lowest standard deviation (SD = 1.146), suggesting more consistent agreement among respondents regarding the effort expectancy in adopting digital banking services.

Table 2: Descriptive Statistics

Variables	Descriptive Statistics Factor Name	Mean	Std. Dev.
BI	Behavioral Intention	5.264	1.274
PE	Performance Expectancy	5.245	1.334
EE	Effort Expectancy	5.338	1.146
SI	Social Influence	4.829	1.224
FC	Facilitating Condition	5.233	1.163

Reliability Analysis: Cronbach's Alpha was utilized to assess internal consistency, where the higher value is approaching 1.0. It indicates stronger reliability among the items within a given construct. As reported in Table 3, the construct of behavioral intention recorded the highest reliability score, with a Cronbach's Alpha of 0.972, which shows excellent internal consistency among the items. The construct of social influence also demonstrated strong reliability, registering the second-highest score at 0.950. Collectively, all constructs measured in the study yielded Cronbach's Alpha values exceeding 0.880, confirming that the instrument items consistently and accurately signified the theoretical constructs they were anticipated to measure.

Table 3: Reliability Analysis

Variables	No of Items	Cronbach's Alpha
Behavioral Intention	6	.972
Performance Expectancy	6	.943
Effort Expectancy	5	.880
Social Influence	5	.950
Facilitating Condition	6	.882

Reliability Analysis: Table 4 explained the results of a multiple regression analysis to assess the combined impact of performance expectancy, effort expectancy, social influence, and facilitating conditions on behavioral adoption of digital banking. The analysis produced a coefficient of determination (R^2) value of 0.773, suggesting that around 77.3% of the variance in users' behavioral intention can be described by these four predictor variables. These findings show a strong explanatory power of the model in accounting for the factors influencing digital banking adoption among the sampled population.

This finding reflects a high explanatory power, suggesting the proposed model effectively captures the primary factors influencing the adoption of digital banking services. Nevertheless, the remaining 22.7% of unexplained variance implies that other influential variables, which may also contribute to the formation of behavioral intention and warrant exploration in future research.

Table 4: Multiple Regression - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.879**	**.773**	**.754**	**.63713**

The regression findings, as in Table 5, reveal that performance expectancy exerts a positive and significant relationship on behavioral adoption, demonstrated by a standardized beta coefficient (β) of 0.216 and a t-value of 1.695. The corresponding p-value of 0.0906 meets the threshold for significance at the 10% level, thereby supporting the hypothesis with 90% confidence. This result is consistent with a study done by Farzin et al. (2021), which also identified a meaningful positive significant relationship between performance expectancy and the intention to use digital banking services.

Furthermore, facilitating conditions emerged as a strong dimension of behavioral intention, with a beta coefficient of 0.595 and a p-value of 0.001, indicating a high level of statistical significance at the 1% level. This suggests that individuals who prioritize adequate technical and organizational support significantly increase the adoption of digital banking, aligning with findings by Paraskevi et al. (2023).

In contrast, effort expectancy (β = 0.061, p = 0.678) and social influence (β = 0.058, p = 0.585) were found to have no statistically significant relationship with behavioral intention in this context. These results imply that for the Malaysian youth surveyed, the perceived ease of use and social encouragement were not critical drivers in the decision to adopt digital banking technologies.

Table 5: Multiple Regression - Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.115	.421		.274	.785
	Performance Expectancy	.206	.122	.216	1.695	.096
	Effort Expectancy	.068	.163	.061	.417	.678
	Social Influence	.060	.109	.058	.550	.585
	Facilitating Condition	.652	.156	.595	4.192	.001

Discussion

This study set out to identify the primary determinants of the intention to adopt digital banking among youngsters in Malaysia. The multiple regression analysis revealed that the four dimensions, which are performance expectancy, effort expectancy, social influence and facilitating condition are collectively explained 77.3% (R^2= 0.773) of the variance in behavioral intent in adopting digital banking. This high R^2 value indicates a strong model fit, suggesting that users' intentions are significantly influenced by these key constructs. This is consistent with the UTAUT framework, which posits that these factors are fundamental in shaping technology adoption behavior.

The results show the significant predictors, which are performance expectancy and facilitating conditions validating Hypotheses 1 and 4. These findings are parallel with earlier studies, including those by Abikari et al (2023), Ali et al. (2022), Yusof and Anthonysamy (2024) , and Hilal and Varela-Neira (2022), all of which underscored the important role of these constructs in influencing the adoption of digital banking services. Notably, the strong relationship between facilitating conditions and behavioral intention corroborates the findings drawn by Yuan et al. (2023) which emphasizes the importance of reliable technical infrastructure and institutional support in fostering digital banking adoption. On the other hand, effort expectancy and social influence did not have statistically significant effects on behavioral intention within this context. This suggests that, for the youth demographic surveyed, effort expectancy and social influence may not be as critical in shaping their intent to engage with digital banking platforms compared to functional benefits and infrastructural support.

Although digital banking has seen widespread adoption in many countries, its development in Malaysia

remains at a relatively early stage. To ensure a successful diversion from traditional to digital banking, it is crucial to understand both the enablers and barriers to adoption. This includes conducting broader, nationwide studies that consider demographic factors such as gender, age, education level, and income, all of which may moderate the adoption process.

Moreover, since digital banking serves as an alternative to conventional banking, understanding the decision-making processes behind users' preference for one system over another warrants further investigation. This study expands the body of knowledge on digital banking adoption by offering insights into the behavioral intentions of Malaysian youth. The outcomes highlight the critical importance for financial institutions to effectively communicate the practical advantages of digital banking while simultaneously ensuring that users are supported by robust technical and organizational infrastructure. By addressing both perceived value and usability support, service providers can enhance user acceptance and promote long-term engagement among younger consumers.

5. Managerial Implications and Recommendations

There are several limitations that future research could aim to overcome to provide a deeper understanding of the factors influencing digital banking adoption. First, the cross-sectional design employed restricts the ability to assess behavioral shifts over time. Future studies adopting a longitudinal approach could track changes in users' intentions across different stages of digital banking implementation, offering more dynamic insights into adoption patterns. Second, the present research uses used Unified Theory of Acceptance and Use of Technology (UTAUT). Subsequent studies may benefit from utilizing extended frameworks such as UTAUT2 or UTAUT3, which incorporate additional variables that may more accurately reflect the multifaceted nature of user acceptance behavior. Third, the sample was restricted to young adults in Malaysia, potentially limiting the external validity of the findings. Broader demographic representation and comparative analyses across diverse cultural or geographic settings could help determine whether the observed relationships hold in other contexts. Lastly, the current model included a limited set of predictors. Future research could expand the theoretical model by integrating supplementary constructs and employing advanced analytical techniques, such as confirmatory tetrad analysis to further intensify the robustness and validity of the findings.

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Redefines Traditional Techniques in Batik Industry: A SWOT Analysis Approach

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Abstract: This research investigates a contemporary strategy for revitalizing Malaysia's batik industry by introducing the Batik Pointillism Block, a modern substitute for the traditional copper batik blocks. Utilizing a focused qualitative case study alongside SWOT analysis, the study closely examines the strengths, weaknesses, opportunities, and threats related to this product innovation. The Batik Pointillism Block, manufactured with CNC technology and heat-resistant acrylic, directly addresses persistent challenges in the sector, including high production costs, limited skilled labor, and waning interest from younger generations. Findings indicate that this new approach can enhance productivity, reduce operational expenses, and expand design versatility, thereby making batik production more accessible, particularly for B40 communities and emerging young artisans. Nonetheless, limitations persist regarding distribution, market reach, and users' technical proficiency, which currently hinder broader adoption. The study further underscores the potential of social innovation and community-driven training initiatives in supporting both cultural preservation and economic development. From a managerial perspective, the findings suggest a clear need for structured training programs, diversified marketing strategies, sustained investment in research and development, and the formation of strategic partnerships to facilitate commercialization and scalability. Ultimately, the Batik Pointillism Block represents a sustainable and inclusive pathway for modernizing Malaysia's batik industry while safeguarding its cultural heritage.

Keywords: *SWOT Analysis; Block Batik Innovation; Batik; Sustainability*

1. Introduction and Background

Batik is crucial to the culture and economic growth in Malaysia. Batik art in Malaysia originated around 1921, greatly enhancing economic activities and entrepreneurial prospects in rural areas, especially in the East Coast Region, specifically Kelantan and Terengganu (Nugroho et al., 2022). The earliest batik techniques introduced in Malaysia involved using block prints (Rahayu & Peng, 2020). This traditional textile art form has had a significant impact on both the economy and culture (Poon, 2020). Recognizing batik as an intangible cultural heritage by UNESCO shows how vital the batik is, as the batik shows how communities express themselves artistically and culturally (Asmah et al., 2018; Nugroho et al., 2022). The preservation and promotion of batik are vital for safeguarding cultural heritage and ensuring the economic sustainability of local artisans and businesses.

Social innovation is therefore essential for maintaining and safeguarding the cultural heritage of batik by confronting challenges and capitalizing on opportunities. It is crucial to support initiatives that promote cultural identity and awareness. Social Innovation (SI) refers to the deployment of novel solutions targeting societal challenges, with the dual aim of generating economic value and strengthening social welfare and environmental sustainability (Aksoy et al., 2019; Gupta et al., 2020; Westley & Antadze, 2010). Social innovation efforts will help people recognize batik as an intangible cultural heritage that shows how people express themselves creatively and culturally, which will help preserve and promote it. Community empowerment initiatives are also significant. They help to protect batik by involving local artisans and communities, which keeps batik production economically viable while keeping traditional techniques and designs. To guarantee its sustained relevance, extensive educational initiatives aimed at imparting the complex knowledge and specialized skills intrinsic to batik production to subsequent generations are imperative (Poon, 2020). These efforts help keep traditional methods alive, promote cultural heritage, and help local economies grow (Nugroho et al., 2022).

Through analyzing a single case study, this study conducts a thorough SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of the novel technique in batik block. This innovative technique replaces the traditional batik block made of copper. It evaluates the internal strengths and weaknesses of these novel methods, as well as the external opportunities and threats in the market. In conclusion, this study highlights the importance of adopting innovative methodologies in batik block processing, fostering a more competitive and sustainable Batik industry.

2. Literature Review

This section presents literature evaluations on the significance of production innovation for economic growth and government initiatives toward encouraging research on innovations.

The Roles of the textiles industry in economic growth

Globally, the textiles industry plays a crucial role in economic growth, innovation, and cultural development. This sector significantly contributes to global trade and employment, supporting millions of workers across a wide range of skill levels (Weerasinghe et al., 2023). However, it also encounters persistent challenges, including long production cycles, fragmented supply chains, delayed market responsiveness, and increased pressure from fast-changing fashion trends (Glogar et al., 2025). Moreover, concerns over its environmental footprint, particularly related to water usage, pollution, and waste, have prompted calls for sustainable transformation (Shofari et al., 2022).

In Malaysia, batik is a part of the textiles industry, representing a culturally rich and economically vital subsector (Wesnina et al., 2025). Batik is a traditional textile art that uses wax-resist dyeing techniques to create intricate patterns rooted in local culture. It is not only a symbol of national heritage but also a source of income for many communities (Nugroho et al., 2022). Since independence, the Malaysian government has actively promoted batik through cultural policies that encourage its use in formal attire and support for local artisans (Sulaiman et al., 2022). The global appeal of batik also contributes to Malaysia's tourism sector, with patterns often inspired by nature and cultural stories, reinforcing national identity.

Sustainability has thus become a growing concern in batik production. Ensuring the industry's long-term viability requires adopting environmentally responsible practices together with innovations using technology advancement, integrating sustainability throughout the production chain, and promoting the use of eco-friendly materials (Shofari et al., 2022). The future of the batik industry hinges on its ability to embrace innovation while remaining rooted in the rich cultural tapestry of Malaysia. As batik continues to be celebrated as a vibrant expression of national identity, artisans and manufacturers need to adopt environmentally responsible practices that address the increasing concerns surrounding sustainability. By integrating advanced technologies and utilizing eco-friendly materials, the industry can thrive and ensure its long-term viability. Balancing tradition with modernity will ultimately allow batik to flourish in a way that respects both cultural heritage and the planet, paving the way for a sustainable future that honors the past.

National Initiatives to Promote Innovation Efforts

Governments worldwide have acknowledged the vital role of innovation in driving economic growth, enhancing standards of living, and addressing pressing challenges in society. One key aspect of government efforts to encourage innovation is the creation of an enabling regulatory framework. Policymakers must carefully navigate the balance between necessary oversight and control and allow for the flexibility and risk-taking that often characterize innovative activities (Bradley et al., 2021). As noted, the same regulations that may hinder innovation in one industry could potentially serve as a stimulus in another (Barr, 2018). Governments must therefore adopt a tailored approach, continuously evaluate the impact of their policies, and adjust accordingly.

In Malaysia, product innovation stands out as a significant catalyst for both economic and social transformation. The Twelfth Malaysia Plan (12MP), covering the years 2021 to 2025, emphasizes innovation as essential for the country's pursuit of high-income nation status. Central to this plan is the cultivation of an innovation-driven economy, which involves strengthening the national innovation ecosystem, boosting investment in research and development (R&D), and encouraging the adoption of advanced technologies across multiple sectors. The

plan also highlights the importance of robust collaboration between the public and private sectors to facilitate the commercialization of innovative products. Collectively, these measures are designed to accelerate Malaysia's growth while supporting broader sustainable development objectives.

Within this context, the Malaysian Innovation Foundation (Yayasan Inovasi Malaysia, YIM), established in 2008 under the Ministry of Science, Technology, and Innovation (MOSTI), plays a pivotal role in fostering a culture of creativity and technological innovation throughout Malaysian society. YIM's initiatives are notably inclusive, targeting a wide range of groups including students, youth, women, rural communities, persons with disabilities, and non-governmental organizations. To empower these communities, YIM provides both financial and technical grants that support the development and commercialization of technology-based projects. Moreover, YIM maintains strategic partnerships with government research institutes (GRIs) and higher education institutions (HEIs), ensuring that technical expertise and the latest technologies are effectively transferred and applied in ways that meet current societal needs. YIM also has three primary initiatives, including MySI Akar Umbi, MySI Perintis, and MySI Komuniti, which have been established to empower the communities.

Moreover, the Madani Economy framework, introduced in 2023, marks a significant shift in Malaysia's approach toward building a resilient and sustainable economic landscape. Rather than focusing solely on economic growth, the framework integrates economic prosperity, social equity, and environmental stewardship, positioning innovation at its core. The intention is clear: transform Malaysia into a knowledge-based, high-income nation through widespread digital adoption and the development of high-tech industries (Narayanan & Yew-Wah, 2018).

A notable aspect of this initiative is its emphasis on fostering collaboration between the public and private sectors. Public-private partnerships are regarded as crucial drivers of innovation, facilitating the commercialization of emerging technologies and encouraging entrepreneurial ventures. Additionally, the framework prioritizes social innovation as a mechanism to address inequality and poverty. By supporting social enterprises and community-driven efforts, the Madani Economy seeks to ensure that economic advancement is both inclusive and beneficial to all segments of society (Narayanan & Yew-Wah, 2018).

Continuous monitoring plays a vital role in ensuring the success and effectiveness of each project. It helps to ensure that all funded and ongoing initiatives are closely supervised and remain aligned with their original objectives. The selection and allocation of funding must be based on a thorough evaluation of project plans, taking into account both financial and non-financial impacts on businesses and local communities. Ongoing monitoring enables the tracking of project performance and supports continuous refinement. To support this process, Yayasan Inovasi Malaysia (YIM) has engaged a team of researchers from Universiti Teknologi MARA (UiTM) to carry out an impact assessment, focusing on the economic, social, and environmental outcomes of the supported projects. This agenda is underpinned by the aspiration to build a robust social innovation ecosystem, leveraging Science, Technology, and Innovation (STI) to promote long-term sustainable development.

3. Research Methodology

Case Study: A Single Qualitative Case Study of the Batik Pointillism Block

This study employed a single qualitative case study approach to gain a deeper understanding of the phenomenon under investigation (Yin, 2009). This method was selected for its strength in providing rich, detailed insights and a holistic perspective of the specific case, the Batik Pointillism Block innovation. By focusing on a single case, the researchers were able to explore the complexity and distinctive characteristics of the innovation in depth.

The case study allowed for a thorough examination of the strategies, challenges, and achievements of the key innovator, Mr. Z, thereby offering meaningful lessons and implications for similar initiatives. Moreover, this approach facilitated close observation of team dynamics and interactions throughout the development process, highlighting the significance of collaboration and mentorship in driving innovation. Overall, the single-case study method provided a contextualized and nuanced understanding of the various factors that contributed to

the development and potential societal impact of the batik block.

Participant Selection and Profile

Mr. Z, a designer affiliated with a public university located on the east coast of Peninsular Malaysia, was purposively selected as the sole participant for this case study in recognition of his pivotal role in the development of the batik block innovation. To preserve confidentiality, the pseudonym "Mr. Z" is used throughout this study.

Mr. Z is in his mid-40s and holds a master's degree in industrial design, with a specialization in product design and development. He is currently doing his PhD in Industrial Design at one of the local universities in Malaysia. He has over 10 years of experience spanning both academia and industry, particularly in the field of product innovation. Renowned for his collaborative and practice-oriented approach, Mr. Z has consistently engaged in hands-on innovation activities, often working closely with students under his colleagues' supervision to co-create solutions addressing real-world challenges. He is actively engaged in innovation and invention competitions and has received numerous awards at both national and international levels.

Interview Procedure

A semi-structured interview was conducted with Mr. Z at his university office. The session lasted approximately two hours. Before the interview, the participant was briefed on the study's purpose and provided informed consent. The semi-structured format allowed for a flexible yet focused exploration of Mr. Z's experiences and reflections on the invention process.

During the interview, Mr. Z offered comprehensive narratives of his creative journey, including the obstacles encountered and the strategies employed to overcome them. He also elaborated on the collaborative processes with students and how these interactions influenced the conceptualization and refinement of the innovative tool. This interview approach enabled a nuanced understanding of both the technical elements and the personal experiences that contributed to the innovation's development and eventual success.

Ethical Considerations

To ensure the ethical conduct of this research, the participants' confidentiality and anonymity were maintained throughout the study. The interview data was securely stored, and any identifying information was removed from the transcripts. The participant was informed of their right to withdraw from the study at any time without consequence.

Data Analysis

The interview data were analyzed using narrative analysis to explore the underlying processes and experiences contributing to the successful development of the Batik Pointillism Block innovation. This method was chosen for its capacity to interpret the personal stories shared by the participant, uncovering key themes and meanings related to Mr. Z's creative process, collaboration with students, and innovation journey.

Narrative analysis, a well-established qualitative research approach, emphasizes the value of personal narratives in understanding complex human experiences. Through this lens, the data derived from in-depth interviews were examined to highlight how Mr. Z constructed and made sense of his experiences, including his motivations, challenges, and strategies. The stories revealed insights into the innovation process that might not be captured through more traditional analytical techniques.

In addition to narrative analysis, a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) was employed to further assess the viability and market potential of the innovative tool. Originally developed for strategic planning in business contexts, SWOT analysis was deemed appropriate for its systematic and practical approach in identifying both internal and external factors influencing innovation. This complementary analytical framework enabled a structured evaluation of the tool's technical capabilities, user-friendliness, scalability, and sustainability, while also considering potential challenges and opportunities within the broader ecosystem. Together, narrative and SWOT analyses provided a comprehensive understanding of innovation's development and its potential contributions to social, cultural, and economic impact.

Data Analysis Approach and Procedure

For this study, data gathered from a semi-structured interview with the primary informant, Mr. Z, underwent two qualitative analytical frameworks: narrative analysis and SWOT analysis. Narrative analysis was utilized to examine the participants' personal accounts and reflections throughout the innovation process. This enabled the identification of key themes such as the challenges encountered, strategies adopted, and the collaborative interactions that influenced the development of the batik pointillism block. The narrative approach also facilitated deeper insight into the creative and social facets underpinning the innovation journey, capturing nuances that might otherwise remain obscured with more rigid analytical techniques.

To augment the narrative findings, a SWOT analysis was subsequently implemented. Through this framework, strengths, weaknesses, opportunities, and threats were systematically delineated based on both the participant's contributions and contextual observations. Employing both methods allowed for a comprehensive understanding of the innovation's potential impact, integrating both the individual and strategic dimensions.

Saturation Point

Although this was a single-case qualitative study with one key informant, the analysis reached thematic saturation due to the richness and depth of the collected data. The two-hour interview yielded detailed narrative accounts that spanned the entire innovation lifecycle from conception and development to implementation and user interaction. These findings were further substantiated by contextual observations and reference to relevant literature, ensuring adequate depth and breadth of discussion. The point of saturation was identified when no novel themes or significant insights emerged during the analytical process.

4. Results

This section presents the development of the innovative product of the batik block. Further, the analysis of SWOT will be discussed.

Development of the Innovative Product

The batik block represents a contemporary innovation designed to be an alternative tool to the traditional copper batik block. Traditional block production involves high costs, extended production time, and requires a high level of craftsmanship. In contrast, the batik pointillism block integrates the fundamental batik concept of "point" with a flexible arrangement of nails to create motifs for block printing. This innovative product offers several advantages: it is lightweight, cost-effective, reusable, and user-friendly. Currently, the innovation is in the process of obtaining a patent.

Observations indicate that the batik pointillism block addresses several persistent challenges faced by the traditional batik industry. One of the key issues is the time-consuming process of producing conventional batik blocks. Conventionally, these blocks are crafted from copper sheets by skilled metal artisans. On average, creating a single block takes approximately two to three days, depending on the complexity and size of the design. Consequently, the lengthy production time hampers mass production efforts.

Additionally, the limited availability of skilled artisans contributes to the challenges in traditional block production. The number of artisans with expertise in traditional batik block-making has been steadily declining. Most contemporary batik practitioners focus primarily on designing patterns rather than crafting the blocks themselves. Moreover, the high cost of producing batik blocks negatively affects profit margins, especially when the design and block size vary according to customer demands.

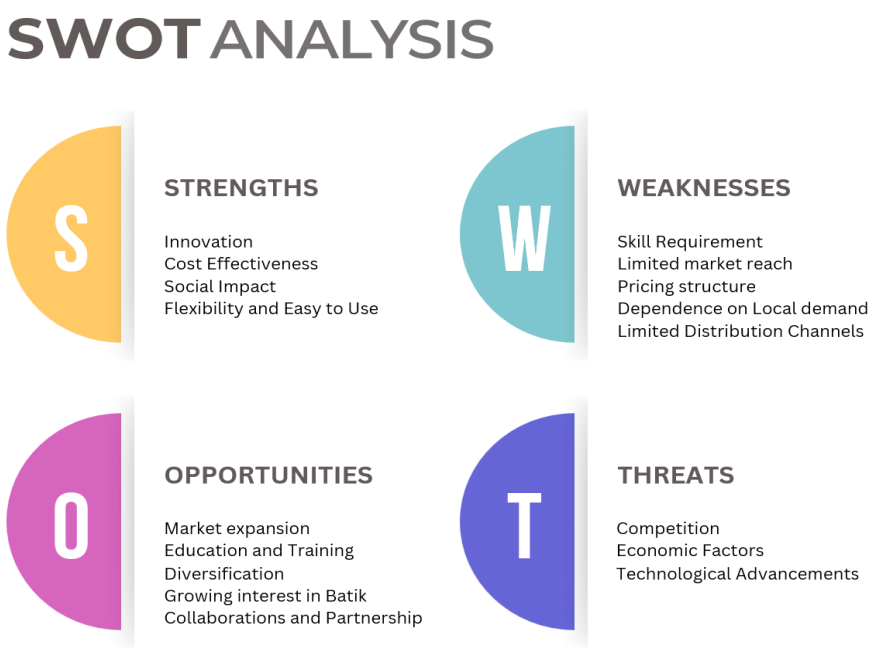
Another concern pertains to the declining appeal of traditional batik patterns among the younger generation. Traditional batik block designs are often perceived as less attractive to young people, who increasingly prefer more modern and innovative patterns. This shift in aesthetic preference, coupled with waning interest in learning the traditional techniques, further jeopardizes the sustainability of this cultural heritage.

In response to these issues, the development of the batik pointillism block offers a promising solution by introducing a faster, more efficient, and visually appealing method for creating batik patterns. It also aims to reignite interest among the younger generation, encouraging their participation in preserving and revitalizing

this important cultural tradition.

Analysis of SWOT

SWOT analysis, an acronym for Strengths, Weaknesses, Opportunities, and Threats, serves as a foundational strategic planning tool, providing a structured framework for evaluating the internal and external factors that influence the success of a project. SWOT analysis is employed to explain the batik pointillism block innovation project.



Strengths:

The first strength of this product is innovation. The batik pointillism block innovation introduces a new method utilizing acrylic and heat-resistant materials, making it lighter, more economical, reusable, and easier to handle compared to traditional copper blocks. Next is cost-effectiveness. With a selling price of RM120 per unit and an original cost of RM60 for the prototype, the product offers a cost-effective solution for batik makers, especially those from the B40 category. Indeed, this produced a more affordable option compared to traditional methods. Third is social impact. The product targets young batik makers and the B40 group, providing them with a modern and affordable tool for batik production, thereby contributing to the local economy and job creation. The final strength of this product is its flexibility and ease of use. The pointillism technique allows for flexible arrangements of the batik design, enabling the creation of various patterns and styles. Moreover, the tool is designed to be user-friendly, allowing even those without extensive experience in batik-making to create intricate designs.

Weaknesses:

The first weakness is a skill requirement. While the batik pointillism block innovation offers a modern solution, it may still require a certain level of skill and precision to operate effectively, potentially limiting its accessibility to less experienced batik makers. Next is limited market reach. The current sales strategy relies on orders and targets mainly batik makers from the local community, which may limit its market expansion potential. The third weakness is the pricing structure. The selling price varies depending on the size and pattern of the block, which could be perceived as a barrier to adoption for some potential buyers. Another weakness is dependence on international customers. In addition to that, the degree of acceptance by conventional batik manufacturers becomes the product's weakness. This hesitation can deter acceptance of the product within the industry, thus affecting the overall sales performance. Finally, the weakness of this product is its limited distribution channels. The product is sold through pre-orders, which may not be as effective in reaching a wider audience compared to established distribution channels.

Opportunities:
The first opportunity is market expansion. There is an opportunity to expand the market reach beyond the local community by exploring online sales channels and partnerships with retailers or distributors. By targeting a broader demographic and establishing a stronger online presence, the product can expand its market reach beyond the initial target audience. Second is education and training. Offering training programs or workshops on how to use the Blok Batik Innovation could enhance its value proposition and attract more customers, including those from outside the traditional batik-making community. The third opportunity is diversification. Exploring the development of additional accessories or complementary products for batik-making could diversify the product line and attract new customers. The fourth opportunity is the growing interest in batik. The increasing popularity of batik as a traditional craft and art form presents opportunities for the product to tap into this growing interest. Finally, the last opportunity is collaboration and partnerships. Partnering with local Batik artists, designers, or organizations can help increase the product's visibility and credibility within the Batik community.

Threats:
The first threat is competition. There may be existing or potential competitors offering similar innovative solutions or traditional batik-making methods, posing a threat to market share and differentiation. Additionally, competition from traditional methods may also occur due to the traditional methods of batik-making may still be preferred by some, posing a threat to the adoption of innovative technology. The second threat is economic factors. Economic downturns or fluctuations in raw material prices could impact production costs and pricing, affecting the product's affordability and profitability. Therefore, the economic fluctuations could impact the demand for the product, affecting its sales and profitability. Next are technological advancements. Rapid technological advancements in batik-making tools and techniques could render the Blok Batik Innovation obsolete if not continuously improved or updated.

Discussion
The Batik block technique clearly marks a notable advancement within the traditional batik-making industry. This discussion brings together various internal and external factors found throughout existing literature. Notably, the technique has the potential to improve accessibility and support the preservation of cultural heritage, all while offering new avenues for sustainable entrepreneurship. It is important to acknowledge that certain limitations persist, and the technique is not without its challenges. Overall, the evidence suggests that, with proper implementation, the Blok Batik technique may positively impact the future of the batik industry.
The internal strengths of the Batik block technique are prominently attributed to its design innovation and cost-effectiveness. By replacing conventional copper blocks with lighter, heat-resistant acrylic materials, the tool significantly reduces production costs while enhancing usability (Handayani et al., 2012; Hardjati et al., 2020) et al., 2020). This shift not only democratizes batik production by lowering the barrier of entry for novice artisans but also promotes wider participation among marginalized groups, particularly those from the B40 income segment (Sebayang et al., 2019). The flexibility afforded by the Blok Batik technique allows for a broad spectrum of creative patterns, enabling individual artistic expression and catering to evolving aesthetic preferences. The innovation is in line with current batik block method trends, where artists may improve perceptual flexibility (Setyaningrum & Nuraini, 2020). Furthermore, batik with bright colors and patterns will result in aesthetic flexibility of the products (Adikuncoro, 2021).

Moreover, this paper also highlights that Mr. Z used the user-friendly tool’s design to simplify the batik-making process, thus attracting younger generations and educational institutions interested in preserving and modernizing cultural practices. The user-friendly tool's design and traditional batik-making, which is well-known for its emphasis on updating and protecting cultural heritage, are similar. Both contain cultural wisdom (Wesnina et al., 2025). Its affordability is evidenced by a significant cost margin between production and retail pricing, which makes it a viable alternative for small-scale batik entrepreneurs competing in cost-sensitive markets.

Nonetheless, the system presents several internal weaknesses that may inhibit its widespread adoption. Despite its simplified mechanism, effective use of the tool still requires a certain degree of artistic precision and manual dexterity, which may discourage less experienced users (Adhanita, 2013). This partly contradicts the tool's inclusive aspirations. Furthermore, the reliance on direct pre-orders and community-based marketing

strategies limits broader market reach, thereby constraining scalability at both national and international levels (Razali et al., 2021). The pricing structure, which fluctuates based on block size and design complexity, may also be perceived as unpredictable, reducing appeal among price-sensitive consumers. Finally, the absence of structured distribution and retail channels curtails accessibility and limits the product's exposure to spontaneous or broader consumer segments.

Based on the findings, the batik block innovation technique distinguishes itself primarily through its innovative approach to design and heightened cost efficiency. By substituting traditional copper blocks with lightweight, heat-resistant acrylic, the technique not only significantly reduces manufacturing expenses but also improves operational ease (Handayani et al., 2012; Hardjati et al., 2020). This advancement effectively democratizes access to batik production, lowering entry barriers for novice artisans and fostering broader participation, notably among marginalized communities such as those within the B40 income segment (Sebayang et al., 2019). The inherent flexibility of the pointillism method supports a diverse array of creative patterns, enabling individual artistic expression and accommodating evolving aesthetic sensibilities. (Adikuncoro, 2021).

Additionally, the ergonomic and user-friendly design of the tool streamlines the batik-making process, thereby attracting interest from younger generations and educational institutions invested in the preservation and modernization of cultural heritage. Its affordability, demonstrated by a considerable margin between production costs and retail pricing, positions it as a competitive option for small-scale batik entrepreneurs operating within cost-sensitive markets.

Nevertheless, several internal limitations may impede the widespread adoption of this system. Despite its simplified mechanism, effective utilization still demands a degree of artistic precision and manual skill, which may deter less experienced users. (Adhanita, 2013). This reality partially contradicts the tool's inclusive objectives. Furthermore, the current reliance on direct pre-orders and community-centered marketing restricts broader market penetration and scalability at both national and international levels. (Razali et al., 2021). The pricing model, which fluctuates according to block size and design complexity, may also be perceived as inconsistent, potentially diminishing its appeal among price-sensitive consumers. Finally, the absence of established distribution and retail networks limits accessibility, curtailing the product's visibility among wider consumer segments.

Externally, the batik pointillism block technique is positioned to benefit from several significant trends. There is currently a notable global resurgence in the appreciation of traditional crafts and heritage products, providing a supportive environment for innovations rooted in cultural practices such as batik (Wesnina et al., 2025). Simultaneously, heightened consumer awareness regarding environmental sustainability has opened new opportunities for the integration of eco-friendly materials and processes. This includes the adoption of natural dyeing techniques and the use of raw organic materials, both of which align with shifting market preferences (Martuti et al., 2020; Nurcahyanti et al., 2025). Furthermore, leveraging digital marketing strategies and e-commerce platforms can greatly enhance the visibility and accessibility of batik pointillism block products across a range of demographic and geographic markets (Hartomo & Bakal, 2021). Educational initiatives, such as workshops and instructional content, present further avenues for expanding consumer engagement, particularly within schools and cultural institutions. Additionally, diversifying the product line through the introduction of complementary tools, design templates, or ready-to-use kits can broaden market reach and reinforce brand identity within the batik sector.

Nonetheless, several external challenges persist. The technique faces competition from established methods, such as traditional copper blocks, which possess significant symbolic and functional importance. It must also contend with ongoing innovations in textile design that continuously redefine the boundaries of traditional craft. There is an innovation using cheaper tools, such as cardboard, to produce the traditional motifs of batik. Thus, to maintain a competitive advantage, the Blok Batik technique requires ongoing refinement and differentiation. Moreover, external market factors, including economic instability and fluctuating costs of materials, may threaten production viability and pricing strategies. Weaknesses in supply chain infrastructure can further heighten these risks. Finally, the rapid pace of technological change within the creative and craft industries necessitates continual adaptation to ensure the technique's long-term relevance and to avoid obsolescence.

5. Managerial Implications and Recommendations

This study found several management implications within the batik sector. To begin with, the adoption of the batik block integrating CNC technology has demonstrably enhanced both productivity and operational efficiency. This innovation addresses declining skilled labor pools by enabling scalable and rapid production cycles. For small and medium-sized enterprises, strategic investment in such technological tools and automation is strongly recommended to streamline workflows, reduce labor dependency, and foster greater operational scalability.

From a market perspective, the flexibility inherent to the Pointillism technique facilitates the creation of contemporary batik designs, broadening appeal to younger demographic groups. Managers are advised to align product development and branding efforts with evolving consumer trends, thereby capturing youth segments domestically and internationally. Additionally, the accessibility and user-friendliness of this innovation provide notable potential for community-based skill development and economic empowerment. Targeted programs for low-income groups, Indigenous communities, and incarcerated individuals could leverage this technology for skill-building and income generation, with managerial and policy support through inclusive training and entrepreneurship initiatives.

Indeed, sustained innovation is essential to ensure the long-term relevance and competitiveness of the batik pointillism block. It is recommended that continuous investment be made in research and development to explore new features, materials, and techniques. Such efforts will support product diversification, such as the creation of modular kits and design templates, and allow for iterative improvements based on user feedback and evolving market demands.

Educational and cultural institutions play a critical role in long-term sustainability. Integrating this technique into educational curricula and heritage conservation programs is advisable for facilitating intergenerational knowledge transfer and enhancing public appreciation for batik as a living tradition. Strategic partnerships with batik practitioners, vocational centers, and social innovation agencies could further embed this technology within broader socio-economic frameworks.

Moreover, securing funding through public innovation grants, corporate social responsibility initiatives, and impact investment schemes is essential for scaling these efforts. Furthermore, robust digital marketing strategies, including social media outreach, influencer collaborations, and narrative-driven branding, are recommended to strengthen visibility and position the product as both culturally significant and commercially viable. Finally, establishing a certification or quality assurance framework will likely enhance market differentiation, foster consumer trust, and reinforce the status of batik pointillism block as a high-value innovation in both cultural and economic contexts.

Conclusion

The development of the batik block innovation has significantly enhanced the batik industry in Malaysia by providing a more cost-effective, efficient, and user-friendly method for creating batik block patterns. This tool reduces dependency on manual labor while streamlining production processes, ultimately benefiting both artisans and entrepreneurs. By introducing a modern, exclusive, and versatile technique, this innovation appeals especially to the younger generation, empowering them to produce unique and visually striking batik designs. In doing so, it not only nurtures creativity but also plays a vital role in preserving and enriching Malaysia's cultural batik heritage. Ultimately, this innovative tool represents a sustainable advancement in reinforcing the national identity through batik.

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E-Learning on Teaching and Learning: The Role of Accessibility, Behavior and Knowledge

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Abstract: E-learning represents a form of technological advancement applied in higher education. This technological progress offers an opportunity to improve teaching methods and enhance students' learning capabilities. Many educational institutions are embracing E-Learning and utilizing technologies, leading to a notable impact and creating a specific niche within the industry. Some students involved in E-Learning show better academic outcomes and a positive mindset, while others have voiced negative sentiments regarding e-learning due to usability issues, demanding workloads, limited technological skills, and a deficiency in face-to-face interaction. Consequently, this study seeks to examine the relationships between accessibility, behavior, and understanding of e-learning within higher education institutions. An online survey was administered to 150 students enrolled in a bachelor's degree program at a higher education institution. The findings reveal that accessibility correlates most strongly with students' engagement with the e-learning system, in comparison to behavioral and knowledge-related aspects. This research emphasizes that E-Learning has the potential to redefine the future of education by transforming traditional classroom experiences into online formats. E-Learning can be regarded as one of the most effective methods for education and teaching.

Keywords: *E-Learning, Accessibility, Behavior, Knowledge*

1. Introduction and Background

The realm of higher education has undergone a substantial shift from traditional teaching methods to innovative strategies that leverage computer technology for knowledge sharing and learning enhancement. The evolution of technology has opened avenues to improve teaching techniques and skills, thus enhancing students' educational capabilities (Omar, Sarudin, & Aziz, 2020). E-learning represents a key example of this technological advancement employed in higher education. It is characterized as the delivery of educational resources to students via computer technologies, software applications, and communication technologies (Mahdi, Lajim, Shamsuddin & Kanyan, 2020). Additionally, e-learning offers financial advantages for institutions by reducing expenses related to physical teaching spaces, utility bills, staffing costs, and student accommodations (Chung, Subramaniam & Dass, 2020). Students can utilize computers and other connected devices to access digital resources such as books and articles anytime and anywhere through e-learning (Greener, 2019). This modality enhances accessibility for international learners, allowing them to acquire knowledge and skills across borders, as e-video conferencing and meetings provide complete educational opportunities for them. Moreover, the e-learning approach allows students to maintain their study adaptability in terms of mood and rhythm, as long as they have a solid lesson plan, stay disciplined, and remain motivated (Omar, Sarudin & Aziz, 2020).

The global outbreak of the coronavirus disease 2019 (COVID-19) made e-learning the primary method for education in 2020. Educational institutions, including schools, colleges, and universities, were notably impacted. As of June 1, 2020, the World Health Organization (WHO) reported that 5,939,234 individuals had contracted the virus, with 367,255 fatalities. The Education Ministry mandated all educators in schools, colleges, and universities to transition from traditional face-to-face instruction to remote, non-physical teaching modalities. Physical classrooms were banned, obligating instructors to conduct classes using the available digital infrastructure. However, beginning in 2022, the online education sector saw significant growth. According to the Malaysia Digital Economy Corporation (MDEC), the e-learning market in Malaysia experienced an annual growth rate exceeding 15% by 2022. This rapid expansion was fueled by a tech-savvy young population, increased mobile access, and supportive government policies promoting digital initiatives. Moreover, a report from 2023 indicated that the online education market in Malaysia is expected to grow at a

rate of 17.4%, potentially surpassing a market value of $400 million by 2025.

Higher education has progressively shifted its teaching methods from traditional in-person formats to e-learning (McKenna & Rice, 2018). Numerous e-learning strategies have been suggested to provide learners and educators with more effective and successful educational experiences (Mahdi, Lajin, Shamsuddin & Kanyan, 2020). Well-designed e-learning applications can enhance student engagement in online classes, thereby improving their comprehension, skills, and overall competence, and allowing them to learn effectively or autonomously (Encarnacion, Galang & Hallar, 2021). Furthermore, e-learning is viewed as a promising educational approach and a valuable field for investigating its effects and effectiveness on students' understanding and teaching methods. The growth of e-learning has created a demand for educational institutions to deliver courses online (Greener, 2019). However, both learners and instructors encounter various obstacles during the online teaching and learning process. Considering these challenges and the limited familiarity with evolving technology, there is an urgent need to evaluate e-learning to better understand its impact and effectiveness on educational practices. While some students who participate in e-learning exhibit enhanced academic results and positive attitudes, others have reported negative experiences due to usability issues, heavy workloads, lack of technological skills, and insufficient face-to-face interactions. Consequently, the objectives of this study are as follows: 1) To investigate the relationship between accessibility and e-learning among students in higher education institutions. 2) To explore the relationship between behavior and e-learning among students in higher education institutions. 3) To examine the relationship between knowledge and e-learning among students in higher education institutions.

2. Literature Review

E-Learning

The latest and most prevalent form of distance education today is online learning. Often called e-learning, this approach involves acquiring knowledge through the use of digital technology and communication. Through e-learning, students have the flexibility to access educational materials at any time and from anywhere. Popular types of e-learning include online courses, online degrees, and virtual classes. E-learning is distinguished by its use of online technology to improve skills and enhance job prospects (Rovai, 2022). The adoption of e-learning has greatly transformed and improved teaching and learning practices in higher education (Rubin & Babbie, 2020). As stated by Picciano (2022), e-learning includes all varieties of technology-enhanced learning that leverage technology to facilitate the educational experience. An effective e-learning environment is characterized by instructors who deliver quality course design and instruction (Rovai, 2022; Selim, 2019), implement robust assessments (Siragusa, 2022), foster collaborative teaching (Omar et al, 2020), and employ appropriate teaching strategies to meet the needs of students. Instructors receive technical support, which allows them to seamlessly integrate their teaching activities into e-learning platforms. Students are encouraged to take control of their education, gain familiarity with technology, establish connections with peers, improve their critical thinking skills, and apply these abilities to real-life contexts.

The Relationship Accessibility and E-Learning

Accessibility in e-learning involves utilizing technology and services to develop learning experiences that are readily available to all students, irrespective of their limitations. Students with disabilities can participate in an accessible online course similarly to their peers. An online course is deemed accessible when every student can both access and navigate course materials, as well as review and submit their assignments. In designing courses, accessibility must address four main areas of impairment: visual, hearing, cognitive, and motor. The most effective way to provide information is by using a mix of text, video, audio, and images to cater to all students. For instance, visually impaired students or those with learning disabilities often rely on text screen readers to navigate links on a webpage and headings in a document. Since many individuals face challenges that hinder their learning potential, ensuring accessibility in e-learning is crucial. According to the 2010 U.S. Census data, approximately 20% of Americans have a disability, with over half experiencing significant impairments. Additionally, some disabled students favor online courses over traditional classroom settings. Students with special needs can engage in accessible online programs alongside their peers without needing to highlight their challenges. Accessibility is also a legal requirement, as federal law dictates that educational institutions must offer coursework that is accessible. Instructors and students can promote the accessibility of their e-learning materials by adhering to a specific set of guidelines that clarify the current state and the

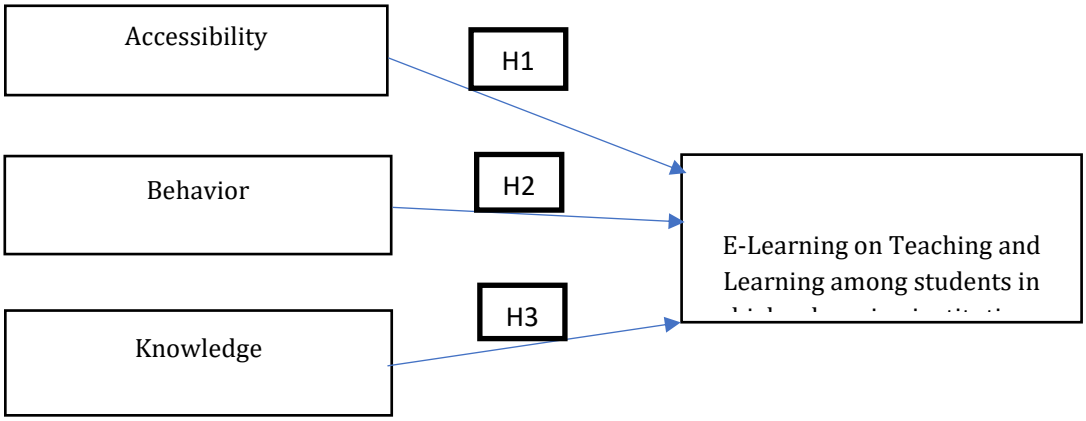
necessary actions to take. Therefore, it is proposed that:
H1: Accessibility has a significantly positive relationship with E-Learning among students in higher learning institutions.

The Relationship Between Behavior and E-Learning
Individuals, creatures, systems, or artificial entities exhibit behaviors or traits in relation to themselves or their surroundings, which encompasses other systems or organisms as well as the physical environment. Records of student responses are an effective way to understand how students navigate the internet. Observing students' behavioral patterns is a crucial step in identifying their learning styles. For instance, Zaid (2019) created a method, the student activity meter (SAM), which accurately tracks the number of hours students dedicate to learning activities and processes in virtual environments. Their findings indicated that the visuals produced by SAM enhance teachers' awareness of their environment, enabling them to devise various teaching strategies. Haitham (2019) sought to explore the different behaviors of students that correlate with their academic performance. Moreover, lecturers are essential in fostering positive student behavior during E-Learning to motivate students to engage in online activities. It is important to simplify the review process for students by utilizing accessible methods and materials. Student behavior is vital for the effective functioning of the E-Learning system, particularly during the ongoing COVID-19 pandemic. Therefore, it is posited that:
H2: Behavior has a significantly positive relationship with E-Learning among students in higher learning institutions.

The Relationship Between Knowledge and E-Learning
E-learning enables individuals to access information remotely through the internet. It provides the opportunity for people to learn at any moment and from any location, requiring only a computer and internet connectivity. Knowledge is essentially information, understanding, or insights regarding anything or anyone, encompassing data, facts, observations, or skills acquired through education and experience. It can be described as a conceptual comprehension of a situation. Sonwalkar (2022) suggests that knowledge can be shared either deliberately or unintentionally as a byproduct of various other, distinct activities. Nonetheless, there is a difference between using the internet to share knowledge and utilizing it for teaching purposes. Musa, Rosle, Baharuddin & Sara (2020) point out that while interaction is vital for the effectiveness of distance education, it is often absent in online educational settings. On the other hand, in e-learning environments, it is essential to facilitate knowledge growth and transfer (Rovai, 2022). However, students in e-learning contexts may risk coming away with inadequate knowledge and understanding, along with difficulties grasping foundational theories. Therefore, it is proposed that:
H3: Knowledge has a significantly positive relationship with E-Learning among students in higher learning institutions.

Research Framework
Figure 1 illustrates the proposed framework for this research. The study consists of three independent variables: Accessibility, Behavior, and Knowledge. The dependent variable of the research is E-Learning in Teaching and Learning among students in higher education institutions. The framework also depicts the relationships pertaining to the hypotheses in the study.

Figure 1: The proposed research framework



3. Research Methodology

A correlational study was conducted to explore the relationship between accessibility, behavior, and knowledge regarding E-Learning in Teaching and Learning among higher education students. The study focused on students from the Faculty of Business and Management. As outlined by Krejcie and Morgan (1970), the sample size is determined based on population guidelines. For a total population of 250 students, a sample of 150 students was selected for this research. Additionally, the tools used in the study were sourced from established and credible literature. To assess E-Learning, the study incorporated 8 items from the work of Chung, Subramaniam, & Dass (2020). For measuring accessibility, 6 items were taken from McKenna & Rice (2018). The measurement of behavior included 7 items from Capay (2011). Furthermore, knowledge was evaluated using 5 items from Sammour (2020). The questionnaire was organized into five sections, which detailed the demographic information of the respondents, as well as E-Learning, Accessibility, Behavior, and Knowledge. A five-point Likert scale was utilized to gauge the responses of participants. The scale ranged from 1 (strongly disagree) to 5 (strongly agree) in relation to the specific statements. Specifically, a stratified sampling technique was applied as the probability sampling design for this study. The research employed quantitative methods, utilizing a standardized questionnaire that was distributed uniformly to all participants.

4. Results

Table 1: Demographic Profile

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Males	110	73.3%
Females	40	26.7%
Total	**150**	**100%**
AGE		
19-23	44	29.3%
24-28	70	46.7%
29-33	23	15.3%
Above 34	13	8.7%
Total	**150**	**100%**
TYPE OF STUDY		
Full-Time Student	79	52.7%
Part-Time Student	71	47.3%
Total	**150**	**100%**
EDUCATION LEVEL		
Higher Certificate	17	11.3%
Diploma	53	35.3%
Bachelor Degree	72	48.0%
Master	8	5.3%
Total	**150**	**100%**

A total of 150 individuals participated in the survey. According to the data presented in Table 1, 73.3 percent of respondents are male, while the remaining 26.7 percent are female. The age group with the highest representation is 24-28 years old, accounting for 46.7 percent of the respondents. In terms of educational qualifications, 48 percent of participants hold a Bachelor's Degree, making them the largest group. Finally, most respondents fall into the category of full-time students.

Table 2: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha	Results
E-Learning	8	0.745	Good
Accessibility	5	0.823	Good
Behavior	7	0.628	Good
Knowledge	5	0.787	Good

As indicated in Table 2, the results from the reliability test demonstrate that all four constructs meet satisfactory levels, as their values exceed 0.6. This study has conducted reliability tests, including assessments of internal consistency, to evaluate the reliability of each variable. Table 2 provides the interpretation of reliability according to Cronbach's alpha for 150 respondents. The Cronbach's alpha result for employee engagement is 0.745, which is considered good. Next, the accessibility construct has a value of 0.823, also indicating good reliability. The behavior construct shows a Cronbach's alpha of 0.628, marking it as good. Finally, the knowledge construct has a value of 0.787, which is regarded as good as well.

Table 3: Correlation Analysis

		E-Learning	Accessibility	Behavior	Knowledge
E-Learning	Pearson Correlation	1	0.670**	0.458**	0.600**
	Sig. (2-tailed)		0.000	0	0
	N	150	150	150	150
Accessibility	Pearson Correlation	0.670**	1	0.428**	0.566**
	Sig. (2-tailed)	0.000		0.000	0
	N	150	150	150	150
Behavior	Pearson Correlation	0.458**	0.428**	1	0.454**
	Sig. (2-tailed)	0	0.000		0
	N	150	150	150	150
Knowledge	Pearson Correlation	0.600**	0.566**	0.454**	1
	Sig. (2-tailed)	0	0	0	
	N	150	150	150	150

According to the information presented in Table 3, there exists a significant moderate positive correlation between accessibility and E-Learning ($r=0.670$, $p=0.000$, $p<0.05$). This suggests that increased accessibility leads to enhanced E-Learning experiences for students in higher education institutions. Additionally, Table 3 demonstrates a significantly low positive correlation between behavior and E-Learning ($r=0.458$, $p=0.000$, $p<0.05$). This further implies that greater accessibility contributes to improved E-Learning teaching and learning for students in higher education institutions. Lastly, Table 3 indicates a significant moderate positive correlation between the knowledge of E-Learning teaching and learning among students in higher educational settings ($r=0.600$, $p=0.000$, $p<0.05$).

Table 4: Regression Analysis

	Dependent Variable Usage
Independent Variables (β)	
Accessibility	0.452
Behavior	0.136
Knowledge	0.282
F value	55.892
R2	0.535

According to the findings in Table 4, the R2 value of the model is 0.535. This means that 53.5 percent of the

variation in employee engagement can be attributed to changes in accessibility, behavior, and knowledge, while the remaining 46.5 percent is influenced by other factors. The F value of the model is 55.892, with a significance level of ($p < 0.01$), indicating a strong fit for the model. The coefficient table demonstrates that the work environment exerts the greatest influence on employee engagement, accounting for 45.2% and showing significance ($\beta = 0.452$, 0.000, $P < 0.05$). This finding is supported by Zaid (2019), who discovered that accessibility and E-Learning have a positive, moderate, and significant relationship, suggesting that increased accessibility results in improved E-Learning experiences for students in higher education. Following this, the perceived job aspects account for a 28.2% influence on knowledge, which is also significant ($\beta = 0.282$, 0.000, $P < 0.05$). This was substantiated by Omar et al. (2020), who found a positive, moderate, and significant relationship between knowledge and E-Learning, indicating that greater knowledge enhances E-Learning experiences within higher learning institutions. Additionally, the behavior variable shows a positive and significant influence on E-Learning, although it is noted as ($\beta = 0.136$, $P = 0.617$, $P > 0.05$). Hypothesis 3 is supported. In line with Haitham's (2019) study, the association between behavior and E-Learning is significant and positive, suggesting that improved behavior leads to enhanced E-Learning experiences among students in higher education.

Discussion

In summary, this study has effectively met the research objectives, which include identifying the positive significant link between accessibility, behavior, and knowledge with E-Learning in the context of teaching and learning among students at higher education institutions. The research demonstrates that the goals related to accessibility, behavior, and knowledge significantly impact E-Learning among students within higher learning institutions. This implies that higher degrees of accessibility, behavior, and knowledge are associated with an increased perception of E-Learning by students in these institutions. The findings align with earlier research conducted by McKenna and Rice (2018), which indicated a notable and positive correlation between access to E-Learning and teaching and learning outcomes for students in higher education settings. Among the various factors, accessibility emerged as the most influential on E-Learning engagement among students in these institutions, as confirmed by regression analysis. The results indicated that accessibility positively affects the utilization of E-Learning systems. This can be observed when students access all their study resources through the E-Learning platform. Consequently, this allows students to engage fully in the learning experience. Additionally, students not only enhance their technological skills but also gain improved accessibility. In the wake of the pandemic, many countries are opting for virtual online classes instead of traditional face-to-face instruction to curb the spread of the virus. Various forms of in-person learning, including lectures, are being transitioned to online formats. Meanwhile, both part-time and full-time students must adapt to new norms when interacting with instructors or peers through digital platforms.

The research indicated that there is a significant and positive correlation between student behavior and E-Learning in higher education, which aligns with previous studies. This finding supports earlier research (Capay, Mesarosova, & Balogh, 2021), demonstrating that students' behavior impacts their engagement with the e-learning system. Students tend to participate in quizzes more frequently than in other online activities. Therefore, it can be concluded that hypothesis 2 (H2), regarding the significance of behavior on e-learning system usage, is validated. The results showed that behavior has a positive effect on utilizing E-learning for teaching and learning among students in higher education. This is evident as students exhibit greater motivation and discipline when engaging with the e-learning system, arriving on time for classes. Furthermore, the flexible schedule and effective time management contribute to a healthy study-life balance for students. Additionally, educators play a crucial role in motivating students to pursue careers by imparting knowledge within specific subjects. By employing unique strategies, lecturers can enhance student engagement in online learning. Consequently, this can further boost student motivation and behavior, leading to increased utilization of the e-learning system among students.

In alignment with earlier research, the study found that there is a significant and positive correlation between knowledge and E-Learning among students in higher education institutions. This finding aligns with the work of Sammour, Schreurs, Al-Zoubi, and Vanhoof (2020). Knowledge is often viewed as something that is rooted in a specific context or as a collective activity. Therefore, the learning environment should reflect the cultural and traditional contexts in which the skills related to tasks are situated. Students' abilities to engage effectively in a community or environment are closely linked to their academic success. A key aspect of the conversation

around learning and teaching is for educators to utilize their conceptual abilities to evaluate and respond to student performance, while also adapting the educational setting or curriculum as required. E-Learning has become essential for universities to embrace due to the current circumstances, with the government promoting online learning for all students. In summary, the study determined that knowledge is positively impacted by the use of the E-Learning System among students in higher education, as the majority of students are able to enhance their soft communication skills.

5. Managerial Implications and Recommendations

The findings of this study are vital and exceptionally beneficial for institutions of higher education. Numerous pertinent recommendations could be adopted for enhancement. Firstly, students have expressed a highly favorable response to all the factors, and the researchers suggest that the university continue to engage with and support students, particularly those residing in rural areas, while also providing incentives such as internet data, which is the foremost issue that needs to be addressed for online learning to be effective. This can alleviate some of the challenges faced by students trying to gain knowledge without restrictions.

Additionally, considering that all students are mandated to participate in online learning strictly following the pandemic, universities might think about modifying the payment structure each semester by cutting unnecessary expenses like library fees and technical charges for potential classrooms. Our nation, Malaysia, has dealt with the aftermath of the pandemic for nearly two years, forcing both students and lecturers to transition to online learning during this period. This approach could, in some measure, lessen the strain and anxiety experienced by students.

Furthermore, as evidenced by the current landscape, online learning plays a crucial role and will likely be utilized by all students and lecturers in nearly all Malaysian higher education institutions. Organizations should pursue ongoing enhancements to the platforms that students and lecturers use, as numerous students encounter difficulties when accessing platforms that are not user-friendly, often due to environmental factors that hinder connectivity if the platform is not accessible. To ensure that educational activities run smoothly, organizations should opt for a singular platform to facilitate the online learning process. If a consistent platform is not employed across all educators, discrepancies may arise, with different lecturers utilizing various platforms, complicating access for students.

Conclusion

To summarize, this study has effectively met its research goals, which aimed to identify the positive and significant connection between accessibility, behavior, and knowledge in relation to E-Learning among students in higher education institutions.

In summary, accessibility, behavior, and knowledge were identified as key factors influencing the use of E-Learning Systems by students in higher education. This research also successfully established that the relationship between independent and dependent variables is indeed significant. It is widely recognized that in the current context, following the COVID-19 pandemic, e-learning presents challenges for everyone involved. Ultimately, collaboration between instructors and students is crucial for the success of E-Learning in higher education in this period. Teaching can proceed smoothly if both parties cooperate effectively.

Following the completion of this study, several recommendations are offered to encourage further research on this topic. Understanding this topic's significance is essential for future researchers. Consequently, the researcher has put forth a few suggestions to assist those who will study this area in the future. First, subsequent research might also explore other types of factors that influence the use of the E-Learning System. Additionally, future investigators could employ different research methodologies to gather more insights into the topic. They might also examine the distinctions among e-learning reliability programs, key applications, and their implementation within relevant areas of the program. These approaches could yield beneficial outcomes, serving as a means of student education, preparation techniques, and a catalyst for creativity in E-learning.

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Factors Influencing Job Satisfaction: A Case Study at Credit Counselling and Debt Management Agency (AKPK), Malaysia

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Abstract: Employee performance, retention, and organizational success are crucially impacted by job satisfaction. While a multitude of prior studies have identified its determinants, less attention has been devoted to understanding the drivers of job satisfaction in the context of financial counseling in Malaysia. The goal of this research is to understand the level of job satisfaction of employees at the Credit Counselling and Debt Management Agency (AKPK) in Kuala Lumpur by examining the effects of work-life balance, extrinsic rewards, intrinsic rewards, employee empowerment, organizational support, and perceived organizational support. A quantitative approach was utilized to collect data from a structured questionnaire administered to 127 employees. The data was processed and analyzed statistically using SPSS version 28.0, where correlation and multiple regression analyses were performed to ascertain the predictors of job satisfaction. This study found strong relationships between intrinsic rewards ($r = 0.751$, $p < 0.01$) and perceived organizational support ($r = 0.734$, $p < 0.01$) with job satisfaction. Moreover, multiple regression analysis showed both intrinsic rewards ($\beta = 0.482$, $p < 0.01$) and perceived organizational support ($\beta = 0.290$, $p = 0.002$) strongly predicted the outcome.

Keywords: *Job Satisfaction, Work-Life Balance, Intrinsic Rewards, Extrinsic Rewards, Employee Empowerment, Perceived Organizational Support.*

1. Introduction and Background

Employee job satisfaction significantly impacts workplace performance, retention, and organizational success. A satisfied workforce is more productive, committed, and innovative, making it essential for sustainability (Robbins & Judge, 2017). Hoppock (1935) explains job satisfaction as a result of psychological, physiological, and environmental factors affecting employees' contentment with their roles. In Malaysia, job satisfaction is particularly crucial as organizations adapt to globalization, technological advancements, and workforce diversity. Findings demonstrate moderate satisfaction levels among Malaysian workers determined by workload, incentives, work-life balance, and organizational support (Hasan & Aljunid, 2019; Ganesan, Shanmugan & Subramaniam. 2017).

Job satisfaction is crucial for the Credit Counselling and Debt Management Agency (AKPK) to understand, considering its high-pressure activities of financial education, advice, and debt management. As a main organization in Malaysia's financial sector, AKPK's effectiveness relies on the performance of its human resources. This study investigates the relationship between job satisfaction and other factors such as work-life balance, extrinsic rewards, intrinsic rewards, empowerment, and perceived organizational support, relevant in high-pressure settings such as AKPK. Drawing from Herzberg's Motivation Theory, the study elucidates these factors' influence on job satisfaction. Findings will contribute to organizational behavior research and offer practical recommendations to HR practitioners and policymakers to enhance job satisfaction.

2. Literature Review

Job satisfaction has been a central area of research due to its inherent impact on employee commitment, retention, and organizational performance (Hoppock, 1935; Robbins & Judge, 2017). Various factors influence job satisfaction, which can be broadly categorized into intrinsic and extrinsic motivators, and organizational and contextual dimensions (Mosadegh & Yarmohammadian, 2006). This study focuses on five concern variables: work-life balance, extrinsic rewards, intrinsic rewards, employee empowerment, and perceived organizational support, according to Herzberg's Motivation Theory.

Herzberg's Motivation Theory

Herzberg's two-factor theory segregates job satisfaction determinants into motivators (intrinsic factors) and hygiene factors (extrinsic factors). Motivators such as recognition and personal growth lead to job satisfaction, and hygiene factors such as pay and conditions of work prevent dissatisfaction (Herzberg, 1968). This theory was chosen due to its applicability to the identification of drivers and inhibitors of satisfaction. This theory has been examined in research, which verifies that intrinsic motivators have a stronger impact on satisfaction than hygiene factors (Aziz, Noor & Fauziyana, 2021).

Work-life Balance

Work-life balance (WLB) refers to the balance of work and personal life. Studies show that a successful WLB increases workplace satisfaction by reducing work stress and absenteeism (Panda & Sahoo, 2021). Low-quality WLB, in contrast, equates to lower job satisfaction and turnover (Lavanya & Sree, 2021). In Malaysia, scholars have highlighted the organizational policy as being key in promoting the practice of WLB in an effort to preserve employee health (Rashmi et al. 2021). Another study by Agarwal and Bhakuni (2024) explains the beneficial impact of a healthy harmony between professional duties and personal life on organizational performance and employee well-being. The results depict a significant positive correlation between work-life balance and job satisfaction, which means that the employees who have a healthier balance tend to be more satisfied with their jobs.

Extrinsic Rewards

Extrinsic rewards, such as salary, bonuses, and promotion, are hygiene factors of Herzberg's theory and prevent dissatisfaction but do not necessarily lead to satisfaction (Mottaz, 1985). Malaysian studies, including Zuraida and Chandrakala (2020), show that these rewards are significant predictors of employee retention and performance. However, their long-term impact on job satisfaction may be limited compared to intrinsic motivators (Siti & Nadzirah, 2018). Muhamad et al. (2024) emphasize the crucial roles of intrinsic rewards, such as personal growth and recognition, to improve employee job satisfaction in private and public organizations.

Intrinsic Rewards

Intrinsic rewards such as recognition, significance of work, and autonomy play a crucial role in improving job satisfaction. Herzberg (1968) emphasized that intrinsic motivators generate long-term job satisfaction. Mosquera Ruiz and Torres (2020) study demonstrated that intrinsic rewards greatly increase employees' motivation and commitment. Autonomy and task variety are increasingly valued in Malaysia, in accordance with global trends (Groblena & Tokarz-Kocik, 2017). Muhammad Kolawole, Ayo and Sulaiman, (2024) study further confirms the important roles played by intrinsic rewards such as personal growth and appreciation in the promotion of job satisfaction among employees and advises that managers ought to implement intrinsic and extrinsic rewards as primary drivers of job satisfaction.

Employee Empowerment

Employee empowerment involves the delegation of control and decision authority to employees. This enhances their sense of pride and satisfaction (Jalal, 2016). Empowerment is, by research such as that of Idris, Othman and Yusof (2018), also identified as a crucial impetus in creating a healthy working environment in Malaysia. Castrillon (2024) highlights how employee empowerment, through autonomy, trust, and participation in decision-making, boosts engagement, innovation, and productivity. She is convinced that organizations embracing this tactic enjoy job satisfaction, staff retention, and overall performance.

Perceived Organizational Support

Perceived organizational support (POS) is the employees' perception of how much their organization cares for their well-being and contributions. Empirical evidence has documented that POS establishes trust, which generates feelings of belongingness, enhancing job satisfaction (Eisenberger, Huntington, Hutchison & Sowa, 1986). POS has been revealed to be highly correlated with job satisfaction and organizational citizenship behaviors in Malaysian studies, e.g., Ghazali, Salleh and Omar (2018).

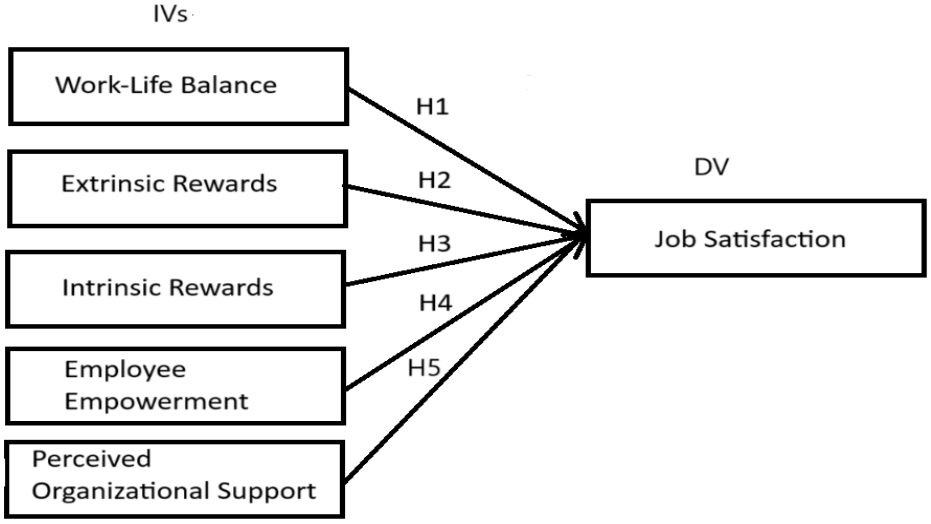
Relationships Between Variables and Job Satisfaction

In-depth research has established principal correlations between the variables and work satisfaction. POS and intrinsic rewards are always better predictors (Maan, Noor & Ahmad, 2020; Pancasila, Purba & Setiawan, 2020). The power of extrinsic rewards and empowerment sometimes varies depending on organizational contexts, but with little or no influence in some cases (Noor & Zainordin, 2018).

Theoretical Framework

This study framework (Figure 1) is based on Herzberg's theory and previous empirical findings, with emphasis placed on work-life balance, extrinsic rewards, intrinsic rewards, employee empowerment, perceived organizational support, and job satisfaction.

Figure 1: Research framework



3. Methodology

The quantitative approach was followed by this study in exploring factors of employees' job satisfaction at Credit Counselling and Debt Management Agency (AKPK), Headquarters, Kuala Lumpur. The research process entails research design, population and sampling, data collection, and data analysis. The research design is descriptive, cross-sectional and aims to examine cause-and-effect relations between job satisfaction and independent variables. Correlational research is appropriate for the determination of patterns and associations among variables, while the cross-sectional design allows data to be collected at a single point in time (Sekaran and Bougie, 2016). The sample in this study consists of 180 AKPK Headquarters Kuala Lumpur staff members. From the Krejcie and Morgan (1970) sampling table, the sample was 123. Simple random sampling was applied to provide an equal chance for each and every participant to have a chance (Pace, 2021). There were 127 valid responses in the data, a number higher than the intended sample size, which made the result more reliable.

Data Collection

Data collection was through a guided online questionnaire using Google Forms. There were seven sections in the online survey: Demographics, Job Satisfaction, Work-Life Balance, Extrinsic Rewards, Intrinsic Rewards, Employee Empowerment, and Perceived Organizational Support. The Likert scale used a five-point measure to ensure consistency and easy analysis (Sekaran & Bougie, 2016).

Questionnaire Design and Pre-Test

A pre-test among six AKPK staff members revealed Cronbach's alpha coefficients of above 0.75 for all variables, excluding work-life balance, reflecting high reliability in total (Perry, Brook & Harrison, 2004).

Data Analysis

Data analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 28.0. Analysis comprised:

Descriptive Statistics: To summarize demographic data and variables.
Reliability Analysis: Using Cronbach's alpha to assess internal consistency.
Correlation Analysis: Pearson's correlation coefficient was used to evaluate the strength and direction of relationships between variables (Senthilnathan, 2019).
Multiple Regression Analysis: This technique revealed the best predictors of job satisfaction out of the independent variables. A significance threshold of $p < 0.05$ was utilized to test hypotheses (Hair, Black, Babin & Anderson, 2014).

Ethical Considerations and Limitations of Methodology

The study adhered to ethical research practices. Participation was voluntary, and anonymity was ensured to protect respondents' identities. The research received approval from the Ethics Approval Committee. The study's focus on AKPK Headquarters in Kuala Lumpur limits generalizability to other branches or sectors. Additionally, reliance on self-reported data may introduce bias.

4. Results

Demographic Analysis

The study achieved a response rate of 70.5%, with 127 valid responses collected from 180 employees at the Credit Counselling and Debt Management Agency (AKPK) Headquarters, Kuala Lumpur. The demographic profile revealed; Gender: 63.8% female and 36.2% male, Age: 44.9% of respondents were below 30 years old, 26% aged 31–40, Education: 52% held a bachelor's degree, with 24.4% holding a diploma and Position: Executives formed the largest group (42.5%), followed by clerical staff (31.5%).

Reliability Analysis

Cronbach's alpha values showed high reliability for most variables, except work-life balance ($\alpha = 0.52$), which led to its exclusion. The remaining variables, including intrinsic rewards ($\alpha = 0.871$) and perceived organizational support ($\alpha = 0.932$), demonstrated strong internal consistency.

Descriptive Analysis

Intrinsic rewards had the highest mean score ($M = 4.2113$, $SD = 0.66284$), indicating their prominence in influencing job satisfaction. Job satisfaction had a mean of 3.937 ($SD = 0.73731$), reflecting an overall positive sentiment among employees.

Correlation and Regression Analysis

The regression model explained 64% of the variance in job satisfaction ($R^2 = 0.640$). Intrinsic rewards ($\beta = 0.482$, $p < 0.01$) and POS ($\beta = 0.290$, $p = 0.002$) were the strongest predictors, as in Table 1.

Table 1: Regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.276	0.304		0.907	0.366
IV2: Extrinsic rewards	0.09	0.056	0.111	1.599	0.113
IV3: Intrinsic rewards	0.482	0.103	0.412	4.701	0.050
IV4: Employee empowerment	0.105	0.099	0.082	1.063	0.290
IV5: Perceived organizational support	0.290	0.090	0.300	3.215	0.002

$R = 0.800$, $R^2 = 0.640$
Adjusted $R^2 = 0.628$
F-statistic = 54.199
df = (4,122), Sig. = 0.000

Summary of Hypotheses

Intrinsic Rewards and Perceived Organizational Support were significant predictors of job satisfaction, supporting the hypotheses. Extrinsic Rewards and Employee Empowerment showed moderate correlations but were not significant predictors. Work-life Balance was excluded due to reliability issues. These results highlight the importance of intrinsic motivators and organizational support in fostering job satisfaction. Extrinsic rewards and empowerment, while relevant, had no significant power in this context.

5. Conclusion

This study explores the factors influencing job satisfaction among employees at the Credit Counselling and Debt Management Agency (AKPK), Kuala Lumpur, focusing on five key variables: work-life balance, extrinsic rewards, intrinsic rewards, employee empowerment, and perceived organizational support. The findings reveal that intrinsic rewards and perceived organizational support are the most significant predictors of job satisfaction. Intrinsic motivators, such as appreciation, a feeling of meaningful work, and prospects of promotion for personal growth, were most strongly positively related to job satisfaction ($r = 0.751$, $p < 0.01$; $\beta = 0.482$, $p < 0.01$), which highlights their key role in initiating employee engagement and satisfaction. Similarly, perceived organizational support was the most strongly positive relationship ($r = 0.734$, $p < 0.01$; $\beta = 0.290$, $p = 0.002$), emphasizing the critical importance of trust and organizational care in enhancing employee morale and commitment.

On the other hand, extrinsic rewards and employee empowerment maintained moderate positive correlations with job satisfaction ($r = 0.550$, $p < 0.01$; $r = 0.603$, $p < 0.01$) but were insignificant predictors when placed in regression models, suggesting that their effect may be limited or controlled by situational factors such as leadership and communication. Work-life balance was not examined because of inadequate measurement, and future studies can take advantage of more accurate measures or contextual control. The findings indicate the need for organizations to emphasize non-monetary rewards, such as intrinsic rewards, and cultivate a supportive workplace to sustain worker satisfaction. Enhancing recognition, meaningful work opportunities, and perceived care by the organization can lead to enhanced employee engagement, greater retention, and organizational performance. Future research would need to expand the range of variables and settings across different organizations and utilize larger samples to further our knowledge of job satisfaction processes across industries. It will provide more insight into factors underlying employee happiness and well-being.

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Factors Influencing Employee Retention among Oil and Gas Sector Employees based in Kuala Lumpur

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Abstract: Oil and gas companies are renowned for their generous compensation packages in terms of recruiting and maintaining high-quality employees. However, despite such financial incentives, employee turnover remains an intractable issue, which implies that compensation alone may not suffice. The present study explores the most important factors in maintaining employee retention among oil and gas professionals who work in Kuala Lumpur. Specifically, it examines the inter-relationships between work-life balance, work environment, and compensation and their impact on staff retention. Largely rooted in Herzberg's Two-Factor Theory, the research employs a quantitative, exploratory approach and a structured questionnaire completed using Google Forms. 381 participant data will be collected and examined using SPSS Version 26 to perform correlation and regression tests. The findings aim to present pragmatic suggestions to organizations seeking to enhance employee retention strategies beyond monetary compensation, emphasizing the role of intrinsic motivators and organizational culture.

Keywords: *Employee Retention, Work-Life Balance, Work Environment, Rewards and Compensation, Oil and Gas Industry, Herzberg's Two-Factor Theory.*

1. Introduction

Employee retention is crucial in the oil and gas industry in aiming to stay competitive in today's fast-paced business environment. Retaining those skilled and competent employees is not only about reducing turnover but also ensuring that the talent and expertise that the organization invests in continue to add value over time. Given the significant costs already incurred in hiring, training, and developing employees, retaining high-performing talent is essential for maximizing return on those investments. Within the organization, policies and procedures for employee retention have two main goals. Firstly, reducing staff turnover and secondly, the expense of recruiting, onboarding, and training new employees needs to be drastically reduced (Chatzoudes & Chatzoglou, 2022). By focusing on effective employee retention strategies, organizations can foster a motivated and loyal workforce, reduce the financial and operational burdens of recruitment, and create a culture of long-term engagement. This proposal examines the importance of employee retention, highlighting its impact on organizational costs and its role in maintaining a competitive edge in today's dynamic business environment. Employee retention is crucial for organizational success as it directly impacts costs, morale, and productivity. High turnover not only leads to increased hiring and training expenses but also affects the quality and consistency of work output (Yousuf & Siddiqui, 2019).

Problem Statement

According to previous research, numerous factors influence employee retention, with compensation and rewards often cited as primary contributors to employees' decisions to remain with an organization. However, this perspective does not entirely apply to the oil and gas industry, where employees continue to leave despite being offered high salaries and attractive benefits. Kamselem, Nuhu, Lawal, Liman, and Abdullahi (2022) highlight compensation as one of the most critical factors in attracting and retaining talent, and Manzoor, Wei, and Asif (2021) emphasize that money influences employee behavior by shaping their attitudes. Consequently, wages play a significant role in attracting and retaining a workforce. This view was also held by Kamalaveni, Ramesh, and Vetrivel (2019), citing that pay is among the top drivers of turnover intentions and employee retention. This is also in line with findings collected in a pilot study by the researchers in exit interviews with some employees. The majority mentioned that they were offered an attractive package that they could not refuse. However, there were also individuals with high current salaries who left due to dissatisfaction with the work environment and a lack of career development opportunities. This suggests that while compensation is a critical factor, other elements such as workplace culture and growth prospects also play an essential role in retention. Additionally, some researchers argue that money is not the primary factor influencing employee retention. Nowadays, employees truly value their overall happiness and well-being by looking for employers

who can provide a positive work environment, work-life balance, and opportunities for career growth. With numerous options available, employees are quick to leave if they feel dissatisfied and pursue other opportunities.

According to Manzoor et. al (2021), once pay surpasses the subsistence level, intrinsic factors become more significant motivators. Staff motivation increasingly depends on intrinsic rewards, such as the satisfaction of doing a good job and the sense of contributing to something meaningful. This perspective is supported by Herzberg's Two-Factor Theory, which highlights that achievement, recognition, and responsibility serve as key motivators for individuals. All these factors create a research gap worth exploring. While it is customary to engage in discourse regarding remuneration and incentives as determinants for employees to remain with or depart from an organization, non-financial considerations frequently exert a considerable influence on an employee's decision-making process. These factors can make employees reconsider their choice to retain, highlighting the importance of exploring beyond monetary incentives. Therefore, the main study objectives are outlined as follows:

RO1: To examine a significant positive relationship between work-life balance and employee retention among Oil and Gas employees based in Kuala Lumpur.
RO2: To examine a significant positive relationship between work environment and employee retention among Oil and Gas employees based in Kuala Lumpur.
RO3: To examine a significant positive relationship between rewards and compensation and employee retention among Oil and Gas employees based in Kuala Lumpur.

2. Literature Review

Employee Retention

Retention of the workforce is the most crucial thing Human Resources (HR) has to consider in workforce planning, as it allows HR professionals to forecast and bridge the gap between future workforce supply and demand and align it with the organizational strategic goals. The retention of the workforce provides a stable, experienced workforce that is necessary for continuity in the business and long-term success. By focusing on talent retention, HR is able to better predict recruitment requirements, lower turnover, and plan for long-term workforce development in alignment with organizational need changes. Studies have shown that labor turnover not only imposes a financial burden in the form of direct expenses such as recruitment, onboarding, and training but also as lost productivity and institutional memory when employees leave. Other studies place the cost of replacing an employee as high as 2.5 times their annual salary in the form of recruitment, hiring, and lost productivity (Zainal, Ahmad, Mohd and Omar, 2022). Moreover, replacing experienced employees, especially those with specialized knowledge, takes a great deal of time and effort, and this has implications for business performance and innovation in general. Elsafty and Oraby (2022), in their paper, highlighted that training new employees is generally more costly than keeping existing ones. They referred to the fact that investing in training to enhance employees' knowledge and ability not only enhances their productivity but also makes employees feel appreciated and valued. Such a sense of being valued, therefore, enhances their job satisfaction and commitment, resulting in higher employee retention. Therefore, companies that value employee development are able to achieve improved retention by making employees feel committed to developing themselves and establishing a good work culture.

Companies that value strategies for employee retention, such as providing competitive compensation, establishing a good work culture, providing opportunities for career growth, and developing a culture of appreciation and acknowledgment, can reduce turnover and improve retention. Since they translate into an active and committed employee base, they save the organization a lot of recruitment and training expenses in the long term (Sang-rit & Gilitwala, 2023). Work-life balance refers to the personal view that work and non-work pursuits are in a condition of balance and contribute to personal growth, consistent with a person's immediate priorities in life. Based on the study conducted by Zainal et al. (2022), which sampled 400 respondents, shows the direct relationship between work-life balance and employee retention. Work-life balance is part of corporate social responsibility (CSR) today in any business organization. The importance of ensuring that workers are not work-oriented in a way that interferes with their personal lives is now a concern to many businesses. If work-life balance is not effectively managed, it leads to burnout, stress, and reduced job

satisfaction. This, in turn, negatively affects employee morale, lowers productivity, and ultimately leads to higher turnover. As a result, promoting a healthy work-life balance has come to be a key approach to improving employee retention and building an engaged and motivated workforce. The study by Hashim, Azman, Ghani, and Sabri (2022) found that no relationship existed between flexible job scheduling, a key aspect of work-life balance, and staff retention. Despite the increasing popularity of flexible work arrangements, according to the study, giving flexible schedules alone may be insufficient in impacting staff retention. Other problems such as career development opportunities, organizational culture, and job satisfaction will be able to contribute more to employee retention. This makes it complicated for employee retention, which implies that work-life balance initiatives, such as flexible working time, should be paired with a broader, more comprehensive plan that seeks to enhance employee commitment and loyalty. Brown, Chemei and Sang-rit (2021) emphasize that work-life balance is essential in employee retention. When employees can manage their work responsibilities along with their personal life, they feel less stressed and more well-being, and this leads to enhanced job satisfaction and a higher likelihood to stay with the organization. Flexible work arrangements such as working from home or flexible working hours are best to meet the work-life balance.

A good work environment is one of the key drivers of employee retention. In their study, Zainal et al. (2022) provide evidence of positive and direct relationships between work environment and employee retention. The employees will remain in organizations that offer a good, healthy, and comfortable work environment. The physical, social, and psychological aspects of the workplace, especially supervisor support and relationships among co-workers which are responsible for feelings of belongingness and commitment to the organization. If employees are appreciated in a friendly workplace, they are less likely to quit, hence reducing turnover and enhancing productivity. The work environment, Chatzoudes and Chatzoglou (2021) aver, has an indirect but highly significant impact on employee retention, being of utmost importance to organizations that aim to retain their employees in the long term. A healthy and supportive work environment, including dimensions like safety, company culture, people relations with supervisors and co-workers, and availability of resources, is associated with organizational commitment and job satisfaction. Thus, workers are more likely to remain in the company, reducing turnover and establishing long-term stability.

Companies that concentrate on improving their work culture are best positioned to build an energized, loyal workforce, ultimately contributing to their overall success and growth. Relationship of Rewards and Compensation with Employee Retention as put forward by Manzoor et al. (2021), rewards and compensation which are competitive serve to drive employees for motivation and retention in the long run. Those employees who are compensated (monetary as well as non-monetary) are likely to stay with the organization. Recognition, promotion, and opportunities for career development are considered rewards that meet not only financial needs but also psychological rewards. Career advancement and growth aspirations of employees are satisfied through job promotions, which is a powerful retention tool (Kamselem et al., 2022). The survey of a research study of 400 employees employed in the Malaysian service sector, Zainal et al. (2022), shows a positive correlation between compensation and reward and employee retention. The study demonstrates that equitable and competitive compensation packages greatly influence employees to stay with the company, thereby constraining turnover and enhancing overall retention. Based on Tadesse (2018), the survey conducted indicates that increased salaries have a significant connection with employee retention. The study by Alshamrani, Alharthi, Helmi, and Alwadei (2023), based on a survey of 325 respondents, finds that compensation and rewards are strongly associated with employee retention. The study indicates that offers of competitive salaries and attractive rewards schemes are key to retaining employees, as they play an important role in job satisfaction and organizational allegiance. This highlights the importance of offering equitable and full compensation to reduce turnover and enhance employee commitment in institutions.

Theories related to Employee Retention

The Two-Factor Theory, formulated by Frederick Herzberg in 1959, also known as the Motivator-Hygiene Theory, presents a distinctive perspective on job satisfaction. According to Herzberg's theory, the satisfaction of workers is influenced by two distinct categories of factors, i.e., motivators and hygiene factors. Motivators are factors that lead to job satisfaction, such as opportunities for career development, appreciation, and achievement, whereas hygiene factors are those that, if found unsatisfying, may lead to dissatisfaction, such as pay, working conditions, and organization rules. Herzberg's theory was different from the previous theories of job satisfaction in that it viewed job satisfaction as a two-sided continuum of employees who could be

dissatisfied based on poor hygiene factors but also get satisfied by the presence of motivators. The two-sided view provided a better understanding of what triggers employee motivation towards retention. According to research by Mohd, Rahman and Latif (2022), the authors suggest that there is a necessity to balance intrinsic motivators and hygiene factors to promote job satisfaction and minimize employee turnover. Intrinsic motivators such as opportunities for skill development and increased responsibility are essential drivers of feelings of personal success and engagement, which are core to long-term job satisfaction. In contrast, hygiene factors such as job security, work environment, and fair remuneration are the magic to prevent workers' dissatisfaction and disengagement. However, the researchers point out the aspect that whereas prevention of dissatisfaction is guaranteed through hygiene factors, the latter are not sufficient to construct a highly motivated and engaged workforce all by themselves. The findings concur with the perception by Herzberg that organizations ought to strike a balance between fulfilling basic needs and offering challenges for development and achievement in order to sustain long-term employee satisfaction and retention. Based on the literature reviewed, the following hypotheses were developed:

H1: Work-life balance has a positive relationship with employee retention among employees in the Oil and Gas industry based in Kuala Lumpur.
H2: Work environment has a positive relationship with employee retention among employees in the Oil and Gas industry based in Kuala Lumpur.
H3: Reward and compensation have a positive relationship with employee retention among employees in the Oil and Gas industry based in Kuala Lumpur.

3. Research Methodology

Purpose of Study

This study will adopt an exploratory study, which is a research method that enables the researchers to observe and establish the relationship between different variables without manipulating them. The independent variables in this study are work-life balance, work environment, and reward and compensation, while employee retention is the dependent variable. By applying this design, the researchers want to determine the degree of relationship between these independent variables and employee retention. For instance, one study by Zainal et.al (2022) examined the role of such variables in employee retention in Malaysia's service sector and found that work-life balance and work environment contributed positively significantly, and reward and compensation contributed even more positively. Similarly, one study by Gupta (2021) worked with the theme of work-life balance policies' impact on employee welfare and productivity and found that such policies are critical to employee retention.

Population

In research, a population refers to the entire group of people, items, or things that share common characteristics and are under study. Population, according to Creswell (2014), refers to all the items or subjects to which conclusions are to be drawn by researchers. It is the population from which samples are to be selected for analysis. The sample for this research consists of 50,000 Oil and Gas employees from various organizations such as PETRONAS, Velesto Energy Berhad, Carigali Hess, Petronnic, to name a few, operating in Kuala Lumpur. The sampling frame for this study was provided by the Malaysian Employers Federation (MEF) Table. The questionnaire will focus on individuals who have been employed at the executive level for a minimum of one year in oil and gas companies to guarantee respondents possess an idea about the business. To achieve accuracy and relevance, organizations whose respondents will be invited will be secured directly from an MEF representative to access verified and up-to-date organizational data. This approach will enhance the authenticity and credibility of the findings, as they are in a better position to reflect on their experience and provide richer information about organizational dynamics. The sampling technique adopted in this study was convenience sampling, which was chosen for being easy to use.

Sampling Technique

Convenience sampling is a type of non-probability sampling where the participants are selected from a part of the population that is readily available to the researchers. According to Etikan, Musa and Alkassim (2016), this method is often utilized where time and resources are limited (such as an exact list of respondents due to companies' concealment), as it allows the data to be gathered from participants who are reachable or available

during the time of the study. The questionnaire has traditionally been regarded as one of the best methods of acquiring standard data in order to ensure that all the questions posed are the same to all the participants (Cohen, Manion, & Morrison, 2018).

Questionnaire Development

Issuing the same set of questions to all the respondents in the same format, the questionnaire guarantees that the information gained is comparable and can be trusted. For this study, the questionnaire will be properly designed to fit the research objectives so that it can effectively get information on the major variables under investigation, for example, work-life balance, work environment, reward and compensation, and employee retention (Johnson & Christensen, 2021). The questionnaire will be posted on Google Forms for easy access and response. It will be distributed to employees via email and WhatsApp so that respondents can respond at their convenience and in their comfortable way (O'Leary, 2023). Data analysis is very crucial in this study as it allows for proper summarization, scrutiny, and explanation of the data obtained.

Data Analysis

Initially, the researchers aimed to utilize Statistical Package for the Social Sciences (SPSS) version 26, rather than analyzing manually. SPSS version 26 facilitates efficient data analysis and performing statistical tests, with better and clearer interpretation of the data compared to manual calculations. Moreover, correlation and regression analysis will also be used in this research, which are crucial to examine the dependency and the independent variables between which connections must be examined. The analyses help to quantify the effect and increase of these variables according to the responses offered by the sample in the questionnaires they were given. Correlation helps to identify whether two variables increase together in the same direction (positive correlation) or different directions (negative correlation). High correlation allows the researchers to observe how strong the relationship of the variables is, but it doesn't necessarily mean causality, while regression analysis not only represents the relationship of variables but also quantifies the strength and significance of these relationships. This will allow the researchers to predict the dependent variable from the independent variable values. Regression and correlation analysis will allow the researchers to find out the impact of work-life balance, pay, and work environment on employee retention, and how they are related to each other. This will ensure conclusions drawn based on firm statistical information, leading to actionable recommendations for further enhancing retention strategy in the oil and gas industry.

Validity Test

Validity is essential in research because it defines the relevance and meaning of the components of the research. Validity ensures that the instrument utilized is proper in measuring the constructs that it aims to measure. For the sake of ensuring the validity of the instrument in this research, an expert conducted a double verification of the questionnaire in terms of quality and accuracy. The researchers made use of a quantitative research design where they employed questionnaires and primary data in gathering information regarding the determinants of employee retention.

4. Conclusion

A five-point Likert scale was used as the instrument of measurement to produce systematic and quantifiable data on the variables. The design is correlational as it aims to determine the interrelation between the variables without modifying them. As for the interference of researchers, the current study will have minimal intervention required, with emphasis on the study site, unit of analysis, and time horizon. The population of this research is approximately 50,000 workers in the Oil and Gas industry in Kuala Lumpur with 381 employees in their sample population. In designing the questionnaire, the researchers drew inspiration from a mix of two journal articles so that the applicability and accuracy of extracting the information required could be guaranteed. Finally, the researchers also opted to make use of the Statistical Package for the Social Sciences (SPSS) version 26, a quicker and improved program used for analyzing large quantities of data and conducting statistical analysis. This approach offers a better and more precise description of the data, thus supporting the overall validity and quality of the results of the research.

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Factors Influencing Volunteer Motivation amongst Trained Satria Volunteers of the Malaysian Ministry of Youth and Sports

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Abstract: Volunteer decisions are heavily influenced by motivation, particularly when monetary rewards or recognition are not in play. While existing research has provided insights, there remains a gap in understanding specific motivational factors. This study aims to address this gap, focusing on the Malaysian Ministry of Youth and Sports, a significant choice due to its recent initiation and substantial volunteer base. The research concentrates on 508 trained Satria volunteers nationwide, utilizing a stratified sampling technique based on shared characteristics. Diverse analyses, including demographic, reliability, descriptive, correlation, and regression, were employed to uncover crucial insights. Positive correlations establish links between motivation and factors such as values, community involvement, interpersonal contacts, career orientation, and personal growth. Aligning opportunities with individuals' core beliefs, fostering a sense of belonging, emphasizing social aspects, linking volunteering to skill development, and highlighting intrinsic rewards are pivotal for maximizing volunteerism. The findings of this study shed light on the factors that influence volunteer motivation among the trained Satria volunteers registered with the Malaysian Ministry of Youth and Sports. These insights are particularly valuable for government agencies, as they pinpoint key motivational drivers that should be prioritized to encourage volunteers to dedicate their time and expertise to future volunteer opportunities. It also helps the ministry to design and implement future programs that align with the motivations, needs, and preferences of young people. By incorporating the identified motivational factors, the ministry hopes to create more engaging and effective volunteer opportunities, attracting and retaining young volunteers.

Keywords: *Volunteer motivation, Trained Satria Volunteers, Self-enhancement, Community Involvement, Interpersonal Contacts, Career Orientation, Personal Growth, Extrinsic Rewards.*

1. Introduction

The practice of volunteering is expanding in Malaysia, where it is frequently linked to everyday activities in the community and has the potential to generate a large number of volunteers (Faranadia, Bukhari, Kamal, Normala, Lukman, & Azlini, 2018). Engaging in volunteer activities makes a substantial contribution to the well-being of both citizens and communities (Mekonen & Adarkwah, 2022). Volunteering strengthens civic participation, which in turn fosters the social cohesiveness of the community and nation, making it essential to the social growth of a country (Tan, Lopez, Tam, Ng & Goh, 2020). Volunteering can be done on an individual basis; however, most volunteers work with organizations and groups that coordinate activities for a shared cause (Grey & Stevenson, 2019). Volunteer motivation has been demonstrated as having a strong, positive relationship with volunteer behavior and sustainability (Aydinli, Bender, Chasiotis, Van de Vijver & Cemalcilar, 2014; Wilson, 2012). Clary and Snyder's model of volunteer motivation makes a significant contribution to our comprehension of this intricate field, offering practitioners a valuable framework for crafting and implementing successful volunteer programs (Clary, Ridge, Stukas, Snyder, Copeland, Haugen and Miene, 1998). Based on Clary et. al (1998), the Volunteer Function Index (VFI) offers a framework for recognizing volunteers' motivations and organizing suitable volunteer opportunities to address these motivations. In addition, Clary et. al (1998) emphasize the need to take volunteers' needs into consideration when creating and implementing programs and services to cater to their needs. Furthermore, the VIF developed by Clary et. al (1998) remains a vital source for understanding volunteer management and motivation, skillfully blending theoretical concepts with practical applications.

Clary and Snyder's volunteer motivation theory is a rich contribution to our understanding of this complex area, providing practitioners with a useful model for designing and implementing successful volunteer schemes

(Clary, Ridge, Stukas, Snyder, Copeland, Haugen & Miene, 1998). According to Clary et. al (1998), the Volunteer Function Index (VFI) offers a means of identifying what encourages volunteers and constructing appropriate volunteer activities to meet those needs. Besides that, Clary et. al (1998) also highlighted the importance of paying proper attention to volunteer needs in designing and conducting programs and services for serving their aims. The success and sustainability of most community-based services also rely to a great extent on volunteer recruitment and retention. This is why numerous charitable service organizations depend on volunteers to provide invaluable services to their communities (Ainsworth, 2020). Although volunteering exists in many societies, Asia has one of the lowest volunteerism rates, with only 20% of the population participating, compared to the 22% and 40% recorded by the Americas and Oceania (Tan et. al, 2020).

Through comprehending volunteer motivations, effective management can be employed to ensure that the advantages of assistance outweigh potential negative consequences for individuals and the community. The Malaysian Ministry of Youth and Sports is chosen for this study, as despite its recent launch in July 2022, it has successfully attracted 230,905 registered volunteers as of March 6, 2023 (data sourced from an email from a Malaysian Ministry of Youth and Sports officer). Consequently, this paper aims to identify the factors influencing volunteer motivation among a population of 508 trained Satria volunteers deployed by the Malaysian Ministry of Youth and Sports across Malaysia. Sukarelawan Anak Malaysia (Satria) is a flagship volunteer initiative by the Ministry of Youth and Sports Malaysia, designed to harness the energy and enthusiasm of Malaysian youth for various community service activities. Satria was launched on July 16, 2022, on National Youth Day in Tuaran, Sabah. Satria aims to create a professional and efficient platform for Malaysian youth to volunteer their time, particularly in post-disaster and recovery activities.

This study aims to analyze factors influencing volunteer motivation, and in this study, considers Expression of Values (IV1), Community Involvement (IV2), Interpersonal Contacts (IV3), Career Orientation (IV4), Personal Growth (IV5), Extrinsic Rewards (IV6), and Love of Volunteerism (IV7) among trained Satria volunteers. Volunteerism is a critical component of crisis management and nonprofit organizational operations, as volunteers end up providing the foundation for essential tasks during emergencies and daily operations of these organizations, delivering necessary services and support to those in need.

Research Objectives

Therefore, the specific research objectives (ROs) are outlined below:

RO1: To examine the relationship between the expression of values and volunteer motivation.
RO2: To examine the relationship between community involvement and volunteer motivation.
RO3: To examine the relationship between interpersonal contacts and volunteer motivation.
RO4: To examine the relationship between career orientation and volunteer motivation.
RO5: To examine the relationship between personal growth and volunteer motivation.
RO6: To examine the relationship between extrinsic rewards and volunteer motivation.
RO7: To examine the relationship between love of volunteerism and volunteer motivation.
RO8: To examine the most significant factor that influences volunteer motivation.

2. Literature Review

Malaysia has implemented a range of strategic initiatives aimed at enhancing volunteer motivation, employing a holistic and multifaceted approach. These initiatives integrate diverse methods and policies designed to foster a robust culture of volunteerism across the country.

Volunteer Motivation

According to Wilson and Son (2022), volunteer motivations encompass the diverse reasons individuals have, or reasons perceived by others, for participating in voluntary work, which plays a crucial role in supporting the third sector's institutions and civil society; however, despite the well-established institutionalization of volunteering, the participation rate remains relatively low, with only about a quarter of the adult population engaging in such activities annually. According to Suandi, Hamzah, Ismail and Shah (2014), understanding volunteer motivation is a pivotal aspect of volunteerism that aligns with the Social Exchange theory, which posits that sustained volunteer efforts depend on the perceived rewards either exceeding or balancing out the

associated costs, suggesting that individuals are motivated to contribute to volunteer activities to the extent that they perceive their efforts are adequately rewarded and are likely to seek equilibrium when they sense an imbalance between their contributions and the rewards received. Volunteers play a vital role in the operation of our modern communities; thus, their dedication to non-profit organizations is a significant social issue. In addition, Alajmi and Alasousi (2018) in their research stated that motivation is a management technique for influencing behavior based on an understanding of what motivates individuals to act. It is the process of arousing, energizing, directing, and maintaining behavior and performance; it is the process of motivating individuals to take action to achieve a specific objective (Alajmi & Alasousi, 2018).

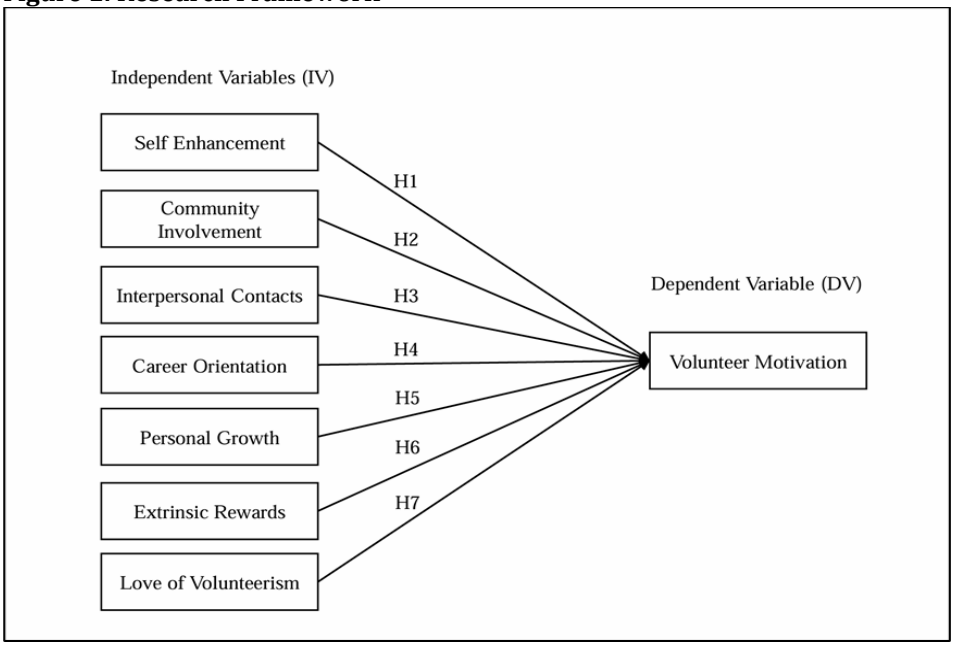
Maslow's Theory of Hierarchical Need

Maslow's theory of the hierarchy of needs states that people are motivated when their needs and desires are known and fulfilled. According to Maslow (2000), human beings are stimulated by the need to fulfil or maintain the various conditions on which these basic satisfactions depend, and also some higher-order intellectual desires. According to Maslow's hierarchy of needs, introduced in his 1987 book, individuals can be explained in terms of various needs at a given time. This model is particularly useful when attempting to explain the motivation for volunteering, as the various motives can typically be traced to these psychological needs. Thus, knowledge of the hierarchy of needs can offer insightful remarks as to why people choose to volunteer and what they expect to gain out of it. Generally, volunteer motivation may be understood by Maslow's hierarchy because different individuals would be motivated by the need to complete different ranks of this hierarchy through volunteering. From the literature, the following model (Figure 1) was developed.

3. The Methodology

The survey questionnaire has been developed by adopting and modifying the material from previous studies conducted by Faranadia et. al (2018) and Vinnicombe and Wu (2020). It was thereafter validated by a faculty expert to measure factors of volunteer motivation among the sample of 508 trained Satria volunteers of the Malaysian Ministry of Youth and Sports. The research intends to identify the association among Expression of Values (IV1), Community Involvement (IV2), Interpersonal Contacts (IV3), Career Orientation (IV4), Personal Growth (IV5), Extrinsic Rewards (IV6), and Love of Volunteerism (IV7), which all affect the dependent variable, Volunteer Motivation (DV). The study aimed at a sample of 508 trained Satria volunteers who were trained under the Malaysian Ministry of Youth and Sports across the country. The population consisted of 508 people across the country.

Figure 1: Research Framework



4. Empirical Results

Pearson correlation analysis was conducted to determine the strength and direction of relationships between the independent variables and volunteer motivation. The results revealed significant positive correlations between Expression of Values ($r = .62$, $p < .01$), Community Involvement ($r = .58$, $p < .01$), Interpersonal Contacts ($r = .54$, $p < .01$), Career Orientation ($r = .47$, $p < .01$), and Personal Growth ($r = .46$, $p < .01$) with Volunteer Motivation. These findings support the inclusion of these variables in the regression model.

The main objective of regression analysis is to construct a model and understand how changes in the independent variables are associated with changes in the dependent variable. The regression analysis result is shown in Table 1 below. Based on Table 1, the Regression Analysis table, the value of "R" represents the correlation coefficient, which measures the strength and direction of the linear relationship between the independent variables and the dependent variable. In this case, the value is approximately 0.845. In this research, R^2 is approximately 0.713, meaning that about 71.3% of the variance in the dependent variable is accounted for by the independent variables, suggesting 28.7% to be accounted for in future research. Adjusted R Square provides a more accurate estimate of how well the model fits the data while penalizing the inclusion of unnecessary variables. In this research, the adjusted R^2 is approximately 0.709. The F-value is the ratio of the regression mean square to the residual mean square. In this case, the F-value is 177.645. The F-value is used to test whether the overall regression model is statistically significant. The larger the F-value, the more evidence you have against the null hypothesis that all coefficients are equal to zero.

The regression equation is $F(7, 500) = 177.645$, $P<0.001$ and the Predictive DV: Volunteer Motivation = 0.381 + 0.244 (IV1: Expression of Values) + 0.204 (IV3 Interpersonal Contacts) + 0.145 (IV2: Community Involvement + 0.137 (IV4: Career Orientation) + 0.134 (IV5: Personal Growth) Thus, 5 of the IVs which are Expression of Values (IV1), Community Involvement (IV2), Interpersonal Contacts (IV3), Career Orientation (IV4), and Personal Growth (IV5) were significant predictors and related to the dependent variable.

Table 1: Regression Analysis

Independent Variable	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	.381	.102		3.736	.000
IV1: Expression of Values	.244	.046	.254	5.322	.000
IV2: Community Involvement	.145	.047	.155	3.109	.002
IV3: Interpersonal Contacts	.204	.047	.212	4.366	.000
IV4: Career Orientation	.137	.050	.139	2.755	.006
IV5: Personal Growth	.134	.053	.139	2.523	.012
IV6: Extrinsic Rewards	.009	.025	.010	.338	.736
IV7: Love of Volunteerism	.016	.038	.017	.420	.675
Dependent Variable: Volunteer Motivation					
R	0.845				
R^2	0.713				
F Value	177.645				
Significance	0.001				

Discussion

The motivation for volunteering stems from the understanding that individuals can participate in the same volunteer activities while being motivated by a range of diverse and multifaceted reasons. This acknowledgment highlights the intricate nature of human behavior and the multitude of factors that influence individuals' choices to devote their time and energy to charitable pursuits. For instance, one individual may opt to volunteer to visit hospital patients as a reflection of their deeply ingrained personal principles, guided by a

genuine desire to alleviate feelings of loneliness and offer companionship to those in need. Conversely, another individual may perform the same volunteer duty with a more strategic intention, viewing it as a conscious step towards realizing their long-term career aspirations in the healthcare industry. Through this process, they seek to gain first-hand experience and expertise that may enhance their professional credentials and prospects.

Volunteerism that is consistent with people's personal values and aspirations can be a manifestation of self-actualization, since people consciously pursue chances to contribute meaningfully to causes that they are passionate about. Volunteering can then go beyond mere satisfaction of lower-level needs and become closely related to higher-level needs like social belonging and personal growth. When individuals have their lower-level needs met, they are more likely to engage in volunteer work, which may serve to satisfy other needs in the hierarchy of Maslow. These results are in accordance with Clary et al. (1998), who also pointed out that value expression and social involvement are the key themes in volunteer motivation. In consonance with Mekonen and Adarkwah (2022), internal drivers of personal growth and contributions to the community were more powerful predictors of sustained volunteering. Ironically, though contrary to Wilson (2012), who expressed that extrinsic factors play critical roles in certain situations, this study found extrinsic rewards to be statistically insignificant to Malaysian youth volunteers.

5. Implications and Limitations

Findings offer significant observations of the most important variables that have considerable influence on volunteers' motivation, offering a detailed picture of the nuanced dynamics of the volunteer world. This is particularly significant because it draws attention to the specific variables that influence Satria volunteers' motivation in the Malaysian Youth and Sports Ministry. Through the identification and exploration of these determinative factors, the research contributes to an enhanced understanding of the underlying motivators for reasons behind individuals to engage in volunteer service under this context. Such knowledge is instrumental in informing strategic decision-making operations and program development initiatives aimed at enhancing volunteer engagement and satisfaction for Satria volunteers. Besides, through the elucidation of what drives volunteer motivation, the study offers helpful directions towards the application of certain interventions and assistance measures with a view to establishing a more favorable environment for volunteerism in the Malaysian Youth and Sports Ministry. Lastly, the research results serve as a valuable guide for policymakers, organizational executives, and stakeholders involved in volunteer management and community development activities, informing responsible decision-making and the formulation of effective strategies to enhance volunteer participation and contribution towards ministry goals and objectives. Nonetheless, Extrinsic Rewards and Love of Volunteerism failed to be determinants influencing Volunteer Motivation among Trained Satria volunteers. Within the research question structure, these findings suggest that although volunteers will respond positively to extrinsic rewards in the form of money or material gain, such rewards are not the greatest or most potent motivator of volunteers. Other drivers, such as intrinsic motivators or self-enrichment, may be more significant in creating volunteer motivation. This outcome highlights the complexity of volunteer motivation, where extrinsic rewards contribute but may not be as impactful as other motivational drivers. However, despite the strong correlation, the regression analysis reveals that love of volunteerism was not statistically significant in predicting volunteer motivation.

Conclusion

In conclusion, this study has illuminated several key factors that significantly influence volunteer motivation. Expression of Values, Community Involvement, Interpersonal Contacts, Career Orientation, and Personal Growth were identified as central factors that drive volunteer motivations by the study. It is important for organizations, policymakers, and program developers to identify and actualize the place of these factors to develop effective volunteer programs. According to Maslow's hierarchy of needs theory, human behavior is guided by a development through successive levels of needs, namely physiological, safety, social, esteem, and self-actualization. This theoretical view can be applied to understand the motive of volunteering. Expression of Values is a powerful motivator, emphasizing the alignment between volunteer activity and a person's core values and beliefs. This alignment causes one to feel greater commitment and attachment towards volunteer actions. Community Involvement promotes the importance of belonging to a community and contributing to a greater cause, which fulfils social and esteem needs by enhancing one's sense of identity and worth in a community.

Interpersonal Contacts stress the social aspect of volunteering, illustrating how interpersonal relationships and friendships can contribute to motivation and enjoyment. This factor aligns with social needs in Maslow's hierarchy, where being part of a group and forming relationships are paramount. Career Orientation supposes that volunteers will be motivated by the possibility of skill development and career growth, fulfilling both esteem and self-actualization needs via avenues of personal and professional growth. Lastly, Personal Growth embodies the innate advantages volunteers gain from volunteering, such as gaining new skills, new experiences, and personal development. This is also in alignment with Maslow's self-actualization, wherein individuals try to realize their potential and abilities.

For organizations to unlock the potential of volunteerism, they must consider these factors in program design, such that volunteer opportunities spark the interest of participants on a personal and meaningful level. In addition, subsequent research should investigate the dynamics and variations of the factors between different demographic groups. By having an in-depth insight into the dynamics between the factors like Expression of Values, Community Involvement, Interpersonal Contacts, Career Orientation, and Personal Growth, researchers and practitioners are able to design more targeted and high-performing volunteer programs. This will increase the sustainable and meaningful culture of volunteer engagement, ultimately enhancing the impact and longevity of volunteer work.

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Corporate Social Responsibility, Output Control and Motivation on Task Performance of the Meter Readers in PAIP Berhad

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Abstract: The research on task performance (TP) has grown linearly throughout the years. However, there is still a lack of complete understanding of the quantitative method to identify the perceived management support (PMS) for Corporate Social Responsibility (CSR), perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM) and controlled motivation (CM) on task performance (TP), especially in Pengurusan Air Pahang Berhad (PAIP) context. Investigating the relationship between the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), controlled motivation (CM), and task performance (TP) is the primary purpose of this study to be conducted. According to the PAIP, in an interview session, the performance review session is held twice throughout the year: Mid-Year Performance Review and Final-Year Performance Review. However, the management noticed that the performance of the employees was not really well for the meter readers in PAIP.

Keywords: *Corporate social responsibility, Output control, Motivation, Task Performance.*

1. Introduction and Background

Task performance (TP) greatly influences the success of organizations. Organizations achieve task performance with good efforts (Borman & Motowidlo, 1997). Employees' performance deals with both financial and non-financial outcomes, with the help of employees working on achieving organizational objectives. (Hanaysha & Tahir, 2016). Employees' determination and organizations' encouragement work together to increase the task performance (TP) of employees (Pattnaik & Sahoo, 2021). Task performance (TP) is the outcome of employee engagement that results from result-oriented behavior (Shantz et al. 2013; Anitha, 2014). Numerous empirical studies have demonstrated employee engagement as a crucial predictor for the enhancement of task performance (TP) at the workplace (Johnson et al., 2018).

In the present study, the researchers will examine the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM) and controlled motivation (CM) on Task Performance with special reference to the meter readers in Pengurusan Air Pahang Berhad (PAIP) which is one of the water operator industries in Malaysia. Many researchers conclude that perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), and controlled motivation (CM) will influence task performance. Therefore, from the literature reviewed, the research objectives were developed as below.

Research Objectives

The study addresses the following research objectives:

- To examine the positive relationship between perceived management support (PMS) for CSR and task performance (TP) of the meter readers in PAIP Berhad.
- To examine the positive relationship between perceived customer support (PCS) for CSR and task performance (TP) of the meter readers in PAIP Berhad.
- To examine the positive relationship between output control (OC) and task performance (TP) of the meter readers in PAIP Berhad.
- To examine the positive relationship between autonomous motivation (AM) and task performance (TP) of the meter readers in PAIP Berhad.
- To examine the positive relationship between controlled motivation (CM) and task performance (TP)

of the meter readers in PAIP Berhad.

Scope of the Study

The scope of the study covers the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), and controlled motivation (CM). This study will be conducted among the population of 103-meter readers with 97 sample size in PAIP, which is from eleven (11) districts in Pahang Darul Makmur.

2. Literature Review

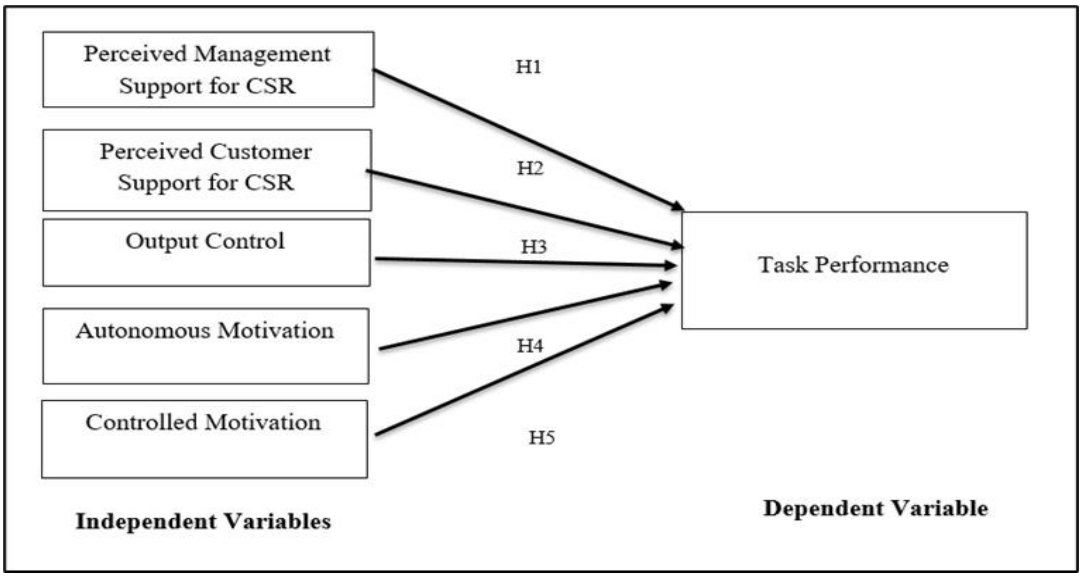
The research on task performance (TP) has grown increasingly over the years. However, there is still insufficient understanding of the quantitative method to identify the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), controlled motivation (CM), on on-task performance (TP), especially in the PAIP context. Investigating the relationship between the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), controlled motivation (CM), and task performance (TP) is the primary purpose of this study to be conducted. According to the PAIP, in an interview session, the performance review session is held twice throughout the year: Mid-Year Performance Review and Final-Year Performance Review. However, the management noticed the performance of the employees was not performing really well for the meter readers in PAIP, based on the low performance indicated by PAIP. The literature review was conducted, and the main variables in the study were identified. The named variables are the perceived management support (PMS) for CSR, perceived customer support (PCS) for CSR, output control (OC), autonomous motivation (AM), controlled motivation (CM), and task performance (TP).

Autonomous motivation is expressed in the interests and personal values of each public servant, in the sense that these human resources endorse the importance or value of their work, and they perform their duty with intrinsic pleasure, satisfaction, and desire (Fernet et al. 2012). Another independent variable for this research is control. Control is the process of aligning the actions of employees with the interests of the organization, and when the company defines its strategic objectives, it must inevitably achieve them, with the estimation and application of control mechanisms (Anthony & Govindarajan, 2007; Snell, 1992), called managerial controls (Merchant & Van der Stede, 2012) or organizational controls (Flamholtz, 1996). While autonomous and controlled motivations vary with respect to their fundamental regulatory processes and their related experiences, generating behaviors that can be characterized by the extent to which they are autonomous or controlled (Deci & Ryan, 1985; Koestner et al. 2008). Based on the literature reviewed, the theoretical framework was developed as shown in Figure 1 below.

3. Research Design

The research design refers to the methodology used in this study. In this research, a quantitative questionnaire was used to analyze the hypothesis and research questions. Tsourvakas and Yfantidou (2018) analyzed research using quantitative methods on employee engagement and found positive correlations between all independent variables (IVs) and the Task performance as the dependent variable (DV). Quantitative research commonly explores specific and clearly defined questions examining the connection between two (2) occasions, or events, in which the subsequent occasion is a result of the primary occasion. Besides, quantitative, the research is correlational, with individual meter-readers as respondents, and using cross-sectional/one-shot data collection.

Figure 1: Theoretical Framework



Primary Data

The primary data that will be used in this research are the results of the distributed survey questions. For the attitudes and intentions measures, the researchers use a 31-item research questionnaire as it is the best method (Bapat & Upadhyay, 2017). According to Sekaran and Bougie (2016), primary data can be referred to as a source of data taken firsthand by the researcher for the proposed research. The primary data will be obtained, will be regarded as original as it was obtained directly from the meter readers in PAIP, highly relevant to the research topic, and to produce high-accuracy data. The meter readers in PAIP are expected to give their most accurate opinion related to all independent variables (IVs) and dependent variables (DVs), which is task performance (TP). Besides, the primary data taken produces a realistic and reliable review of the research topic, as the meter readers in PAIP involved know their working environment.

Validity of the instrument

Validity refers to how consistently a measurement represents what it was created to measure. When analyzing a questionnaire, there are several forms of validity to consider, including face validity, content validity, construct validity, statistical validity, ecological validity, internal validity, and external validity. (Rozali et al. 2022). Assessing the validity of an instrument usually involves interviewing a small group of experts who can give important perspectives into the knowledge and abilities tested by each item. Professionals do a comprehensive analysis of the survey questionnaire's content and face validity. This procedure guarantees that the questions are in line with the study's aims and appropriate for the research setting. Therefore, the instrument was validated by experts both in academia and in the area of subject matter.

Target Population

The proposed target population for this research is 103-meter readers in PAIP in which consists of eleven (11) districts in Pahang, Darul Makmur. Only permanent employees will be taken into account to ensure this research is precise and not biased (Narehan et al. 2014). According to the study conducted by Dirks and Ferrin (2001), the research suggested that employees' actions and perceptions have a strong influence on the organizational image. Moreover, a study conducted by Narehan et al. (2014) emphasized that a sample should represent the whole population.

Sampling Technique and Sample Size

In this research, the sampling technique that will be used is proportionate stratified sampling, which is a probability sampling technique. Proportionate stratified sampling is a type of sampling method in which the total population is divided into smaller groups or strata to complete the sampling process that needs 103-meter readers, as table below. Choosing the correct sample size is very important for any research. The sample size will affect the quality and originality of the data that will be analyzed. According to Malhotra and Birks (2007), the proper sample size of research should be at least 10 percent of the population. Sampling size is the

representation of all the elements in the population which was drawn (Sekaran & Bougie, 2016). The minimum sample size was determined to be around 97 respondents.

4. Conclusion

In this study, the data will be obtained from survey questions, and the analysis of the collected data will be conducted using SPSS version 29. This research also used descriptive statistics and inferential statistics for data analysis. Furthermore, in this research, the standard deviation was used to measure the centreline of the trend. According to Kousar and Azeez (2015)The standard deviation, usually signified with the Greek letter sigma, is the proportion of a spread of information around the mean. The high standard deviation implies that information is spread more generally from the mean, whereas a low standard deviation flags that more information lines up with the mean. In an arrangement of data analysis, the standard deviation is helpful for rapidly determining the scattering of data points. Besides standard deviation, mean, median, mode, skewness, and kurtosis, the researchers will analyse with reliability analysis, correlation, and regression. The researchers are at the proposal stage and recently completed the ethics approval. The researchers are in the stage of collecting the data. Once the sample size has been collected, the analyses will begin.

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A Study on the Causes of Work Stress Among the Malaysian Civil Defense Force Personnel

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Abstract: The frustrations, expectations, and deadlines that accompany life in the contemporary world have, for many, become a default setting. Receiving different signals that upset our equilibrium, or that we consider a potential danger, is what, physically, we call stress. The seriousness of stress is highlighted by the fact that most people in the working population, during the period between 2021 and 2022, had cases of work-related health illness primarily attributed to work stress, depression, and anxiety. What is understood is that stress is a part of life, and it is certainly something that no one can run away from. The amount of stress that one has to go through in the workplace, particularly in the context of Malaysia, has been on the rise ever since the onset of the Coronavirus 2019 (COVID-19) pandemic. A number of earlier researchers looked into the levels of stressful occupations in Malaysia and the reasons that can predict such stressful situations, and many such incidents were uncovered. Given the stressful nature of the pandemic, the government of Malaysia put in motion the Malaysia Civil Defense Force (MCDF), heavily referred to as the 'Angkatan Pertahanan Awam Malaysia'. Given the nature of the work that the MCDF has to do, it is clear that stress is a huge problem. This thesis investigates the relationship between work stress and its underlying organizational, operational, and lifestyle causes among personnel at the MCDF Kuala Lumpur District Office. Utilizing Pearson Product Correlation Coefficient and Multiple Regression Analysis, the study supports the correlations between work stress and both organizational and operational causes, while lifestyle factors were found to be unsupported. The study underscores the importance of addressing these stressors to enhance employee well-being and productivity. Recommendations for MCDF include enhancing psychological support, improving occupational health and safety measures, and fostering effective communication within the organization. The research highlights the necessity for broader sample areas and multi-method data collection in future studies. Understanding these dynamics is critical for strategic decision-making and fostering a supportive work environment in high-stress government agencies.

Keywords: *Stress, Organizational, Operational, Lifestyle, Civil Defense.*

1. Introduction

In today's fast-paced, high-pressure world, workplace stress is an increasingly critical issue, particularly among frontline responders. According to the World Health Organization (WHO, 2023), mental health issues caused by work-related stress contribute significantly to lost productivity and absenteeism. Recent data from the Institute for Public Health (2023) indicates a worrying rise in mental health disorders among Malaysians, particularly post-pandemic. Stress, while a natural physiological response to challenging situations, can also be beneficial in emergencies—such as reacting quickly to avoid an accident or overcoming pressing challenges. However, prolonged exposure to stress becomes detrimental. As Dua (2019) noted, once it exceeds manageable limits, stress contributes to serious health consequences, including cardiovascular issues, mood disorders, and decreased quality of life. Prolonged stress exposure is associated with various physical and psychological disorders such as depression, anxiety, and heart disease (Paganin & Simbula, 2021). Work-related stress does not vanish after office hours; instead, it accumulates and may lead to long-term harm (Canadian Mental Health Association, 2016). Karasek's Job Demand-Control model (Crescenzo, 2016) explains that stress intensifies when employees face high demands with low autonomy, a condition leading to negative outcomes like immune suppression and mental health degradation.

The Malaysian Civil Defense Force (MCDF), due to its high-stakes role in disaster response, embodies these conditions. Despite the significant mental and emotional load borne by MCDF personnel, especially during and after the COVID-19 pandemic, little empirical research has examined their specific stressors. This study seeks

to fill that gap. While the prevalence of stress-related disorders is acknowledged in global and national reports, little focus has been given to stress experienced by MCDF personnel—a group tasked with both enforcement and rescue roles. Organizational factors (e.g., leadership instability, job ambiguity), operational demands (e.g., long hours, exposure to trauma), and lifestyle challenges (e.g., irregular sleep, lack of exercise) are all stress-inducing elements. Yet, there is a lack of urgency in addressing these in occupational health discourse. This study aims to explore these critical independent variables and how they relate to work stress among MCDF Kuala Lumpur personnel. To understand this topic, it is important to identify the research question as the guideline to determine the objective of conducting the research. Therefore, the research questions of this research are as follows:

RQ1: Is there any relationship between organizational causes and stress among MCDF personnel?
RQ2: Is there any relationship between operational causes and stress among MCDF personnel?
RQ3: Is there any relationship between lifestyle causes and stress among MCDF personnel?
RQ4: What is the most significant factor that contributes to stress among MCDF personnel?

2. Literature Review

Organizational Causes and Work Stress

Factors that affect work stress such as differences in the characteristics of each individual, the ability of individuals to deal with a problem, coping with stress, role ambiguity, role conflict, role overload, exposure to incidents critical, discrimination at work, lack of cooperation among co-workers, and job dissatisfaction, organizational justice (at work) lack of quality sleep, lack of motivation or external support, past trauma and low psychological power or stress control that affects the coping used (Wijayanti & Fauzi, 2020). A study by Akerstorm et. al. (2021) has shown that multiple factors, such as high job demands, low job control, low job support, effort-reward imbalance, atypical working hours, poor psychosocial safety climate, bullying, and role stress, are some of the causes for employees' burnout or stress-related mental health problems. Poorly managed and organized work environments can have negative effects on employees that, rather than enhancing their dignity, wear them out and drain their psychological resources (Edú-Valsania et al., 2022). Increasing job control and autonomy is crucial for reducing work stress. Strategies include involving employees in decision-making, providing opportunities for skill development, and allowing flexible work arrangements. An international journal highlighted these strategies' effectiveness in reducing stress and improving job satisfaction (Jatmiko & Pangarso, 2022). Providing clear job descriptions, setting realistic expectations, and offering conflict resolution mechanisms can help reduce stress related to role ambiguity and conflict.

Research in Frontiers in Psychology in 2024 suggested that such interventions effectively reduce role-related stress (Abdou et al., 2024). Improving the physical and psychosocial work environment is essential for reducing stress. This includes ensuring safe and comfortable working conditions, promoting a positive organizational culture, and offering wellness programs. It was found that enhancements in the work environment significantly reduce work stress (Jamil et al., 2023). In the study by Bai et. al. (2004), during the SARS outbreak, infection control procedures were frequently modified because of the evolving understanding of the pandemic. Health care facilities became highly stressful environments because health care workers spent hours each day putting on and removing airtight protective equipment. This only added to the exhaustion that they were experiencing from the increased workload caused by the outbreak (Bai et al., 2004). In the study by Cui et. al. (2021) among nurses, the causes of occupational stress are caused by high expectations, lack of time, skills, and social support, which, in turn, causes anxiety, PSTD, distress, burnout, and other psychological problems. Other common causes of stress and anxiety include lack of an effective hospital management system, lack of training, uncertainty regarding COVID-19 treatment and care policies, which further exacerbate the situation (Cui et al., 2021). According to Stogner et. al. (2020), law enforcement personnel, already compounded by the normal risk factors, had to add to it the COVID-19 social distancing policies that resulted in numerous changes and alterations in protocols that drive workplace stress. The study also found that mental health problems among law enforcement personnel are associated with a demanding work environment, agency culture, and inconsistent shift scheduling. They, as many first responders, are subjected to altered patrolling routines, changes to shift schedules, and work hours that drive workplace stress higher during the COVID-19 pandemic (Stogner et al., 2020).

A study by Li et. al. (2019) found that several sources of stress (stressors) in the police force are poor communication between administrators and officers, unfair supervision, controversial performance ratings, and weak supervisory support. Excessive workload and high job demands are primary operational causes of work stress. Studies have shown that when employees perceive their workload to be unmanageable, it leads to increased stress levels. A study by Benthem et. al. (2022) used a computational model to demonstrate how high job demands can lead to chronic stress, affecting both mental and physical health. The physical and psychosocial work environment also plays a critical role in causing work stress. Poor working conditions, lack of resources, and inadequate support from management can exacerbate stress. This research by Goh et. al. (2016) emphasized the importance of a supportive work environment in reducing stress and improving employee well-being. According to Chua et. al. (2022), stress that produces the psychological response of job strain has been widely recognized as a response that may be explained by the environmental conditions of the workplace.

Operational Causes and Work Stress

To lower employee stress, effective workload management is essential. According to a study by Crescenzo (2016) in the Journal of Health and Social Sciences, the main causes of professional stress are excessive workloads and unrealistic deadlines. According to the study, employees' stress levels rise when they believe their responsibilities are too much to handle, which can result in burnout and lower productivity. Role conflict and ambiguity, where employees are uncertain about their job responsibilities or receive conflicting demands, have been linked to higher stress levels. A study by Abdou et. al. (2024) highlighted that role ambiguity and conflict significantly contribute to psychological distress and reduced job satisfaction. According to the Centers for Disease Control (2020), providing care to others during the COVID-19 pandemic can lead to stress, anxiety, fear, and other strong emotions. How one copes with these emotions can affect their well-being, the care they give to others while doing their job, and the well-being of the people they care about outside of work. Frontline workers such as health care providers and first responders were identified as people who may respond more strongly to the stress of a crisis (Centers for Disease Control, 2020).

The risk of infection for healthcare workers is directly increased by long-term exposure to large numbers of infected patients, and it is also indirectly increased by pressure of treatment, work intensity, and lack of rest (Wang et al., 2020). Lack of job control and autonomy is another significant factor contributing to work stress. Employees who feel they have little control over their work processes and outcomes are more likely to experience stress. Research published in the International Journal of Academic Research by Jatmiko and Pangarso (2022) found a strong inverse relationship between job autonomy and work stress, suggesting that increasing employee control can mitigate stress. A study on anesthesiologists' work pattern behavior by Gupta et. al. (2020) involves erratic work schedules, night shifts, and long hours in the operating theatres and intensive care unit. In the study by Stogner et. al. (2020), he stated that law enforcement personnel presumably face higher exposure to traumatic events. Apart from the direct 25 impact of the COVID-19 pandemic, the officers are likely to experience increased stress encounters with individuals suffering from mental health problems aggravated by fear of contagion, economic uncertainty, resource shortages, and isolation. First responders have the responsibility for maintaining public safety, risk of exposure through interactions with the community, and the concern of exposing family members to the virus (Stogner et al., 2020).

Lifestyle Causes and Work Stress

According to Sherman et. al. (2020), due to depression and anxiety associated with childcare issues, food insecurity, reduced access to routine medical care, symptoms ascribed to COVID-19, and lack of daily structure as a result of social isolation and re adaptation of new norms, due to the reimplementation of movement control measures, had significantly elevated psychological distress (Sherman et al., 2020). Adopting a healthy lifestyle is one of the stress management techniques (Dua, 2019). The need for quick adaptation was urgently promoted by the stress and anxiety created by the social isolation and consequent management of fear; the fear of contamination, health threat, job loss, and insecurity (Soares, 2021). In a study by Shanahan et. al. (2020), participants on average responded that the COVID-19 crisis was somewhat disruptive to their lifestyle (i.e., daily routine, work, education, and family). Secondary consequences of the pandemic and social isolation, as major lifestyle and economic disruptions re-ensued, associated with recurrent social standstill and economic decline, were a common theme. On a broader scale, lifestyle causes can impact workplace productivity, absenteeism, and mental health. Studies have shown that individuals with healthier lifestyle habits, such as

regular physical activity and balanced diets, report higher productivity and fewer mental health issues such as depression and anxiety (Marecki, 2024). Conversely, negative lifestyle choices, such as poor nutrition and substance abuse, are associated with diminished cognitive function and lower work performance (Pignatelli, 2020). The findings of the research of Kraft et. al. (2019) indicate that salespeople who practice a wellness lifestyle would have a high probability of displaying problem-solving tendencies rather than emotion-based avoidance tactics in coping with job stress.

Sharifi-Rad et. al. (2020), in their study, found that lifestyles such as smoking, alcohol consumption, adequate or inappropriate diet, exercise, training, or untrained condition, does contribute to oxidative stress, which can affect muscle activity, ultimately contributing to skeletal muscle fatigue during strenuous exercise. Having an unhealthy eating habit or an unbalanced lifestyle cannot be compensated for by consuming superfoods. (Sharifi-Rad et al., 2020). Lifestyle causes are particularly relevant in the context of military operations, where the physical and mental demands on personnel are often extreme. In the military, lifestyle factors such as fitness, nutrition, stress management, and sleep play a crucial role in ensuring operational readiness and the overall health of soldiers. Maintaining an optimal lifestyle is not only important for physical endurance but also for cognitive performance and mental resilience (Sanders et al., 2021). Sleep is a crucial lifestyle factor that directly influences military performance. In numerous military missions, soldiers must operate under conditions of sleep deprivation, which adversely impacts cognitive function, reaction time, and decision-making capabilities (Petrofsky et al., 2021). From the literature reviewed, several hypotheses were developed:

H1: There is a significant relationship between organizational causes and stress among MCDF personnel.
H2: There is a significant relationship between operational causes and stress among MCDF personnel.
H3: There is a significant relationship between lifestyle and stress among MCDF personnel.

3. Research Design

The unit analysis of this study was the MCDF personnel who were on active duty operating from the MCDF Kuala Lumpur District office, Jalan Padang Tembak, Kuala Lumpur. They were chosen above other agencies as they were carrying out tasks almost like their counterparts from the medical fraternity.

Population

The term "population" is also defined by Sekaran and Bougie (2016) as the total set of people, objects, or events that the researcher is interested in studying. The population consists of 180 MCDF personnel who were on active duty operating from the MCDF Kuala Lumpur District office, Jalan Padang Tembak, Kuala Lumpur. The population was chosen to analyze the employees' work stress levels.

Sampling Technique

The total population for this study consisted of 180 active-duty personnel stationed at the MCDF Kuala Lumpur District office. This site was selected because it represents one of the most active and urbanized deployments of MCDF personnel, frequently tasked with complex emergency responses. This study employed census sampling, surveying the entire population of 180 personnel to ensure comprehensive coverage of stress levels and contributing factors within the district.

Sample Size

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Data Analysis

In this research, the unit of analysis included the individual-level data of those currently working from the MCDF Kuala Lumpur District office, Jalan Padang Tembak. This level of analysis is suitable for the research, which aims to understand the impact of work stress. The study was structured around five essential parts, each focusing on different aspects of the data.

Correlation Analysis

Pearson correlation results showed significant positive relationships between stress and the independent variables. Organizational factors: $r = .627$, $p < 0.01$, Operational factors: $r = .589$, $p < 0.01$ and Lifestyle factors: $r = .403$, $p < 0.05$. These values indicate moderate to strong correlations, supporting the notion that these variables are associated with stress levels among MCDF personnel.

Multiple Regression Analysis

A multiple regression analysis was conducted to determine the predictive power of the three independent variables on stress. The model was significant, $F(3,119) = 42.56$, $p < 0.001$, with an R^2 value of 0.708. This indicates that 70.8% of the variance in stress levels can be explained by organizational, operational, and lifestyle factors. The regression coefficients are as follows: Organizational causes: $\beta = 0.356$, $p < 0.001$; Operational causes: $\beta = 0.417$, $p < 0.001$, and Lifestyle causes: $\beta = 0.087$, $p = 0.109$ (not significant). This result suggests that while organizational and operational causes significantly predict stress levels, lifestyle causes do not show a statistically significant effect.

4. Conclusion

Prolonged delays in managing stress-related health issues can easily lead to health issues that are impossible to cure, potentially impacting the rest of a person's life. Stemming from this, it is needless to say that some of the issues as a result of organisational structure, in verbal and non-verbal, can help a result in relieving a considerable amount of stress. Government institutions like the MCDF, with the stress-driven hierarchical system, can add considerable weight to the already existing stressors in the system. Leadership redesigns appear to have a roll-down effect, inducing modifications on the vision/priorities and subsequently policies. Such a factor, in the perception of many, is bound to elevate stress levels. Effective communication of this type is a suitable course of action rather than the "promotion" of emotional denial. The purposeful organizing of structural aids, combined with the modifications to the functional points, helps in lessening the amount of stress caused. Through consistent leadership, effective communication, resource allocation, and psychological support, the MCDF can mitigate work stress and enhance the overall effectiveness of its operations. Future research should continue to explore these dynamics, expanding the scope to include multiple district offices and incorporating more detailed analyses of specific stressors. By doing so, the MCDF can build a comprehensive understanding of work stress and develop robust strategies to support its personnel. The study confirms the acceptance of two hypotheses:

H1: There is a significant relationship between organizational causes and stress.
H2: There is a significant relationship between operational causes and stress.

These findings align with past literature, such as Akerstrom et al. (2021), who highlighted the effect of organizational environment on burnout, and Crescenzo (2016), who found operational overload to be a major stress contributor (the most significant factor). However, H3, which hypothesized a significant relationship between lifestyle and stress, was not supported. This may be due to the uniformity of working conditions within the MCDF personnel, making lifestyle variations less impactful. This study is geographically limited to Kuala Lumpur and is based on self-reported data, which may be subject to bias.

Suggestions for Future Research

The future research is suggested to expand by adding personnel from various districts. This would widen the scope of the sample, while qualitative approaches would help illuminate nuanced aspects of stress. It would also be interesting to investigate the moderating effect of gender, age, and work experience.

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Employee Engagement Among Distance Learning Students in Higher Education Institutions: A Role of Job Features, Working Conditions and Perceived Support

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Abstract: Employee engagement has become a significant organizational concern in recent years and remains a top priority for employers in the globalized era. It refers to the level of commitment and participation that an employee has towards their organization and its core values. The challenging economic landscape in Malaysia during the MCO period has led many companies across various sectors to face the repercussions of employee disengagement, highlighting the need for scholarly research to develop strategies for maintaining employee engagement. Employee engagement fosters a positive mindset among staff towards their organization. Therefore, this study aims to investigate the connection between job characteristics, working environment, and perceived support on employee engagement among distance learning students in higher education institutions. A total of 115 students pursuing a bachelor's degree through distance learning at a higher education institution completed online questionnaires. The findings revealed a significant positive relationship between the working conditions and job characteristics as the two independent variables. However, the analysis indicated that organizational support does not exhibit a significant positive relationship with employee engagement in the context of distance learning students. This research underscores the benefits and inspires students, as well as leaders and managers across all industries in Malaysia, to effectively leverage their workforce's capabilities, commitment, and unrecognized talent, ultimately improving business performance in the future.

Keywords: *Employee Engagement, Job Features, Working Conditions, Perceived Support*

1. Introduction and Background

In today's globalized world, employee engagement has emerged as a crucial factor for many organizations. High levels of employee engagement in the workplace propel the organization or company toward accomplishing its mission, vision, and goals. From the viewpoint of employees, engagement with their organization is essential as it correlates with their motivation and productivity, which in turn affects the organization's results.

Employee engagement is about the emotional commitment of the employee to their organization's goals. The employees with a high level of engagement do not attend at workplace or work just to receive the rewards, promotion or paycheck, but this category of employees is working on behalf of the organization's goals as they care feeling and appreciate the way to organization operates. To ensure the organization at the right track in achieving the organizational goals, the engagement between employees and employers needs to be developed from time to time. As noted by Ayob & Nor (2019), numerous organizations are facing difficulties in the current economic environment, and fostering employee engagement is the sole strategy that can provide these organizations with a competitive advantage. Additionally, a decline in employee engagement can have a negative impact on productivity, customer service, and overall performance (Mansor & Hassan, 2023).

By the middle of 2020, a significant number of jobs were impacted by the unforeseen COVID-19 pandemic. Numerous companies faced challenges in retaining staff while enhancing work quality and organizational effectiveness. As noted by Eisenberger, Malanoe & Presson (2021), there has been a growing focus on employee engagement in recent years. Various organizations, businesses, researchers, and others have asserted that strong engagement with employees is a predictor of achieving the goals and objectives set by the organization. High levels of engagement are a key factor in why many employees choose to remain loyal to their organization.

In 2024, the Mercer Engagement Index on employee engagement in Malaysia indicated a drop from the prior year, with engagement levels decreasing to 76%. This figure is among the highest in the Asia Pacific region, which may pose challenges for businesses looking to grow and for overall economic development. Employees who are healthier and happier tend to be more productive, and greater employee engagement often correlates

with increased happiness and health. The Employee Engagement Index score for Malaysia highlights significant opportunities for improvement in how companies engage with their workforce and suggests there are numerous advantages to be gained by valuing human capital properly. The level of employee engagement greatly impacts various sectors. Employee disengagement can adversely affect organizations through increased turnover, decreased motivation, diminished performance, and a negative influence on revenue (Markos & Sridevi, 2020). Organizations incur losses when new hires leave shortly after joining, resulting in wasted resources, including time and money, spent on recruiting and training. Discontent at work is one reason why millennial employees experience strain in balancing work and life, as their expectations often go unmet (McCunn, 2019).

Based on the statement and the findings from earlier research, the researcher asserts that employee engagement is currently one of the significant challenges encountered by various organizations in Malaysia. This involves organizational hierarchy and has the greatest impact on employees as well as employers. As an employee also student in a business program, awareness of the factors affecting employee engagement is needed because from this awareness, employees can support the Human Resource department in ways to develop the greatest engagement between employers and employees. Support to Tyagi (2016), employee engagement is one of the key problems that all organizations try to maintain among their employees put their efforts 100% in their duties. The objectives of this research are outlined as follows: 1) To assess how job characteristics relate to employee engagement among students in distance learning programs. 2) To evaluate the connection between working environments and employee engagement among distance learning students. 3) To investigate the relationship between perceived support and employee engagement among distance learning students.

2. Literature Review

Employee Engagement

Emotional commitment from workers toward their organization in pursuit of its objectives can be termed as employee engagement (Mansoor & Hassan, 2016). When employees are motivated to carry out their tasks and find joy in their work, they are also more likely to persist for the good of the organization. Employee participation is vital for any organization. A study by Ayob & Nor (2019), recognized as one of the most important in the field of employee engagement, supports this notion. Research suggests that early academic investigations into employee engagement shed light on the importance of employee participation, particularly regarding the psychological states of employees who may feel mentally detached during their work (Rubel & Kee, 2023). Employee engagement can also be understood as the attentiveness of workers and their capacity to execute their duties efficiently (Kangure, 2023). Macey & Schneider (2018) identify three work-related aspects—energy, absorption, and commitment that are linked to employee engagement. Rather than concentrating solely on individual resources within the workplace, Khan's definition underscores the vital traits of work involvement, which should consider both job performance and psychological ties. Consistently, prior studies have shown a strong correlation between employee engagement and the success of the organization, affecting various factors such as employee performance, efficiency, productivity, attendance, retention, customer satisfaction, customer loyalty, and profitability (Sharma, 2019). Therefore, employers must learn how to attract and keep millennial employees by acknowledging and valuing their contributions and efforts, ensuring that the organization’s values are deeply embedded in all practices, and offering channels for all employees to provide their opinions and feedback on relevant organizational issues.

Recent research emphasizes that employee engagement has gained significant importance in recent years, attracting the interest of many employers. Engagement plays a vital role in the success and growth of an organization. Studies have demonstrated a link between employee engagement and factors such as service quality, safety, retention, sales, profitability, and overall returns for shareholders (Simbolon, Madhakomala & Sentosa, 2020). Higher levels of employee engagement are likely to contribute to increased revenue and greater success for the organization (Mansor & Hassan, 2019). Furthermore, research suggests that when employers engage effectively with millennials and develop a better understanding of them in the workplace, it positively influences multiple organizational outcomes, such as improved productivity, reduced turnover rates, enhanced retention of skilled employees, a more encouraging work culture, strengthened trust between employers and employees, and increased motivation for employees to be present at work. In contrast, poor employee

engagement can have negative repercussions for the organization, including lower employee performance and motivation, higher turnover rates, difficulties in retaining talented personnel, and adverse effects on company revenue (Evelyne, Kilika & Muathe, 2019).

The Relationship Between Job Features and Employee Engagement

Mugo, Wario, and Odhiamo (2024) proposed that jobs with enhanced characteristics enable individuals to invest more of themselves into their work, leading to heightened engagement (Markos, 2020). Furthermore, improved job characteristics foster increased levels of employee commitment and involvement. The research conducted by Nagesh, Kulernur, and Shetty (2019) aimed to investigate the positive effects of job characteristics on employee engagement within State Corporations in Kenya. The results of this study offered valuable insights, demonstrating that certain job characteristics can enhance employee engagement in the workplace. This research analyzed specific sub-variables of job characteristics, including job autonomy, job significance, job performance, and job clarity. The researchers discovered that the components of job characteristics exhibit a positive and significant relationship with employee engagement.

In contrast, Nagesh, Kulenur & Shetty (2019) carried out a study that sought to investigate how job characteristics, organizational climate, job satisfaction, and employee engagement influence the organizational citizenship behavior of teachers in Thailand. Their results indicated that job characteristics directly affect employee engagement, job satisfaction, and organizational citizenship behavior, with a significance level of 0.05. Additionally, the researchers observed that their findings are consistent with those of McCunne & Gifford (2022), who also discovered that job characteristics exert a direct impact on employee engagement, as these characteristics were found to be closely associated with employee engagement within the organization. Thus, it is hypothesized that:

H1: Job features have a significantly positive relationship with employee engagement among distance learning students

The Relationship Between Working Conditions and Employee Engagement

Tyaqi (2019) found that the work environment has the most significant positive impact on employee engagement, followed by rewards and work-life balance. Moreover, many participants feel that the workplace environment is more crucial than having strong employee engagement. Additionally, the work environment should not only be supportive but also enable individuals to contribute their efforts to the organization freely. The study's outcomes confirmed their hypothesis, as all three independent variables (rewards, work-life balance, and work environment) demonstrated a positive and significant relationship with employee engagement in the workplace. Research by Simbolon, Madhakomala & Santoso (2020) focused on employee engagement at PT Taspen (Persero) headquarters in Jakarta, Indonesia, and indicated that the work environment directly and positively impacts employee engagement, concluding that an advantageous work environment elevates employee engagement levels. A study conducted by Nagesh et al. (2019) indicated a positive association between the work environment and employee engagement. The researchers highlighted the importance of improving and maintaining employee engagement by creating an optimal work environment and offering training and development opportunities for all organization members to achieve successful results. In contrast, findings from Sharma (2019) regarding non-academic staff at a university in Nigeria yielded different results. In this research, the work environment was not identified as a factor or predictor that influences employee engagement, as the nature of their roles and the university context did not necessitate a specific emphasis on this matter. Thus, it is hypothesized that:

H2: Working conditions have a significant positive relationship with employee engagement among distance learning students

The Relationship Between Perceived Support and Employee Engagement

Perceived Organizational Support (POS) plays a crucial role in influencing employee engagement (Markos & Sridevi, 2019). Supporting this, Rubel and Kee (2019) found similar results, highlighting a positive relationship and significance with employee engagement. The outcomes from both studies reinforce prior literature, confirming that support from the organization and supervisors is vital for employees to remain engaged in the organization in order to achieve both individual and organizational objectives (Simbolon, Madhakoma & Santosa, 2018).

As a result, Alvi, Abbasi, and Haider (2014) carried out research in the banking sector of Pakistan focusing on perceived organizational support (POS) and employee engagement, indicating that organizational support has a significant impact on employee engagement within the corporate setting. The researchers developed a single hypothesis to investigate the influence of perceived organizational support on employee engagement and suggested that employers in the banking sector should integrate the principle of perceived organizational support into their systems and processes to potentially improve employee engagement levels.

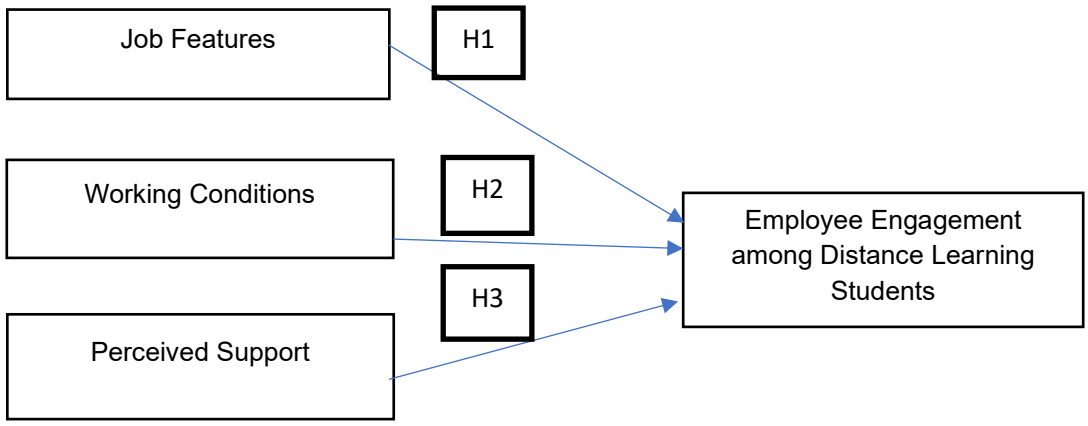
In their study, Dai & Qin (2019) found a strong link between perceived organizational support and employee engagement, contending that when employees perceive support from their organization, it cultivates a sense of belonging and inspires them to pursue the organization's goals. Furthermore, this perception is associated with increased employee engagement. Employees who believe their organization supports them are more inclined to trust that the organization will meet its future obligations, fostering a sense of responsibility to reciprocate by working hard for both tangible and intrinsic rewards, thereby reflecting the tenets of social exchange. Sharma (2019) explored the concept of "Social Exchange Theory," which has consistently served as a theoretical basis for research on organizational support and employee engagement; this theory highlights that social exchange relationships involve one individual offering a favor to another with the expectation of a corresponding return in the future.

H3: Perceived organizational support has a significantly positive relationship with employee engagement among distance learning students

Research Framework

The framework for this study is illustrated in Figure 1. The independent variables in this research consist of Job Features, Working Conditions, and Perceived Organizational Support. The dependent variable in this study is employee engagement. Additionally, the framework indicates the relationships relevant to the hypothesis being tested in the investigation.

Figure 1: The proposed research framework



3. Research Methodology

This study utilized a quantitative research method to investigate the relationship between job characteristics, working conditions, and perceived support concerning employee engagement. The sample included distance learning students in their capacities as employees, classified by their tenure: less than 11 months, 1-3 years, 4-6 years, 7-9 years, and 10 years or more. Following the guidelines established by Krejcie and Morgan (1970), the sample size was determined based on the overall population to make informed decisions about the sample. With a total population of 420 employees, the research sample comprised 115 individuals. Moreover, the instruments used in this study were sourced from reliable and validated resources found in existing literature. To measure employee engagement, the study included 8 items from Sundaray (2021). For assessing job characteristics, 6 items were taken from Baiquni & Lizar (2019). To analyze the work environment, 5 items were adapted from Sharma (2021), while items from McCunn & Gifford (2023) were employed to evaluate perceived organizational support. The questionnaire consisted of five sections, capturing the demographic

information of respondents, employee engagement, job characteristics, work environment, and perceived organizational support. A five-point Likert scale was used to measure participant responses, with ratings ranging from 1 (strongly disagree) to 5 (strongly agree) for each statement. Additionally, a non-probability sampling design applying the quota sampling technique was utilized in this research. The researchers employed a structured questionnaire, ensuring uniformity in the questions posed to all participants.

4. Results

Table 1: Demographic Profile

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Males	30	24.4%
Females	85	69.1%
Total	**115**	**100%**
AGE		
20-24	22	17.9%
25-29	57	46.3%
30-34	24	19.5%
35-39	8	6.5%
40 years and above	4	3.3%
Total	**115**	**100%**
EDUCATION		
SPM	1	0.8%
Certificate	1	0.8%
STPM/DIPLOMA	69	56.1%
Bachelor Degree	44	35.8%
Total	**115**	**100%**
LENGTH OF SERVICES		
Below 11 months	10	8.1%
1-3 years	41	33.3%
4-6 years	28	22.8%
7-9 years	17	13.8%
10 years or more	19	15.4%
Total	**115**	**100%**

The total number of participants is 115. According to the results in Table 1, 24.4 percent of the respondents are male, while the remaining 69.1 percent are female. In terms of age, the largest group of respondents falls within the 25-29 years old category, representing 46.3 percent. Regarding educational background, 56.1 percent of respondents hold STPM/Diploma, making this the predominant group. Finally, in terms of length of service, most respondents fall into the category of 1-3 years of service.

Table 2: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha	Results
Employee Engagement	8	0.865	Good
Job Features	6	0.817	Good
Work Environment	5	0.896	Good
Perceived Organizational Support	5	0.925	Excellent

As shown in Table 2, the results from the reliability assessment indicate that all four constructs have acceptable values, all above 0.6. This study conducted several reliability evaluations, including tests for internal

consistency. This evaluation measures the reliability of each variable. Table 2 presents an interpretation of reliability according to Cronbach's alpha, which was computed for 115 participants. The Cronbach's alpha score for employee engagement stands at 0.865, reflecting a good level of reliability. The score for job features is 0.817, which also indicates a positive outcome. The work environment received a Cronbach's alpha of 0.896, showcasing a strong result. Finally, perceived organizational support achieved a Cronbach's alpha of 0.925, signifying an outstanding result.

Table 3: Correlation Analysis

		Employee Engagement	Job Perceived	Work Environment	Perceived Organizational Support
Employee Engagement	Pearson Correlation	1	0.606**	0.619**	0.486**
	Sig. (2-tailed)		0.000	0	0
	N	115	115	115	115
Job Perceived	Pearson Correlation	0.606**	1	0.622**	0.605**
	Sig. (2-tailed)	0.000		0.000	0
	N	115	115	115	115
Work Environment	Pearson Correlation	0.619**	0.622**	1	0.735**
	Sig. (2-tailed)	0	0.000		0
	N	115	115	115	115
Perceived Organizational Support	Pearson Correlation	0.486**	0.605**	0.735**	1
	Sig. (2-tailed)	0	0	0	
	N	115	115	115	115

As illustrated in Table 3, there is a notable moderate positive correlation between job characteristics and employee engagement (r=0.606, p=0.000, p<0.05). This indicates that as job characteristics improve, employee engagement tends to increase. Table 3 also shows a significant moderate positive correlation between the work environment and employee engagement (r=0.619, p=0.000, p<0.05). This suggests that enhancements in the work environment are associated with higher levels of employee engagement. Lastly, Table 3 reveals a significant moderate positive correlation between perceived organizational support and employee engagement (r=0.486, p=0.000, p<0.05).

Table 4: Regression Analysis

	Dependent Variable Usage
Independent variables (β)	
Job Perceived	0.373
Work Environment	0.426
Perceived Organizational Support	-0.054
F value	59.429
R2	0.464
Adjusted R2	0.45

According to the information presented in Table 4, the model's R^2 value is 0.46. This suggests that 46% of the differences in employee engagement can be attributed to variations in job perception, work environment, and perceived organizational support, while the remaining 54% is influenced by other factors. The model's F value

stands at 59.429 and is statistically significant ($p < 0.01$), indicating a good fit. Looking at the coefficients table, it is evident that the work environment exerts the greatest influence on employee engagement, accounting for 42.6%, which is significant ($\beta = 0.4261$, 0.000, $P < 0.05$). This finding is consistent with the results of Mohda, Shaha & Zailan (2020), who identified a positive, moderate, and significant link between the work environment and employee engagement, suggesting that enhancing the work environment elevates employee engagement levels. Following that, job perception contributes 37.3% to employee engagement and is also significant ($\beta = 0.373$, 0.000, $P < 0.05$). Research conducted by Mugo, Wano & Odhiambo (2024) demonstrated a positive, moderate, and significant relationship between job perception and employee engagement, implying that a more favorable view of one's job results in higher employee engagement. In contrast, perceived organizational support has a weak negative impact on employee engagement and is not significant ($\beta = -0.054$, $P = 0.617$, $P > 0.05$). Consequently, H3 is not supported. A study by Nagesh & Kulenur (2019) found that the connection between perceived organizational support and employee engagement is insignificant and exhibits a low positive correlation, suggesting that perceived organizational support does not significantly improve employee engagement.

Discussion

The findings of this research successfully achieved the outlined goals and thoroughly examined the research questions. All independent variables were evaluated, showing which ones had the greatest influence on employee engagement. The analysis indicated a positive correlation between job characteristics and employee engagement, with a β value of 0.373 and a significant p-value of 0.000 ($p<0.05$). This suggests that as job characteristics are enhanced, employee engagement is expected to rise. Moreover, these findings align with studies by Mugo et al. (2024) and Baiquni and Lizar (2019), which highlighted the influence of job characteristics on employee engagement in the workplace. The results demonstrated a positive relationship between the work environment and employee engagement (β 0.426), supported by a statistically significant p-value ($p=0.000$, $p<0.05$). This is consistent with research from Dash & Mohanty (2019), Mohda, Shah, and Zailan (2020), and Tyagi (2016), emphasizing the importance of a supportive and favorable work environment for employees. When employees are satisfied with their work environment, they tend to show higher engagement and perform their tasks more effectively. The analysis also uncovered a negative and statistically insignificant association between perceived organizational support and employee engagement ($\beta=-0.054$, $p=0.617$, $p>0.05$). The study indicated that perceived organizational support does not correlate with employee engagement. Prior research by Ahmad & Hui (2020) indicated that while perceived organizational support did not enhance employee engagement, it did have a positive effect on organizational citizenship behavior. Consequently, many respondents believe they should not depend solely on organizational recognition to enhance engagement; instead, they are more motivated to advance their job performance and skills. According to the Multiple Regression analysis, job characteristics emerged as the variable with the most significant impact on employee engagement, with a β of 0.373 and a significant p-value of 0.000 ($p<0.05$). This conclusion is reinforced by Bauquni & Lizar (2019), who suggested that meaningful work arises from job characteristics, and improved job characteristics contribute to greater emotional commitment and engagement within the organization.

5. Managerial Implications and Recommendations

The findings from this research are essential and greatly beneficial for students engaged in distance learning. Several pertinent suggestions can be implemented to enhance employee involvement for distance learning students. The initial suggestion is that flexible schedules empower distance learners. Flexible work options, such as remote positions, adjustable hours, or reduced workloads, allow distance learning students to better balance their academic and job responsibilities. This equilibrium results in increased motivation, decreased stress, and enhanced academic outcomes. Furthermore, support from employers, such as study leaves or adaptable scheduling, can bolster student retention, involvement, and long-term achievements in both career and education. Additionally, targeted professional development helps distance learners acquire industry-relevant skills, thereby improving their employability and career advancement. Tailored programs for specific roles or sectors, such as micro-credentials or modular training, ensure learning is practical, flexible, and aligned with real-world needs. This strategy boosts learner motivation, addresses skill gaps, and fortifies the link between academic success and career progress. Finally, providing structured academic and occupational support for distance students can enhance employee engagement among distance learners. Organized support systems like online tutoring, mentoring, time management training, and mental health resources are vital in

assisting distance learners to navigate isolation, stress, and workload difficulties. By addressing both academic and professional requirements, these supports increase learner engagement, improve performance, and raise retention and graduation rates.

Conclusion

To sum up, this research has effectively achieved its objectives by highlighting the significant and positive relationship between job perception and the work environment and their impact on employee engagement among distance learning students. The results suggest that both job perception and the work environment are vital in shaping employee engagement for those in distance learning programs. This indicates that improvements in job perception and the work environment lead to higher levels of engagement felt by distance learning students. The analysis revealed that organizational support was the only factor that did not show a meaningful positive link to employee engagement in this group. Consequently, the work environment stands out as the most influential aspect associated with employee engagement among distance learning students. Future research should investigate additional factors that might affect employee engagement to better understand the strongest and weakest correlations between various elements and engagement levels. Employee engagement is crucial for increasing productivity within organizations moving forward. Elevated levels of employee engagement are anticipated to produce favorable financial outcomes for the entity. Further studies should examine more thoroughly the interactions of existing variables that influence workplace employee engagement. Lastly, it is advisable to use varied methods for measurement, such as conducting interviews and focusing on specific organizations, to enhance study results. Additionally, incorporating moderating or mediating variables into the research design is recommended.

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The Antecedents Affecting Employee Retention at Shopping Malls: An Analysis of Compensation and Benefits, Training and Development, Working Environment, Reward and Recognition

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Abstract: Employee retention is an important factor that any organization must consider if it hopes to stay relevant in the market. This paper seeks to examine the effect that compensation and benefits, training and development, working environment, and reward and recognition have on the retention of employees. The objective of this study is to examine the relationship between these independent variables with employee retention with the view to providing more insight into human resource management (HRM) practices. The measures of reliability analysis, descriptive analysis, correlational analysis, and regression analysis will be used as measures of strength and direction of these relationships. Questionnaires were distributed to employees working in selected shopping malls in Klang Valley using a quantitative approach, with a convenience sampling technique that ensures representativeness of data. Multiple regression analysis is performed using SPSS version 29. Maslow's Hierarchy of Needs Theory and Alderfer's Theory provided a theoretical foundation for examining the relationship between compensation and benefits, training and development, working environment, and reward and recognition. The findings show that the working environment is the factor that most influences employee retention, followed by compensation and benefits, training, and development. However, the relationship between reward and recognition with employee retention is not significant. This study fills a gap in the existing literature by focusing on the Malaysian context and providing practical advice to Human Resource Management (HRM) practitioners. It underlines that strategic HRM practices are very important in promoting compensation and benefits, training and development, working environment, and reward and recognition. Overall, this study represents actionable ways in which organizations can design successful retention programs that facilitate modest turnover while allowing the corporation to grow.

Keywords: *Employee Retention, Compensation and Benefits, Training and Development, Working Environment, Reward and Recognition*

1. Introduction

Background of the Study

One of the top responsibilities for human resource departments is to keep good employees motivated and pleased. They always work to ensure that their best employees are involved and dedicated to the business (Goswami, 2021). Employee retention, according to Anilkumar (2024), is the capacity of the business to retain its staff over an extended period of time. This technique helps the business stay strong and stable by encouraging and motivating its employees to stay. Developing measures to retain valuable personnel and maintain a competitive edge requires an understanding of the aspects that affect employee retention (Vijayakumar, 2020). There are a number of factors that affect employee retention, according to another study by Hussein et al. (2021).

Economic swings have an impact on other organizational procedures as well as staff retention rates. Employee engagement, communication, leadership, pay, training and development, career advancement, job happiness, flexibility, and performance reviews are among the main outcomes of good employee retention (Darmayanti, 2024). A number of factors, including incentives, supervisor support, training, development opportunities, job features, and work-family conflict, have been found to have an impact on employee retention (Nadeem & Malik, 2021). This study also noted that the length of time employees stay with a firm and the frequency with which the organization must acquire new employees to replace departing employees can be used to explain employee retention. Globally, employee retention has an impact on an organization's performance, profitability, and capacity to hold onto valuable personnel in the face of intense international competition (Suraihi et al., 2021).

It feels like machines are intruding in today's world, where technology has a bigger impact on enterprises than ever before. However, because they are the ones who ensure that all of that technology functions properly,

businesses still require people. Therefore, having quality employees remains essential for all businesses. But in addition to attracting exceptional individuals, staff retention is crucial for guaranteeing their sustained dedication to the company. In order to address this problem, businesses can begin looking at ways to maintain employee satisfaction by increasing pay, providing rewards and recognition, and creating a welcoming work environment (Prakash and Philimis, 2022).

Previous research conducted in Malaysia has examined employee retention in a range of sectors, such as manufacturing, services, and construction (Zainal et al., 2022). The aforementioned studies underscored the need to examine staff retention and determine their top priorities. Therefore, the purpose of this study is to determine the relationship between employee retention and pay and benefits, training and development, work environment, reward, and recognition. The impact of each of these factors on staff retention will be established by this study. A poll of staff members at a few Klang Valley retail centers served as the study's data collection approach. By emphasizing each of these elements, businesses may be able to identify the ones that have the biggest impact on employee retention.

Research Objectives:
RO1: To determine the relationship between training and development and employee retention.
RO2: To determine the relationship between training and development and employee retention.
RO3: To examine the relationship between the working environment and employee retention.
RO4: To identify the relationship between reward and recognition and employee retention.
RO5: To determine which factor has the most influence on employee retention.

Research Questions
RQ 1: Is there a relationship between compensation and benefits and employee retention?
RQ 2: Is there a relationship between training and development and employee retention?
RQ 3: Is there a relationship between the working environment and employee retention?
RQ 4: Is there a relationship between reward and recognition and employee retention?
RQ 5: Which factor has the most influence on employee retention?

2. Literature Review

Dependent Variable

Employee Retention: The problem of employee retention has grown in significance, and scholars have attempted to identify retention tactics. Biason (2020) asserts that in order to sustain staff retention, businesses must concentrate on job satisfaction and motivating aspects. According to studies, factors that affect how long employees stay with a company include things like job happiness, dedication to the organization, and a good work-life balance. Several important elements that affect employee retention in Cambodian private enterprises were identified by a survey conducted among 420 employees. According to Nor et al. (2024), the researchers discovered that pay and a healthy work-life balance both greatly increase job satisfaction and aid in employee retention.

Subsequently, in a survey by Ahmed and Vijayakumar (2024), factors influencing employee retention included work-life balance, stress, turnover, organizational culture, job satisfaction, career advancement, compensation, interesting tasks, training and development opportunities, and working conditions. According to a different study, employee retention is an organizational endeavor to develop and retain skilled workers in order to satisfy the demands of an effective workforce. Strategic retention is also used to ensure that human capital aligns with organizational objectives (Elangkumaran et al., 2023).

Thompson and Muda (2021) highlighted that the employee retention relationship with organizational success is multifaceted. Organizations must maintain competitiveness, achieve long-term goals, and sustain operational productivity and retention is pivotal to that. However, both internal and external factors—such as job satisfaction, personal growth, and leadership quality—have an impact on employee retention. External factors include pay, benefits, and job security. The retention of Generation Y employees will be based on their unique traits, which include their appreciation of demanding work, preference for work-life balance, and need for

acknowledgment. This study emphasizes that managers are the problem and that in order to lower turnover and improve employee retention, they must implement tactics that include training, development, and equitable organizational practices. In addition to assisting the business in meeting the organizational expenses associated with the high level of employee mobility, it also helps people achieve their goals, grow both personally and professionally, and align their goals with those of the company.

Independent Variables

Compensation and Benefits: In today's fast-paced and competitive work environment, compensation plays a vital role in the workplace because it has a direct impact on job satisfaction. Pay is a critical factor in today's fast-paced and competitive workplace. Paying workers well recognizes the importance of their labor and helps them maintain more financial stability (Suryadi et al., 2022). Compensation satisfaction is a frequently disregarded element that has a big influence on employee retention (Fitri, 2024). Organizations seeking to retain competent workers must comprehend how compensation affects employee retention (Samosir et al., 2021). These elements are essential to job satisfaction and have a big impact on employee engagement and retention (Nor et al., 2024).

Any additional benefit that an employee receives in exchange for their valuable services to a business is referred to in this context as compensation (Prakash and Philimis, 2022). Sorn et al. (2023), who similarly defined pay as all the benefits that employees receive in exchange for their labor, support this as well. These include their base income (wage/salary), insurance, retirement, and other benefits/emoluments, as well as different types of leave, performance-based incentives, and other perks that the employer provides, such as lunches or promotions. According to some sources, compensation is any kind of payment made by an employer to its workers in exchange for their labor; this can include cash and non-cash benefits, salaries, allowances, incentives, and paid time off (Hanai & Pallangyo, 2020).

Nor et al. (2024) highlighted that compensation became one of the core determinants of job satisfaction. Where an employee's performance has been quantified in terms of work accomplished, he or she is likely to feel valued and appreciated in equal measure to the financial remuneration offered. According to Watkins and Fusch (2022), employees at Kentucky Fried Chicken (KFC) feel they are being treated fairly when they understand that their pay and promotions are commensurate with their work, experience, and results. As a result, workers who give their all at work and receive the recognition they deserve from their employers will stick with them. According to Macaraig et al. (2024), employers report that employees in Cambodia submit resignation letters for a variety of reasons, including a lack of prospects for advancement, increased compensation, and better salaries.

This statement agrees with previous research that highlights how important it is to offer competitive compensation to keep employees from leaving. According to a Kenyan survey including 64 teachers, 87.5 percent of them claimed their pay was insufficient to keep them employed at private secondary schools. Of those surveyed, 76.8% believed they were not being paid enough. Merely 12% of respondents expressed satisfaction with their pay. The overall results of the study demonstrate how important pay is for keeping employees on board (Kariuki, 2020). Biason (2020) asserts that compensation and other elements that are positively associated with employee retention are key determinants of work satisfaction. Employee retention increases a company's chances of long-term success and competitiveness when workers are satisfied with their compensation and general job satisfaction.

Employee retention is positively correlated with salary and promotions. By finding that 64.9 percent of the respondents thought their pay was fair in comparison to their counterparts in similar jobs in other firms, the researchers Alshamrani et al. (2023) showed that this factor had a positive effect on employee retention. Compensation, which includes both monetary and non-monetary advantages that improve workers' mental and physical capacities, is a significant component of the overall rewards system that businesses utilize to draw in, keep and inspire employees.

Although there is ample evidence linking remuneration to employee retention, other studies contend that remuneration may not have an impact on retention. Employee retention and compensation are not positively

correlated. Taking everything into account, research will be done to find out if pay affects employee retention (Ojediran and Adebayo, 2023).

Training and Development: It has also been discovered that factors like training and development affect retention rates. Research indicates that staff retention is favorably correlated with training and development initiatives (Kumari, 2022). Employees' abilities, expertise, and work ethic are always fostered by proper training and development, which improves performance (Fabian, 2024).

Training and development programs are referred to as an educational upgrade for employees, whether they are in public service or the private sector. They are designed to help people level up in their jobs by teaching them new skills and knowledge and giving them a boost of motivation. These initiatives are crucial for guaranteeing that workers give their best efforts and feel equipped to thrive in their positions (Prakash and Philimis, 2022). This claim is in line with recent research that indicates providing employees with training and development is essential to retaining them. According to other studies, training and development is the methodical, planned process of enhancing employees' knowledge, abilities, and competencies to enable them to carry out their tasks more successfully. According to studies, organizations that provide quality training and development programs have a higher retention rate among younger workers because they give them the opportunity to grow in their professions and pick up new skills (Nguyen and Duong, 2021).

Employees of all ages benefit from training since it helps them develop their abilities and work habits. Ensuring that everyone has access to training programs is crucial for the company's growth, particularly in terms of enhancing employee performance and utilizing new technologies (Ojediran & Adebayo, 2023). According to one definition, training is a process that improves workers' abilities and knowledge, which in turn increases their job satisfaction and retention and eventually helps the business reach its goals. Training helps employees grow personally and enhance their jobs, which eventually helps the business (Alharthy and Marni, 2020).

Apart from that, development entails more extensive learning experiences that equip people for future roles and growth prospects, whereas training is similar to a targeted program where you learn new things and acquire skills to perform certain jobs better (Murtiningsih, 2020). Research has indicated that one of the primary determinants of employee retention is training initiatives. For instance, a study by Calinao et al. (2020) demonstrated that businesses may retain staff by investing in their training and development. Some employees may quit without proper training, which could cost the business money and resources.

Working Environment: The actual location where an employee works is one example of the social and physical aspects that make up the working environment. In addition to providing a comfortable working environment and sufficient resources, a good workplace is also thought to have a significant role in keeping clients. According to a study by Alshamrani et al. (2023), employee retention is correlated with a positive work environment. Employee retention is higher when they are satisfied with their working environment. In summary, firms can reduce turnover rates and retain employees by fostering a favorable work environment.

The working environment, according to Xuecheng et al. (2022), is the degree to which workers feel safe in their workplace and are able to express their thoughts on their surroundings to the organization. It was determined that employee retention in the workplace is influenced by the working environment. In their study on the definition of the term "working environment," Prakash and Philimis (2022) defined it as the setting and circumstances in which an individual carries out their responsibilities, engages with coworkers, and functions in a physical setting.

Employee satisfaction, meetings, communications with coworkers, group cohesion, performance ratings, and even their well-being are all directly impacted by these factors. For instance, a study that evaluated the working circumstances of 366 workers in Saudi pharmaceutical companies found that 68% of respondents said they were satisfied enough with the working conditions provided by their employers to stay employed by the company. Just 2% of those who expressed dissatisfaction with their workplaces said they would like to leave. These findings suggest that employee retention in Saudi Arabian pharmaceutical enterprises is directly positively impacted by the target organizations' work environments (Alshamrani et al., 2023).

In the Philippines, in the case of the Filipino seafarers' decision to remain on international cruise ships, one common determinant is the work environment. Other studies have shown that while the workplace environment plays a part in keeping employees, it is not the sole influence. To keep Filipinos on cruise ships, further considerations include pay parity and remunerated wages, training and development, and job stability. Accordingly, it was said that Filipino workers are still highly valued for their ability to work hard and interact with guests in a courteous manner most of the time, which enhances their stay (Calinao et al., 2023). Given the research of Noordin et al. (2021), which indicates that one of the important factors influencing employment retention in the e-commerce logistics industry is the work environment, the study further supports this claim.

Positive work environments not only improve employee performance but also help retain employees. These settings include polite behavior, appropriate communication, opportunities for growth, incentives for diligence, and support. Higher levels of commitment, motivation, and job satisfaction result from this, while the company gains from lower costs associated with hiring and onboarding new staff. The level of job satisfaction among Generation Y employees in the hospitality sector is significantly influenced by their work environment. Their level of commitment to remaining in that industry is subsequently influenced by their level of satisfaction. In the hotel industry, maintaining a positive work atmosphere is crucial for staff retention as found by Naz et al. (2020).

Reward and Recognition: In order to maintain employee motivation and guarantee retention, rewards and recognition are crucial. It's critical for businesses to comprehend how these factors impact employee behavior to increase productivity and maintain a competitive edge. Prakash and Philimis (2022) define reward and recognition as methods of expressing gratitude for workers' efforts. There are numerous tangible and intangible ways to accomplish this. Fairly and quickly recognizing and appreciating workers' accomplishments is the aim to create a positive and encouraging work environment. Incentives serve as a way to recognize someone for their efforts and contributions.

According to Kryscynski et al. (2020), incentives, including prizes, public recognition, and material services are examples of rewards and recognition that are important for employee motivation. This is further corroborated by research by Nor et al. (2024), which found that people are more motivated to keep up their best work when they receive praise or rewards for their efforts. Therefore, rewarding and recognizing exceptional work can be a very effective strategy to maintain employee motivation and engagement. According to earlier research, scholars have been concentrating on figuring out what keeps workers in their professions, especially in relation to incentives and recognition. According to Kršlak and Ljevo (2021), incentives directly encourage staff members to strive toward the organization's objectives.

The literature has emphasized the close connection between employee retention and rewards and recognition. Rewards increase employee engagement, loyalty, and willingness to stick with the organization, according to recent studies. They motivate employees to stay by making them feel appreciated and valued (Noordin et al., 2021). Fairly designed awards make workers feel valued for their efforts and abilities, which increases employee retention. This result is consistent with that of Calinao et al. (2020), who discovered that one of the elements influencing employee retention is incentive and recognition.

Thompson and Muda (2021) studied the relationship between reward and recognition with how retention affects Generation Y personnel in the financial services industry. Reward and recognition were one of the most important contributors to retention, managers found. When employees are rewarded, like bonuses, appreciation, or some sort of acknowledgment for a job well done, it enhances employee retention. On the flip side, if employees do not get recognized, they often look for more opportunities. This reinforces the space tangible rewards and acknowledgment strategies occupy in reducing high turnover and nurturing employee retention and should be taken seriously when trying to retain talent.

The Relationship Between Independent Variables and Dependent Variables

The Relationship between Compensation and Benefits and Employee Retention: Saputra and Riana (2021) demonstrated that one of the key ways of maintaining employees in the organization is through the provision of an attractive remuneration package. The position is that when such bonuses and other forms of

compensation are paid on time, they provide a sense of security to the employees; hence, they will contribute to employee retention. The relationship between remuneration and employee retention was predicted and verified in a study examining the relationship between human resource practices, placement tactics, and compensation practices and corporate outcomes (Samosir et al., 2021). Compensation and employee retention are strongly positively correlated, according to a different study done among workers at three-star hotels in Ghana's New Juaben North Municipality. The study discovered that one of the key elements influencing employee retention is remuneration. Fairly compensated jobs, financial bonus plans, and incentive schemes help to retain employees, which lowers employee turnover (Siaw et al., 2022).

Shrestha and Prajapati (2024) investigated employee retention through survey data from 240 senior leaders, including CEOs, DCEOs, general managers, operation in-charges, Human Resource (HR) managers, and branch managers who worked in six commercial banks and six insurance organizations in Nepal. Pay and benefits have been demonstrated to have a significant and positive effect on employee retention. Pay and recognition are important factors that positively impact employee retention in other countries, per a study done in the Egyptian construction industry (Mohamed et al., 2023). Other research indicates that compensation is one of the main factors affecting employee retention (Zainal et al., 2022). Employees would choose to stay with organizations that offer attractive compensation packages. Effective compensation was found to have a substantial impact on staff retention and top talent retention. It has been shown that there is a considerable correlation between pay and staff retention.

In addition, a study by Kiran et al. (2024) noted that as pay is a major factor in determining employee retention, it has a positive relationship with employee retention. Workers are more likely to view their employer as one that values and values them if they feel that their efforts and salary are appreciated. It follows that a favorable wage relationship not only draws in talent but also improves employee retention, which lowers turnover and increases organizational stability. Alajlani and Yesufu (2022), who noted that pay and perks aid in employee retention and reduce staff turnover, lend credence to this study. Fair compensation expresses the organization's value for employees, which leads to higher employee retention and intention to remain with the organization. It shows that compensation and benefits have a positive relationship with employee retention. Moreover, according to Jiang (2023), retention of employees in the food manufacturing industry is dependent on compensation and benefits, which have a positive effect on employee retention, and thus organizations that engage in formulating strategic benefits and compensation packages are likely to record few changes in the Human Resource (HR) staff.

The Relationship between Training and Development and Employee Retention: According to Siaw et al. (2022), the researchers showed that employee decisions to stay with a company or leave are strongly influenced by training and development. Higher staff retention has also been positively correlated with providing training and development opportunities (Nazeem and Malik, 2021). According to another study, training and development for Indian workers and employee retention are strongly positively correlated (Kumari et al., 2022). In addition, a study by Alsakarneh et al. (2023) showed that staff retention is positively correlated with training and development. The results demonstrate that providing frequent training and development opportunities greatly improves employee retention by equipping workers with the necessary skill set and fostering their professional development.

According to a study on employee retention in the hotel industry, training and development are crucial for keeping employees (Ghani et al., 2022). The results of a second study that looked at the relationship between training and development and staff retention in a subset of Malaysian airline companies showed a strong positive association (Merican et al., 2022). A study conducted on employees at a private commercial bank in Nairobi, Kenya, found a strong correlation between training and development and employee retention. Additionally, the bank demonstrated that its staff members were satisfied with the training courses it provided (Kiragu and Marwa, 2022).

Another study by Alajlani and Yesufu (2022) mentioned that training and development are correlated with employee retention. It has been proven that continuous learning opportunities lead to boosting employees' feelings of being valued and of them being engaged, thus increasing the loyalty of employees to the organization and causing them to be more willing to stay with the organization. In order to perform and become faster, more

self-assured, and more competent on the job, employees teach what is new to them. The company encourages them to stay; therefore, they want to stay. This study was noteworthy since it discovered that training initiatives, empowerment, and performance reviews were important factors influencing employee retention in UAE higher education institutions. Workers believed that prospects for job advancement and frequent employee feedback were more energizing and integrated into their company. The overall conclusion was that effective training and development are the key to retaining team members and building their loyalty over a longer time frame.

However, Jiang's (2023) study found no correlation between staff retention and training and development in the Philippines' food manufacturing sector. It has been discovered that training has no direct impact on how long employees remain with their company, in contrast to many other HR procedures including pay, job security, and performance reviews. According to the survey, providing training programs alone is insufficient to keep staff members on board. Depending on the employee's desire to stay or leave, training decisions may be made based on factors like recognition, job security, and financial incentives. Additionally, there is no interaction between training and the workplace; hence, there is no moderating effect on the relationship between training and employee retention.

The Relationship between Working Environment and Employee Retention: The researchers discovered that the work environment significantly affects employee retention (Islam et al., 2022). Their findings demonstrated a direct correlation between the work environment and employee retention, emphasizing the need to foster a healthy work environment in retaining millennial employees. In a similar vein, a research of 400 workers in the service sector revealed that a supportive work environment is crucial for employee retention since it improves employee performance and increases retention rates (Zainal et al., 2022). The study found that organizations that provide a modern, safe, and comfortable work environment have greater employee retention rates. This is consistent with other research showing that a well-organized workplace encourages job satisfaction and staff retention.

Apart from that, Chatzoudes and Chatzoglou (2022) discovered that, aside from salary, level of empowerment, and management interactions, the work environment is the most important element influencing employee retention. This illustrates the necessity of a suitable workplace culture to retain personnel. Similarly, a study conducted at PT Carana Bunga Persada in Indonesia found that a favorable work environment helps retain employees, confirming the notion that a positive work environment is essential (Rahmani and Prayoga, 2023). In a similar vein, Noordin et al.'s (2021) study of Malaysian e-commerce logistics workers revealed that employee retention rates are influenced by the workplace.

In a similar vein, Jiang's (2023) study found that employee retention in the food manufacturing sector is positively correlated with the work environment. A supportive work environment (both physical and nonphysical) is found to increase employee retention and decrease turnover when compared to non-supportive ones. This is consistent with a study by Kiran et al. (2024) that found that an employee's job satisfaction and working circumstances affect their retention. A supportive Human Resource Management (HRM) strategy creates a pleasant work atmosphere that boosts employee retention and job satisfaction, according to the study.

In addition, a different study by Lasanov et al. (2023) discovered that there is a positive correlation between the work environment and employee retention. This indicates that employees' willingness to remain with a company is quite important and is reliant on a safe, comfortable, and organized work environment. According to the author, a supportive work environment in terms of amenities, communication, and organizational culture will increase employee satisfaction and retention since they will want to work for the company longer. The working environment has a very strong and favorable link with millennial employee retention in state-owned firms, according to another study by Andriani et al. (2022).

The Relationship between Reward and Recognition and Employee Retention: Employee retention and incentive and recognition programs are positively correlated, according to numerous studies. Robertson (2024) claims to have shown that staff retention is significantly impacted by rewards and recognition. This research is corroborated by Al-Suraihi et al. (2021), who found that incentives, benefits, and competitive pay

packages—both internal and external—are essential for increasing organizational commitment and improving employee retention.

Moreover, in a study among employees in the e-commerce logistics industry in Malaysia, it was shown that reward and recognition have a strong relationship with employee retention. With an emphasis on both monetary and non-monetary incentives, the study emphasizes the importance of a thorough rewards program in retaining employees. Employee retention rates are frequently higher in companies with comprehensive reward systems that include competitive compensation, bonuses, opportunities for career progression, and workplace recognition (Noordin et al., 2021). Furthermore, a study conducted among staff members at PT Addis Citra, a digital communication firm located in Jakarta, Indonesia, found a significant relationship between employee retention and the way in which workers are paid and rewarded (Masputra et al., 2023). Employee retention is significantly impacted by rewards and recognition, according to Caredo et al. (2022), who studied workers at a department store in the Samar-Leyte region of the Philippines.

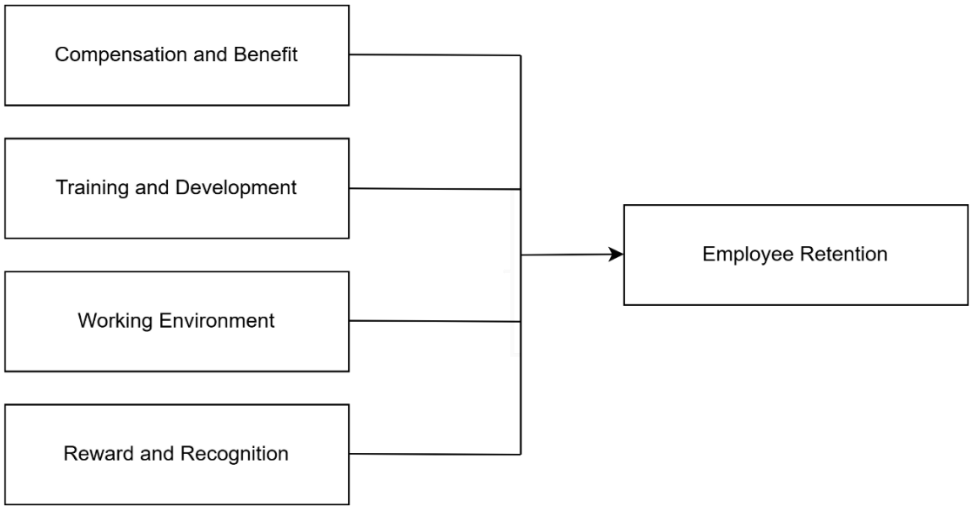
A study in the Malaysian service industry showed that reward has strong positive effects on employee retention. The study proved that when companies offer fair and motivating rewards, employees stay committed to the company and work hard. They are attracting both non-monetary (recognition or professional development chances) and monetary (wage, bonus, and fringe benefits). A well-designed reward system will guarantee that employee retention proceeds easily because the staff will feel valued and appreciated, claim Zainal et al. (2022). Rewards and recognition have a good and significant link with staff retention in Malaysian pharmaceutical companies, according to another study by Saedin et al. (2023), and this finding is corroborated. Employee retention is greatly influenced by rewards, both monetary and non-monetary, which makes them essential for retaining employees.

The study from Tirta and Enrika (2020) emphasizes the huge link between employee retention and reward and recognition through job satisfaction as the crucial mediating factor. Reward and recognition are influenced directly by employee retention, which makes employees feel they are valued and recognized for their contributions. On the one hand, material items like bonuses and pay are nice; on the other, intangible examples are beneficial, such as public recognition and praise, which makes them feel better about themselves in that company. Furthermore, rewards and recognition increase job happiness, which fortifies an employee's will to stick around. This is particularly crucial for today's Millennials, who are less concerned with monetary gains than their older, more discerning colleagues. By fostering a more positive work environment, organizations may also cultivate a culture of recognition, which eventually benefits the company by increasing retention rates and lowering turnover expenses.

Similarly, Geetha and Muthukumaravel (2022) explained that rewards and recognition are an important part of employee retention as a way of making them feel more valued and appreciated. According to the study's findings, 54% of respondents said they were extremely satisfied with organized rewards and recognition programs at work, indicating that these programs produced the highest level of job satisfaction. Employee retention is improved and their likelihood of leaving the company is decreased when you thank them for their contributions. Furthermore, the positive relationship between employee retention and rewards and recognition demonstrates that these practices create an environment where workers are motivated to continue in their careers. Emphasizing employee efforts will improve relationships with staff, which will increase organizational stability and continuity. It is more proof that rewards and recognition should be included in retention strategies.

However, Shah et al. (2021) looked into the connection between rewards and recognition in a study on staff retention at Khyber Medical College (KMC). It was discovered that there was no connection between staff retention and awards or recognition. It's possible that the current system of rewards does not meet the needs of the employees. In order to improve staff retention, the researchers recommend that KMC redesign its compensation programs. This is significant because different companies receive different returns, and tactics should be tailored to meet their unique requirements.

Figure 1: Theoretical Framework



Hypotheses:

H_1: There is a relationship between compensation and benefits and employee retention.
H_2: There is a relationship between training and development and employee retention.
H_3: There is a relationship between the working environment and employee retention.
H_4: There is a relationship between reward and recognition and employee retention.

3. Methodology

This study applies the quantitative approach to determine the factors affecting employee retention in shopping malls. The target population for this study is individuals with working experience within the retail sector. Melawati Mall, Mytown Cheras, KL East Mall and Wangsa Walk Mall were chosen because of their strategic locations in the Klang Valley, which offer a variety of mid-range and busy shopping centers with a range of retail settings. The sample for the study is 85 employees using G*Power software. Selected respondents are chosen by the Convenience Sampling Technique. The data collection of this research is via Questionnaires, which are thought to provide first-hand variables of interest suitable for the study. The research tests the hypotheses through Multiple Regression Analysis. Below is the summary of the data in Table 1.

Table 1: Summary of Data Analysis

	Items	Details		
1.	**Design**	Quantitative Method		
2.	**Population and Sample**	**Population:** Respondents selected from employees working at selected shopping malls in Klang Valley **Sample:** Sample size is 85 according to G*Power Software **Sampling Technique:** Non-probability (Convenience Sampling)		
3.	**Data Collection Procedure**	Structured questionnaires distributed at four shopping malls with high foot traffic in Klang Valley. (Melawati mall, Mytown mall, KL East mall, Wanga Walk mall)		
4.	**Instrument and Measurement Design**			
	Variables	**No. of Items (Questions)**	**Sources**	**Reliability (Cronbach's Alpha)**
	Compensation and Benefit	4	Kumar (2021), Biason (2020)	0.67
	Training and Development	6	Chatzoudes & Chatzoglou (2022)	0.84
	Working Environment	6	Noordin et al. (2021)	0.85
	Reward and Recognition	5	Caredo et al. (2022)	0.86
		6	Ping et al. (2024)	0.89
5.	**Data Analysis**	Statistical Package for the Social Sciences (SPSS Version 29)		

Pilot Study

A pilot study was first done to obtain a deeper understanding of the challenges in using the existing model and it was used to vary the instruments to meet specific needs to establish a dependable study. For this research, the pilot study comprised 30 voluntarily participated in filling in questionnaires through a link provided on the Google form. This was widely shared with employees at selected shopping malls in the Klang Valley. The pilot study confirms the reliability of all scales, with most internal consistency good and the Compensation and Benefit scale acceptable reliability, which gives us confidence in their use for the main study.

4. Results and Discussion

The analysis was based on a total of 111 usable questionnaires. Thus, the Response rate for this study is 99.11%. Moreover, this response rate can be seen as excellent because the researcher was able to get more responses than needed in a total of 112 responses, which is above the minimum sample size of 85.

Means and Standard Deviations after Factor Analysis

Table 2 shows the Means and Standard Deviations for independent and dependent variables. This study included five main variables: the dependent variable, employee retention, and the independent variables (compensation and benefits, training and development, working environment, reward and recognition).

Table 2: The Means and Standard Deviations after Factor Analysis

Statistics	Mean Compensation and Benefit	Mean Training and Development	Mean Working Environment	Mean Reward and Recognition	Mean Employee Retention
N Valid	111	111	111	111	111
Missing	0	0	0	0	0
Mean	3.61	3.74	3.87	3.89	3.19
Std. Deviation	0.77	0.87	0.77	0.83	0.98
Minimum	1.25	1.33	1.33	1.60	1.71
Maximum	5.00	5.00	5.00	5.00	5.00

Participants had high levels of compensation and benefits (M = 3.61, SD = 0.77), training and development (M = 3.74, SD = 0.87), working environment (M = 3.87, SD = 0.77) and reward and recognition (M = 3.89, SD = 0.83). Employee retention was classified as moderate (M = 3.19, SD = 0.98) since the value of the mean score is between 2.5 and 3.5, but it is still acceptable. Overall, the findings indicate that participants experience high compensation and benefits, training and development, working environment, reward, and recognition.

Normality after Factor Analysis

Table 3 summarizes the results of the Factor Analysis. It provides the normality score for each variable. The findings indicate that all variables followed a normal distribution, with the skewness ranging between the scale of -2 to +2, and the kurtosis between -7 to +7.

Table 3: Normality score for all variables after Factor Analysis

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Employee Retention	111	-0.27	0.23	-0.57	0.46
Compensation and Benefit	111	-0.59	0.23	0.25	0.46
Training and Development	111	-0.57	0.23	-0.07	0.46
Working Environment	111	-0.40	0.23	-0.13	0.46
Reward and Recognition	111	-0.48	0.23	-0.23	0.46
Valid N (listwise)	111				

Reliability after Factor Analysis

Reliability analysis aids in determining the consistency and stability of data, as well as testing the connection between various scale components (Suhartini et al., 2021).

Table 4: Summary of Reliability Analysis after Factor Analysis (n=111)

Variables	Cronbach's Alpha	Consistency/Strength
Dependent Variable		
Employee Retention	0.88	Very Good
Independent Variables		
Compensation and Benefit	0.69	Moderate
Training and Development	0.88	Very Good
Working Environment	0.88	Very Good
Reward and Recognition	0.88	Very Good

Reliability analysis shows that the dependent variable Employee Retention has a Cronbach's Alpha value of 0.88, which happened to be very good reliability and strong internal consistency among the measurement items. Training and Development, Working Environment, and Reward and Recognition also display very good reliability, as Cronbach's Alpha values of 0.88 demonstrate strong consistency in data collected for these independent variables. Consequently, Compensation and Benefits shows a Cronbach's Alpha value of 0.69; thus, it can be said that, although acceptable, its items measured for this variable have a moderate reliability. All in all, most variables showed high reliability to enable regression analysis to find out the relationships between Employee Retention and the independent variables. The results of this analysis can tell whether certain elements like compensation, training, working environment, and recognition affect employee retention outcomes.

Pearson Correlation Analysis

The correlation coefficient is a statistical tool that is usually used in research to show the relationship between the variables, or for the evaluation of the consistency between two methods (Rony et al., 2023). For this study, the Pearson Correlation analysis was used to determine the linear relationship of the variables in terms of direction and strength. The correlation analysis explores the relationships between Employee Retention (ER), as the dependent variable, and four independent variables: Working Environment (WE), Training and Development (TD), Compensation and Benefits (CB) and Reward and Recognition (RR).

Table 5: Correlation Analysis

Correlations						
		ER	CB	TD	WE	RR
ER	Pearson Correlation	1	.478**	.543**	.614**	.612**
	Sig. (2 tailed)		<.001	<.001	<.001	<.001
	N	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

A Pearson correlation was calculated examining the relationship between Compensation and Benefit and Employee Retention. A medium positive correlation was found (r = 0.48, p< 0.01), indicating a significant relationship between the two variables. On the same level, the results demonstrated a medium positive correlation between Training and Development and Employee Retention (r = 0.54, p< 0.01), indicating a significant positive relationship between the two variables. It reflected that employees value work that provides them opportunities for skill enrichment and career growth and so that aspect too has an important role in keeping employees engaged and loyal.

In addition, medium positive correlations are found between Working Environment and Employee Retention (r = 0.62, p< 0.01), and between Reward and Recognition (r = 0.61, p< 0.01), which suggests that a healthy work environment characterized by a positive working culture and reward and recognition of individual employees is are vital elements in helping to achieve employee retention. Therefore, organizations should consider these aspects highly important and focus on them so that their employees can be loyal and less likely to get out of the organization.

Consequently, the analysis concludes that under the control of the dependent variable, employee retention is almost impacted by compensation, training opportunities, working environment, and recognition practices. This provides knowledge that organizations can use in developing strategies to increase retention rates.

Multiple Regression Analysis

Multiple linear regression analysis is a statistical method employed to investigate the relationship between a dependent variable and several independent variables (Adhikari, 2022). This study can utilize multiple linear regression analysis to identify the factors influencing employee retention in the industry. The technique can help identify which factors have the most significant impact on employee retention and how they interact with each other.

Table 6: Multiple Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.71[a]	0.50	0.48	0.70

Multiple Regression Analysis is used to study how Reward and Recognition, Compensation and Benefit, Training and Development, and Working Environment affect the outcome, and the model summary gives a general idea about the overall performance of the model. An R-value of .71 indicates that there is a strong relationship between these predictors and the measure of outcome.

The researcher can determine the R Square of 0.50, meaning 50% of the variation in the outcome is explained by the model. These factors explain half of what influences the outcome, and the other half comes from factors that are not included in the model. However, with the adjusted number of factors included in the model, the Adjusted R Square of 0.48 is slightly lower, which means this model is solid, but if the researcher could add more factors that would be relevant to this problem, it could be even better.

Lastly, there is Standard Error of the Estimate is 0.70, which tells us how far off the model's predictions are from the real values. The error here is small, so that means the predictions are more accurate and the error is lower. To summarize, this model suggests that the chosen factors do have a real effect on the result, but further progress is required to make predictions more accurate.

Summary of Hypotheses

The analysis has supported three of the hypotheses (H1, H2, and H3) that compensation and benefits, training and development, and the working environment were significant in employee retention. Nevertheless, H4 was not supported, suggesting that the reward and recognition may not be of as much importance for the employees' retention decisions in the studied context.

Table 7: **Summary of Hypotheses**

	Hypotheses	Results
H1	Compensation and Benefits have a significant relationship with Employee Retention.	**Supported**
H2	Training and Development have a significant relationship with Employee Retention.	**Supported**
H3	Working Environment has a significant relationship with Employee Retention.	**Supported**
H4	Reward and Recognition have a significant relationship with Employee Retention.	**Not Supported**

The first research question inquired if compensation and benefits had any relationship with employee retention. To deal with it, multiple regression was done to give a relationship between the two variables and a hypothesis testing for Research Question 1. In this study, compensation and benefits are the independent variables. This research found that p = 0.05 for compensation and benefits, which indicated a significant relationship between compensation and benefits and employee retention (ß = 0.21, $p < 0.05$). Thus, it has been proven that H1 is supported, indicating a significant positive relationship between compensation and benefits and employee retention. The result is consistent with the literature review that showed that a study conducted on employees at three-star hotels in the New Juaben North Municipality of Ghana shows that compensation has a strong positive correlation with employee retention (Siaw et al., 2022). This study is in agreement with Mohamed et al. (2023), who have conducted a study in the Egyptian construction industry, exploring that compensation and recognition are the factors that positively affect employee retention across varied countries.

According to the study findings, there is a strong correlation between training and development and the retention of employees. By having a (ß = 0.24, $p < 0.05$), which indicated a positive relationship between training and development and employee retention. This indicates that the relationship is statistically significant. So, it has been proven that H2 is supported and that more likely employees will stay with their organization if they receive enough training and development opportunities. These results were also consistent with the findings of Kumari et al. (2022), who also demonstrated a very strong positive relationship between training and development and employee retention. The study showed that returning to training in an organization can decrease employee turnover as employees feel valued and are more likely to stay loyal.

According to the hypothesis, the third research question explored whether the working environment influences employee retention. To address this, a multiple regression analysis was conducted to examine the relationship between these two variables and to test the hypothesis for Research Question 3. Another independent variable included the working environment. The study found a strong positive relationship between p-value=0.00 for working environment and employee retention (ß = 0.34, $p < 0.05$). As a result, they found in this instance that H3 was upheld, suggesting a significant positive connection between employee retention and the working environment. This is in line with the literature review that found that a study on service industry employees indicated that a positive work environment creates a positive based on performance employee environment to retain employees, which then fosters higher retention rates, thus the significance of work environment in the retention (Zainal et al., 2022).

The result of this research was that reward and recognition did not have a significant relationship with employee retention. That's because β=0.13, t=0.05, p=0.30, so the relationship between variables is weak and

insignificant. The findings of this study discovered that there was no relationship between reward and recognition and employee retention; thus, the hypothesis (H4) was rejected. This result was in sync with a study among Khyber Medical College (KMC) employees that reported that there was no linkage between reward and recognition and retention of employees (Shah et al., 2021). Such a result would suggest that the respondents (working employees in Klang Valley) may not consider reward and recognition as an important factor in developing employee retention.

To answer Research Question 5, employee retention is most heavily influenced by the working environment. The results showed that the working environment has the greatest impact on employee retention since it presents the largest standardized coefficient (Beta = 0.34). The strength of influence on employee retention increases in direct proportion to the Beta value of the variables being studied. The statistical significance of the working environment is proven by the significance value of Sig. = 0.00. The factors of training and development and compensation and benefits show significant effects on employee retention (Beta = 0.24, 0.17 Sig = 0.00, 0.05), though they remain lower than the working environment. Results for the reward and recognition variable produce a Beta of 0.13 but a significance value of 0.30, which indicates that this variable has minimal influence on employee retention rates. The working environment has proven to impact employee retention at its highest level compared to training development and compensation benefits. Organizations should focus on enhancing the workplace atmosphere because it creates a positive working environment that helps retain employees.

5. Conclusion

In conclusion, the previous chapter of this research described the objectives, which were to identify the factors on employee retention among workers at selected shopping malls in Klang Valley, Malaysia. Specifically, the study aimed to assess the relationships between four key variables: working environment, compensation and benefits, reward and recognition, training and development, and how these affect retaining employees. There was a total of 111 respondents, with one questionnaire that could not be used, ensuring that sure data was accurately processed.

Three out of the four variables had significant relationships with employee retention. Compensation and benefits, training and development, and working environment variables were also statistically significant ($p < 0.05$), and these variables were compensation and benefits, training and development, and working environment. This provides evidence that these factors matter a lot in shaping employees' decisions on whether to stick to their present jobs or to quit. However, based on collected data, it was found that the fourth variable, reward and recognition, does not have any relation to employee retention. Thus, this implies that other than as a reward or recognition, reward and recognition do not seem to be an important trigger for employee retention in this specific case. Based on the analysis, reward and recognition do not have a significant impact on employee retention in this study. They may motivate the employee, but they are not the critical factor for employees to remain with the same organization. This means that employees may be willing to sacrifice rewards and recognition for long-term employment for other aspects such as compensation, training, and work environment.

The results of the performed multiple regression analysis claimed that the working environment factor was the most determinant in employee retention. The conclusion was based on the standardized coefficients of beta, ß=0.34 for working environment, then ß=0.24 for training and development, and ß=0.17 for compensation and benefits. Working employees in Klang Valley must know that compensation and benefits, training and development, and work environment are some of the factors affecting the level of employee retention. In addition to these factors, leaders should also emphasize them to promote employee retention. Though several different kinds of literature provide documentation of employee retention and its significance to organizations and employees, it is undeniable that to gain more insights, it is essential to explore the fabric of mechanisms that pave the way for the development of employee retention.

Recommendations

The retail industry can retain its workforce better by offering compensation packages that match the market standards. The delivery of fair compensation, together with bonus systems and full employee benefits such as

health coverage and retirement plans, will enhance both staff satisfaction and lower staff turnover. Employees who have work arrangements with flexible options, such as remote work opportunities and shift adjustments, perform better in their personal and professional lives. Businesses need to reassess salaries at regular intervals to verify the competitive position of their payment levels against industrial benchmarks in the marketplace.

The retail industry needs positive workplace support to keep employees from leaving their positions. The workplace environment should be designed to deliver both physical safety and structural organization and comfort to employees. Employee morale grows substantially when organizations give enough rest space, together with clear communication systems and effective leadership backing. When an organization creates environments that promote teamwork together with inclusion, it leads to higher employee satisfaction and extends employee loyalty within the company structure. Employers need to focus on solving issues related to workplace concerns, which include fair scheduling in addition to job security and necessary resource accessibility for employees.

Employee training investments allow staff members to improve their abilities, which results in better job stability rates. Businesses operating through retail outlets must deliver continuous training programs that build employee customer service abilities, product expertise, and leadership capabilities. Employee engagement grows when employees receive career development paths through mentorship programs. Organizational programs should develop individual learning experiences for each job position to maintain employee engagement and career prospects at the company.

Organizations must recognize their employees through rewards because this activity boosts both their motivation and their willingness to stay. Retail organizations need to establish reward frameworks that combine monetary awards through bonuses and commissions with employee-of-the-month recognition programs and recognition through public appreciation, along with career promotion opportunities. The process of celebrating work anniversaries, along with acknowledging outstanding achievements, helps employees recognize their value within the organization. Having transparent reward systems helps employers maintain employee trust as well as satisfaction.

Future research should emphasize generational and demographic differences in the workforce, and organizations can build retention strategies that are customized to a diverse workforce. But it does not just boost employee retention; it massively improves satisfaction, loyalty, and employee productivity. Mediating and moderating factors have also helped us understand under what circumstances certain variables affect employee retention. A mediator tells us “why” one thing affects other things, while a moderator changes when or how strongly one thing influences another. Expanding the study scope is necessary to gain and better understanding of employee retention.

Future research should extend beyond the Klang Valley, a highly urbanized area, to examine whether the retention factors it has identified apply to other areas. Each place may have unique economics, culture, and work habits to decide whether employees are remaining or going from the job. Furthermore, if future researchers studied a lot more industries instead of only one shopping mall, they would have a better idea. Therefore, researchers can investigate multiple industries to find common factors and specific factors for retention.

Future research might look at other factors to get a better understanding of what makes employees stay committed to their jobs. This study has focused on compensation, benefits, training, work environment, and recognition, but indeed other factors are equally important. For instance, career advancement opportunities can encourage employees to remain if they can see how quickly they can move up the ranks, so to speak, at the company.

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Examining the Factors that Influence the Enculturation of Artificial Intelligence to Enhance the Productivity of MSMEs' Business for Sustainability

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Abstract: Micro, Small and Medium-Sized Enterprises (MSMEs) have revolutionary prospects to improve sustainability and efficiency in the digital age thanks to the quick development of artificial intelligence (AI). Micro, Small, and Medium-Sized Enterprises (MSMEs) have revolutionary prospects to improve sustainability and efficiency in the digital age thanks to the quick development of artificial intelligence (AI). However, due to obstacles including scarce resources, a lack of technical experience, and unclear implementation pathways, MSMEs have yet to adopt AI despite its potential. By creating a Framework for AI-Driven Sustainable Enterprises (F.A.S.E.) to help MSMEs successfully integrate AI while adhering to social, economic, and environmental sustainability objectives, this study fills this crucial gap. This study employs a mixed-methods approach, integrating qualitative insights from interviews with AI specialists and MSME stakeholders with a systematic literature analysis on AI and sustainability in MSMEs. The methodology is then validated by the study using quantitative surveys of MSMEs in a variety of industries, evaluating the results, facilitators, and barriers of AI adoption. Key elements for successful AI enculturation are identified by the suggested F.A.S.E. framework, which includes organizational culture, skills development, financial accessibility, and technological preparedness. Preliminary evidence indicates that MSMEs utilizing AI report 20–35% increases in operational efficiency and 15–25% reductions in resource waste, underscoring AI's role in sustainable growth. The study advances theory by bridging the gap between the literature on AI adoption in the MSME setting and sustainability. From a practical standpoint, it offers a thorough strategy for MSMEs to adopt AI ethically, as well as policy recommendations for organizations and governments to support digital transformation. This study highlights the urgent need for structured AI frameworks tailored to MSMEs to support the UN Sustainable Development Goals (SDGs) and allow them to participate in the rapidly digitized global economy. The F.A.S.E. framework is an essential tool for creating resilient, future-ready enterprises.

Keywords: *Artificial Intelligence, MSMEs, Sustainability, Digital Transformation, Framework, Productivity*

1. Introduction

Background of the Study

MSMEs find it challenging to embrace digital transformation due to organizational, financial, and technological obstacles, especially when it comes to applying artificial intelligence (AI) (OECD, 2023). Despite AI's promise to boost sustainability, cost effectiveness, and productivity, most MSMEs lack formal implementation frameworks (Wamba-Taguimdje et al., 2020). Malaysia's economy depends heavily on Micro, Small, and Medium-Sized Enterprises (MSMEs) due to their substantial contributions to GDP, employment, and innovation. But when it comes to using innovative technologies like artificial intelligence (AI), which are crucial for increasing productivity and guaranteeing long-term sustainability, MSMEs face many obstacles. MSMEs are still hesitant to embrace AI despite its promise to revolutionize corporate operations, boost efficiency, and encourage sustainable practices.

Artificial intelligence's (AI) rapid development has transformed corporate operations and given MSMEs previously unheard-of chances to increase productivity, maximize resources, and attain long-term sustainability (Dwivedi et al., 2021). MSMEs are essential to innovation, job creation, and economic growth because they make up more than 90% of all enterprises worldwide (World Bank, 2023). However, due to a lack of capital, technical expertise, and resources, many MSMEs find it difficult to undergo digital transformation (Garzoni et al., 2020).

The incorporation of AI into MSMEs can promote cost reduction, operational efficiency, and sustainable growth as it becomes more widely available (Wamba-Taguimdje et al., 2020). MSMEs are more likely to embrace AI

technologies that are simple to use and integrate seamlessly with their current infrastructure. Research indicates that adoption is more likely to happen when AI technologies work with existing corporate procedures (Wong & Yap, 2024).

Despite its potential, MSMEs are still not adopting AI at a high rate, mainly because of obstacles like unclear ROI, resistance to change, and data privacy concerns (Duan et al., 2019). Furthermore, MSMEs frequently lack formal frameworks to direct AI adoption in a way that is consistent with sustainability goals, whereas large enterprises have effectively employed AI for competitive advantage (Kamble et al., 2021). There is a substantial knowledge vacuum about how AI may be successfully enculturated within MSMEs to increase sustainability and productivity, as the majority of current research has been on AI adoption in large enterprises (Verma et al., 2022).

By creating a Framework for AI-Driven Sustainable Enterprises (F.A.S.E.), especially for MSMEs in the digital era, this study aims to close this gap. To guarantee that MSMEs can take advantage of AI's potential while upholding the values of economic, social, and environmental sustainability, the framework will pinpoint important facilitators, obstacles, and strategic routes for AI adoption (George et al., 2021). This study attempts to give MSMEs a realistic, doable road map for developing into AI-driven, sustainable businesses by combining ideas from the literature on organizational behavior, business sustainability, and artificial intelligence. To increase competitiveness and long-term resilience, the framework will incorporate data governance, AI adoption programs, and sustainable business practices.

The research's findings will contribute to the body of knowledge on AI in MSMEs and provide evidence-based strategies for technology companies, business executives, and regulators to support AI-driven digital transformation. This study concludes by highlighting the need for responsible AI adoption in creating resilient, future-ready MSMEs that can thrive in a global economy that is growing more environmentally conscientious and competitive.

Research Objectives

RO1: To examine the influence of technological readiness on the sustainable business performance of MSMEs
RO2: To assess the role of organizational culture in driving AI adoption and sustainability practices,
RO3: To evaluate the impact of access to skilled workforce and training on MSMEs' ability to implement AI
RO4: To investigate how financial resources and investment enable or constrain AI-driven sustainability initiatives

Research Questions

RQ 1: To examine the influence of technological readiness on the sustainable business performance of MSMEs
RQ 2: To assess the role of organizational culture in driving AI adoption and sustainability practices
RQ 3: To evaluate the impact of access to skilled workforce and training on MSMEs' ability to implement AI
RQ 4: To investigate how financial resources and investment enable or constrain AI-driven sustainability initiatives

2. Literature Review

Dependent Variable

Sustainable Business Performance (SBP): The ability of a firm to attain financial success while reducing adverse environmental effects and making a beneficial contribution to society is known as sustainable business performance (Fatima et al., 2022). Triple-bottom-line (TBL) principles, which balance economic, social, and environmental outcomes, are essential for MSMEs to adopt (Elkington, 2021). It has been demonstrated that robust sustainability practices improve MSMEs' brand recognition, finance accessibility, and resilience (Kumar et al., 2023). However, MSMEs frequently lack the organized frameworks necessary to methodically incorporate sustainability into their operations, in contrast to major enterprises (Awan et al., 2021).

Innovation, job creation, and global economic growth are all dependent on micro, small, and medium-sized businesses, or MSMEs. However, market rivalry, regulatory requirements, and resource limitations typically

pose a threat to their long-term survival. Sustainable company performance, which combines social responsibility, environmental stewardship, and economic sustainability, has become a crucial success criterion in recent years. With an emphasis on digital transformation, regulatory implications, organizational strategies, and stakeholder engagement—all of which are backed by recent scholarly research—this review of the literature looks at the major factors that affect sustainable business performance in MSMEs.

Because of their limited resources, MSMEs have particular difficulties in finding a balance between these criteria. In 2020, Taguimdje-Wamba et al. Operational efficiency is increased by using AI and IoT (predictive maintenance, for example, lowers energy waste). Adoption is hampered by a lack of talent and expensive implementation costs (Garzoni et al., 2020). Recycling and upcycling are examples of circular economy tactics that improve environmental performance (Khan et al., 2022).

Independent Variables

Technological Readiness: One of the most important factors influencing the effective adoption of AI in Micro, Small, and Medium-Sized Enterprises (MSMEs) is technological preparedness. This report offers a summary of current research that looks at the connection between organizational preparedness, digital capabilities, and technology infrastructure and MSMEs' capacity to use AI solutions. Due to its high implementation costs and technical complexity, AI presents a challenge for MSMEs with minimal digital infrastructure (Gupta and Sharma, 2025).

An effective AI enculturation requires technological readiness. MSMEs frequently lack the advanced computing resources and fast internet infrastructure needed for the successful application of AI technologies. The availability of a strong IT infrastructure has a major impact on small enterprises' adoption of AI technology, claim Gupta et al. (2020). The study found that MSMEs with greater technological capabilities are more willing to try AI-driven solutions, which can increase operational efficiency and productivity (Kee et al., 2025).

The availability of strong digital infrastructure, including cloud computing, cybersecurity, and high-speed internet, is a crucial component of technological preparedness. According to studies, only 30–40% of MSMEs in developing nations have access to enterprise-grade IT solutions, and they frequently have serious gaps in their fundamental digital infrastructure (OECD, 2022). For instance, MSMEs with dependable cloud-based platforms reported 25% higher operational efficiency than those using traditional systems, according to a study by Gupta et al. (2020). However, there are still gaps in infrastructure, especially in rural regions where digital transformation is being hampered by low broadband penetration (World Bank, 2023).

Core Infrastructure

Recent studies identify three essential infrastructure components:

- Cloud computing capabilities (Wamba-Taguimdje et al., 2020)
- High-speed internet connectivity (OECD, 2021)
- Edge computing devices for real-time processing (Kamble et al., 2021)

Data Infrastructure

Modern frameworks emphasize:

- Data storage and management systems (Wang et al., 2022)
- Data quality and standardization processes (Garzoni et al., 2020)
- Interoperability with existing systems (European Commission, 2022)

Micro, Small, and Medium-Sized Enterprises' (MSMEs') technical readiness has a significant impact on their competitiveness and sustainability in the digital age. Technological readiness is the capacity of an organization to successfully accept and employ new technologies (Parida et al., 2019). This includes financial capability, organizational culture, skills, and infrastructure. MSMEs—which make up more than 90% of firms worldwide (World Bank, 2023)—find it especially difficult to become digitally competent because of their low resources and lack of access to knowledge.

Organizational Culture: Artificial Intelligence (AI) adoption in Micro, Small, and Medium-Sized Enterprises (MSMEs) is significantly influenced by organizational culture, which is described as the common values, beliefs, and practices inside a company. The impact of cultural elements on AI integration, employee acceptance, and long-term sustainability has been highlighted by recent studies. Important findings about the effects of organizational culture on AI preparedness, implementation, and results in MSMEs are compiled in this study. MSMEs with innovation-driven leadership are more likely to implement AI technology, according to a study by Ofori et al. (2025).

It is impossible to overestimate the importance of leadership and organizational culture in the adoption of AI. A culture that welcomes innovation and change is more likely to experience AI enculturation. To further AI integration, leaders must support AI efforts and cultivate a culture of ongoing learning. Since it guarantees congruence between AI strategies and business objectives, leadership commitment is a crucial factor in influencing the success of AI adoption (Davenport and Ronanki, 2018). By encouraging AI literacy and emphasizing the measurable advantages of implementing AI, executives at MSMEs may also be able to overcome employee reluctance to change. In order to integrate AI, leadership commitment is essential. Top management assistance makes it easier to provide resources and coordinate strategies for an AI implementation to be effective (Lim & Seng, 2024).

Micro, Small, and Medium-Sized Enterprises' (MSMEs') long-term viability, capacity for innovation, and business resilience are all significantly influenced by their organizational culture. According to recent research, culture has a direct impact on sustainability practices (Awan et al., 2021), staff retention (Sahoo & Sahoo, 2022), and digital transformation (Dwivedi et al., 2021). With an emphasis on leadership styles, innovation preparedness, employee engagement, and obstacles to cultural transformation, this study compiles the most recent studies on MSME corporate culture.

Leadership commitment is one of the primary determinants of technical preparation. Businesses are 50% more likely to invest in future technologies if their CEOs are tech-savvy (Deloitte, 2022). More smooth digital transitions are also made possible by an active business culture that embraces failure and promotes experimentation. Artificial intelligence (AI) and automation technologies were adopted three times more quickly by MSMEs with "innovation-friendly" cultures than by those without, according to a European survey of MSMEs (European Commission, 2021). Opposition to change is still a significant barrier, nevertheless, especially in conventional businesses (Parida et al., 2019). Integrating sustainability into MSMEs' main goals requires leadership commitment. Businesses are more likely to invest in green technologies and ethical labor practices when their CEOs prioritize sustainability (Fatima et al., 2022).

AI experiments are more common among MSMEs with innovation-driven cultures (Davenport & Ronanki, 2018). Risk-averse cultures hinder the use of AI because they are afraid of failing (Garzoni et al., 2020). To encourage the deployment of AI, transformational leadership is required (Kamble et al., 2021). Digitally aware CEOs give funding and offer training to speed up AI projects (McKinsey, 2023). Resistance is decreased when the function of AI is discussed openly and honestly (George et al., 2021). AI skill gaps are filled by ongoing upskilling initiatives (Bughin et al., 2019). Knowledge sharing is enhanced via cross-functional AI task forces (Wamba et al., 2021). AI literacy is an issue for MSMEs with limited training resources (World Bank, 2023). MSMEs must employ AI to improve service delivery and be competitive in the face of external challenges like consumer expectations and competitive market dynamics (Badghish & Soomro, 2024).

Access to Skilled Workforce and Training: The presence of a skilled workforce is another important factor impacting AI enculturation. In MSMEs, it might be challenging to locate and keep personnel with experience in artificial intelligence and data analytics. Companies that support training programs to upskill their employees are better positioned to take advantage of AI technologies, per a 2019 study by Bughin et al. The report highlights the importance of continuous learning and development to overcome the skills gap and guarantee that workers can employ AI tools to increase productivity.

Training initiatives that involve employees further improve sustainability results (Awan et al., 2021). Adoption of AI depends on organizational preparedness, especially in relation to sustainable human capital. It is crucial to have qualified staff on hand who are able to use AI technologies. According to research, AI adoption is significantly impacted by sustainable human capital, which improves the internal operations and

manufacturing performance of SMEs.

Equally important is the human capital component. Advanced digital skills like data analytics, artificial intelligence, and IoT management are lacking in the workforces of many MSMEs (Bughin et al., 2019). It has been demonstrated that upskilling programs greatly boost technology use; for example, MSMEs who took part in government-funded digital literacy programs reported a 35% increase in technology use (ILO, 2021). However, there is still a "digital skills divide" between large and small enterprises because smaller organizations frequently find it difficult to invest in training (OECD, 2022).

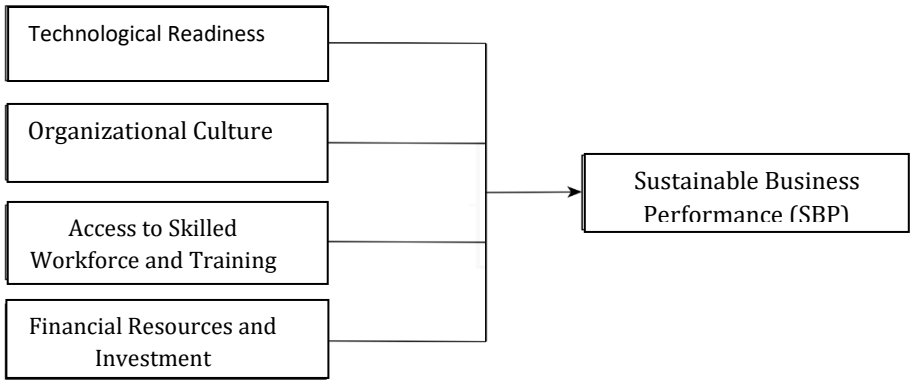
Having access to qualified employees and successful training programs is one of the most important success elements for Micro, Small, and Medium-Sized Enterprises (MSMEs) in the digital economy. Due to their limited resources, informal training programs, and competition from larger companies, MSMEs find it more difficult to hire, retain, and upskill staff than large enterprises (OECD, 2023). According to recent studies, 58% of MSMEs think that the biggest obstacle to deploying cutting-edge technology like automation and artificial intelligence is a lack of skills (World Bank, 2022). This paper reviews recent studies on workforce skill challenges in MSMEs, looking at training effectiveness, governmental interventions, digital upskilling, and regional differences. The results point out fundamental flaws and offer workable fixes for MSME resilience.

Financial Resources and Investment: One of the biggest obstacles to MSMEs' adoption of AI is their lack of funding. Small firms may not be able to afford the significant costs of deploying AI, especially those related to recruiting staff, software, and technology. Nonetheless, research has indicated that well-timed investments in AI can result in substantial long-term gains. For example, MSMEs that invest in AI-driven innovations report increased operational efficiency and competitive advantage, per a McKinsey & Company (2021) report. By offering financing and incentives for the adoption of AI, governments and financial institutions may significantly help MSMEs.

Lack of funding is one of the biggest obstacles to being technologically ready. According to EY (2023), 60% of MSMEs cite money as their biggest obstacle, and many are deterred by the high upfront expenditures of new technology (such as ERP systems and AI tools). Examples of innovative financial strategies that have lessened this problem include government subsidies and pay-per-use cloud services. For instance, digital tools were twice as common among MSMEs in Southeast Asia that used fintech-based lending solutions (ADB, 2022). Access to capital is still uneven, nevertheless, especially for MSMEs that are informal and held by women (World Bank, 2023).

One of the biggest obstacles to MSMEs' expansion, uptake of new technologies, and sustainability worldwide is their incapacity to obtain sufficient capital (Beck & Demirgüç-Kunt, 2021). MSMEs frequently struggle to obtain capital in comparison to larger companies due to perceived risks, a lack of collateral, and a lack of financial awareness (OECD, 2023). According to recent studies, traditional financial institutions either underserve or do not serve 40–50% of MSMEs in developing nations (World Bank, 2023). This review of the literature looks at recent studies on the financial difficulties MSMEs confront, new financing choices, and how investments affect business success and digital transformation.

Figure 1: Theoretical Framework



Hypotheses:
H_1: There is a relationship between Technological Readiness and Sustainable Business Performance.
H_2: There is a relationship between Organizational Culture and Sustainable Business Performance.
H_3: There is a relationship between Access to Skilled Workforce and Training and Sustainable Business Performance.
H_4: There is a relationship between Financial Resources and Investment and Sustainable Business Performance.

3. Methodology

Examining the factors influencing Artificial Intelligence (AI) adoption in Micro, Small, and Medium-Sized Enterprises (MSMEs) and its implications for productivity and sustainability requires a robust study technique. Below is a summary of the recommended research methodology, which blends qualitative and quantitative approaches to ensure comprehensive and reliable findings.

Research Design
The study will adopt a mixed-methods research design, combining qualitative and quantitative approaches to provide a holistic understanding of the research problem.

Research Philosophy
The research will be guided by a pragmatic research philosophy, which emphasizes the practical application of knowledge and the use of multiple methods to address research questions.

Research Approach
Inductive Approach: To explore and identify patterns and themes related to AI enculturation in MSMEs.

Deductive Approach: To test hypotheses about the relationships between factors influencing AI adoption and outcomes such as productivity and sustainability.

Data Collection Methods
Data will be collected through both primary and secondary sources.

Primary Data Collection

Surveys: Structured questionnaires will be distributed to MSME owners, managers, and employees to collect quantitative data on factors such as technological readiness, organizational culture, and AI adoption outcomes.

Interviews: Semi-structured interviews will be conducted with key stakeholders (e.g., business owners, AI experts) to gather qualitative insights into the challenges and opportunities of AI enculturation.

Secondary Data Collection
Review of academic journals, industry reports, and government publications to gather contextual information and validate findings.

Sampling Strategy
Target Population: MSMEs across various sectors (e.g., manufacturing, retail, services) that have adopted or are in the process of adopting AI technologies.

Sampling Technique: A combination of purposive sampling (for qualitative interviews) and stratified random sampling (for surveys) will be used to ensure representation across different industries and sizes of MSMEs.

Sample Size: Surveys: 100-200 respondents.

Interviews: 10-20 participants.

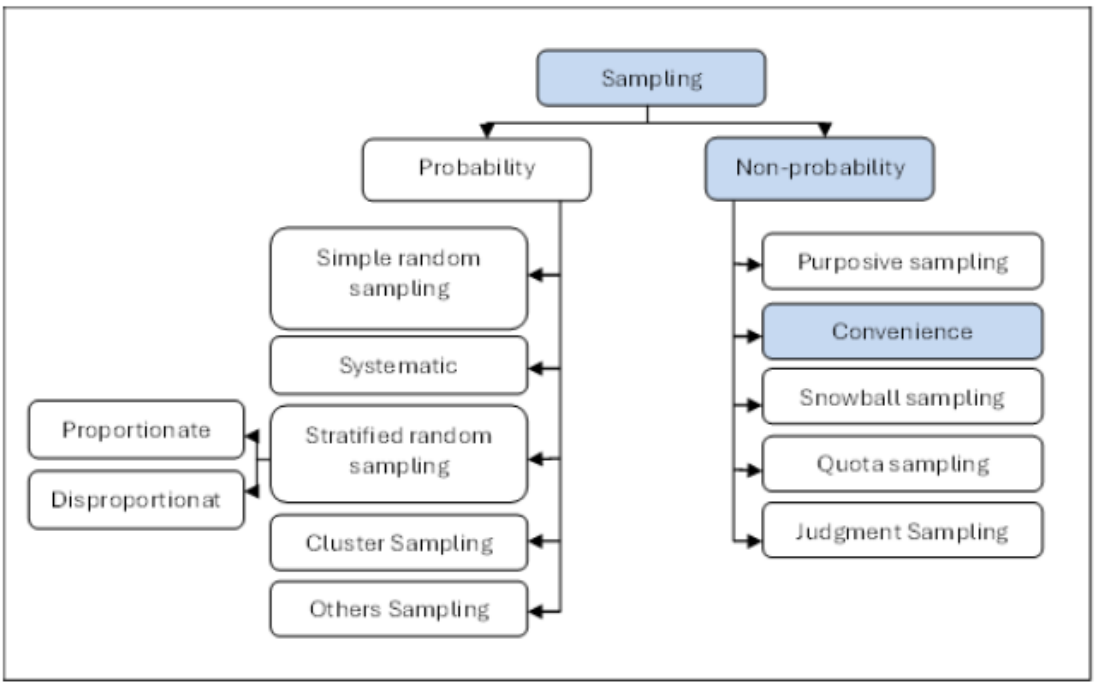
Data Analysis Methods: Quantitative Data Analysis

Descriptive statistics (e.g., mean, standard deviation) to summarize survey data.

Inferential statistics (e.g., regression analysis, correlation analysis) to examine relationships between variables (e.g., AI adoption and productivity).

Tools: Statistical software such as SPSS or PLS-SEM

Figure 2: Quantitative Data Analysis



Qualitative Data Analysis
Thematic analysis to identify patterns and themes from interview transcripts and case study data.

Coding and categorization of qualitative data using tools like NVivo or Atlas. Ti.

Expected output/outcomes/implications:
The research project is expected to yield significant findings, outputs, and consequences that will benefit MSMEs, decision-makers, and the overall economy. The long-term implications of the study will extend beyond Malaysia and offer valuable insights to other countries seeking to deploy AI for sustainable and equitable growth.

The successful enculturation of AI in MSMEs is expected to yield the following outcomes:

Enhanced Productivity
- Automation of repetitive tasks, reducing operational costs.
- Improved decision-making through data-driven insights.
- Streamlined supply chain and inventory management.

Sustainability
- Resource optimization, leading to reduced waste and energy consumption.
- Support for environmentally friendly practices (e.g., predictive maintenance, sustainable sourcing).
- Long-term business resilience and competitiveness.

Significance of output from the research project:
The findings of the study project are crucial because they offer practical solutions to the issues that MSMEs face while integrating AI. By addressing issues including organizational culture, skills shortages, technology readiness, and financial constraints, the study assists MSMEs in utilizing AI to its fullest potential, boosting their sustainability and productivity.

4. Conclusion

In conclusion, a number of factors, including organizational culture, technological preparedness, data availability, financial resources, access to qualified labor, and regulatory considerations, influence the enculturation of AI in MSMEs. These issues need to be resolved if MSMEs are to properly employ AI and experience sustainable growth.

The proposed framework provides a thorough approach to understanding and fostering AI enculturation in MSMEs. By focusing on the enculturation process and addressing the critical input elements, MSMEs can employ AI to increase productivity and achieve sustainable growth.

While prior research highlights the importance of sustainability for MSMEs, few of these studies provide useful frameworks tailored to their unique constraints. To bridge this gap, the F.A.S.E. framework proposed in this study aims to enhance sustainable company performance.

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A Review of Anchor or Streamer Characteristics and Impulse Purchase Decisions in Livestreaming Commerce

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Abstract: This article provides a comprehensive review of existing literature on the role of anchor or streamer characteristics in influencing impulse purchase decisions within the context of livestreaming commerce. Driven by the expansion of e-commerce, the popularity of impulse purchases has grown rapidly, particularly in the context of livestreaming commerce. Anchor or streamer characteristics, particularly attractiveness and professionalism, have been demonstrated to have a significant impact on impulse purchases in livestreaming commerce. Researchers have also discovered that the attractiveness of an anchor or streamer influences customers' trust, enjoyment, and emotional connections. On the other hand, professionalism increases consumers' trust, satisfaction, and purchase intentions. Given the larger benefits provided by attractiveness and professionalism factors, livestreaming marketers should take proper efforts to leverage these benefits. Online livestreaming marketers should also recruit and identify attractive anchors or streamers who are both beautiful and handsome for their livestreaming operations. However, even though an attractive anchor or streamer can help people make impulse purchases during livestreaming, relying too much on physical attractiveness can make other qualities, like knowledge and interaction, less important. Thus, the function of attractiveness should be combined with other things, like the type of product being promoted, trustworthiness, and knowledge factors. As for professionalism factors, anchors or streamers must continue to improve their understanding of the product's qualities (e.g., selling points, usage methods) to be more competent while endorsing it. To make live streaming more interesting and get people to buy products, anchors or streamers can share personal or professional opinions, experiences, and stories while answering viewers' questions. To balance professionalism and attractiveness, it is also recommended that anchors or streamers pay attention to social presence, since this is also one of the factors that leads to impulse purchase decisions in livestreaming commerce. Finally, this conceptual review paper has also concluded that the efficacy of professionalism and attractiveness attributes of attractiveness may vary based on regional and cultural differences.

Keywords: *Anchor Attractiveness, Streamer Attractiveness, Anchor Professionalism, Streamer Professionalism, Livestreaming Commerce, Impulse Purchase*

1. Overview of Impulse Purchase

Impulse purchase behavior is such an emotional behavior that has been studied and examined from offline to online in marketing studies over the last few decades, with the growth of digital payment, e-business, and social business (Abdelsalam et al., 2020). According to the definition by Rook (1987), impulse buying can be defined as a "sudden, powerful, persistent urge to buy something immediately." As defined by Beatty and Ferrel (1998) has extended the definition of impulse purchase as "sudden, immediate, without pre-shopping intention". Ming et al. (2021) have defined impulse buying as unplanned, sudden, and persuasive purchasing behavior. Although there were differences in the specific definitions of impulsive purchase, its unplanned nature remained similar (Zhao et al., 2022). There are four dimensions of impulse purchase behavior identified by Stern (1962), which are 1) pure impulse buying behavior, 2) reminder impulse buying, 3) suggestive impulse buying, and 4) planned impulse buying. Pure impulse buying represents a form of finding new things, escaping reality, and showing the real picture of impulsive buying (Stern, 1962). Reminder impulse buying occurs when consumers see the product and remember a previous interaction. As for suggestive impulse buying, it occurs when products are visualized by customers when they first view them. (Stern, 1962). Planned impulse buying behavior refers to instances where consumers make unplanned purchases because of product promotions orchestrated by promoters. Based on Stern's (1962) definition of all categories of impulse buying behavior, all purchase behavior can be categorized as impulse buying if customers do not engage in making extensive product research before purchase.

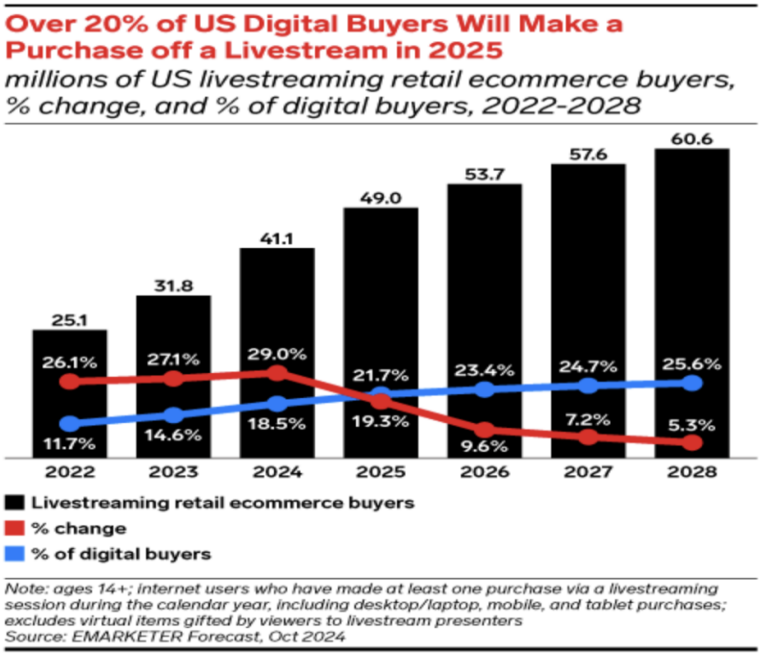
Impulse purchase is one of the popular topics in the context of consumer decision-making (Chen et al., 2022).

Impulse buying behavior is an emotional behavior that has been studied and examined from offline to online in marketing studies over the last few decades, with the growth of digital payment, e-business, and social business (Abdelsalam et al., 2020). Impulse buying has attracted the attention of many scholars and has been investigated in various research fields. A study about impulse purchases has been progressively divided into electronic commerce, social commerce, and mobile commerce. This is happening due to technology globalization (Redine et al., 2023). Focusing on traditional retailing, impulse purchase was introduced first by Clover (1950). However, in early research, the definition of impulse purchase is not well developed (Kollat & Willett, 1969; Rook, 1987). Because of technological advancements, interest in impulse purchases only existed in the early 2000s (Redine et al., 2023). The growth of e-commerce has led to flourishing research on impulse purchases (Gao et al., 2021), particularly in livestreaming. Based on studies, it has been identified that products that are bought impulsively in livestreaming include fashion products such as apparel (Chandrruangphen et al., 2022; Kristi et al., 2023) and cosmetics products (Nugraha et al., 2024).

Overview of Livestreaming Commerce

In the past few years, the growth of livestreaming businesses has helped create new ways for people all over the world to share information. The worldwide spread of the coronavirus disease known as COVID-19 became a contributor to the skyrocketing trends in the use of livestreaming commerce (Jahrir and Tahir, 2020). Livestreaming shopping has become a new economic growth in China (Ma, 2021), with live commerce generating sales of $171 million (Utsi, 2022). In addition, the United States and Europe are gradually progressing in the advancement of the livestreaming business. It is projected that the income generated by livestreaming shopping in the United States will reach 55 billion U.S. dollars by 2026 (Chevalier, 2022), with a fast-growing market in apparel and makeup (Kharif and Townsend, 2020). According to Statista, livestreaming commerce sales in the United States are predicted to reach 50 billion in 2023, and by 2026, revenues from live shopping are expected to climb by 36% (Chevalier, 2024). Therefore, Liederman (2025) predicts that 20% of users in the United States will purchase a livestreaming session in 2025, which presents a promising opportunity for livestreaming marketers.

Figure 1: US Digital Buyers Will Make a Purchase off a Livestream in 2025



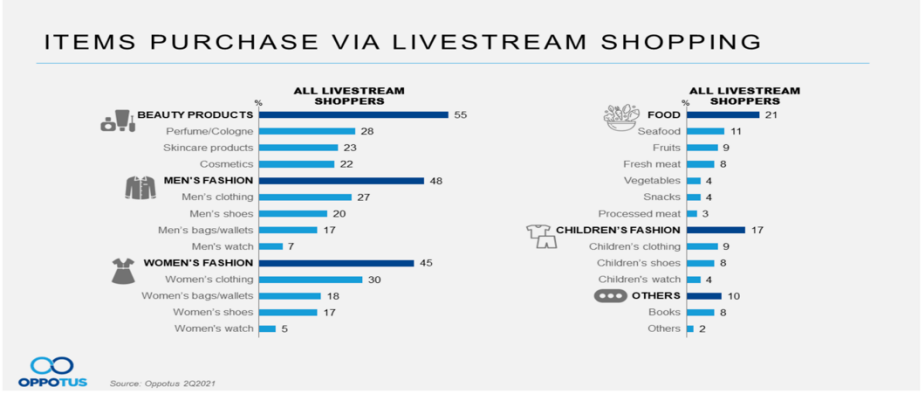
Source: EMARKETER Forecast, Oct 2024

The live streaming business model is also beginning to succeed in Southeast Asia. Live streaming sales in Southeast Asia will grow more than tenfold to 13 billion in 2022, with the most active audiences coming from Vietnam, Thailand, and Singapore (Ignatius, 2022). As of 2024, data from Statista indicated internet consumers in China exhibited the highest familiarity with live commerce, with 87 percent having made purchases through

livestreaming. Indonesia found the second position in live e-commerce adoption, with more than 80 percent of participants reporting prior usage (Yltävä, 2024).

Malaysia has emerged as a favourable market for the rapid growth of live streaming commerce because of its extensive internet connectivity, widespread mobile usage, and booming e-commerce sector. Furthermore, Oppotus (2021), a market research company, has reported that Malaysian consumers are increasingly adopting the emerging trend of livestreaming commerce, as seen by a growing number of customers engaging in livestreaming purchases. Furthermore, the COVID-19 epidemic has had a significant impact on consumer behavior and lifestyle. Because of the global pandemic and the implementation of movement control orders (MCO), customers have transitioned towards utilizing online platforms for buying essential items such as food, clothing, personal care products, and other everyday necessities. The Movement Control Order (MCO) execution contributed to a significant increase in online sales, as numerous enterprises were unable to operate during the lockdown period (Leong et al., 2022). Consequently, the utilization of live stream commerce has emerged as a feasible strategy for firms to effectively engage with consumers. In 2024, Statista data on influencer marketing in Malaysia revealed that nearly 80 percent of Malaysian respondents claimed to have watched live commerce content on the TikTok platform (Statista, 2024). According to the survey, 69 percent of respondents have reported viewing live commerce on the Shopee platform. Data from Oppotus (2021) has also revealed that the most purchased products in live streaming among Malaysian consumers are beauty products, men's fashion, and women's fashion.

Figure 2: Items Purchased via Livestream Shopping



Source: Oppotus (2021)

The above statistics have proven that livestreaming commerce has become rapidly growing in today's world. It is not only a new trend but also serves as an opportunity for a new normal in businesses. Consequently, numerous online marketers are now utilizing social media and internet platforms to establish livestreaming selling channels to satisfy the needs of their customers. Xu et al. (2020) assert that livestreaming commerce enables consumers to observe, comment on, and purchase products during the live broadcast. The comfortable atmospheres present in live streaming commerce shopping are likely to induce customers to engage in impulse purchases (Li et al., 2022). Given that live streaming commerce can capitalize on consumers' "see-now-buy-now" mentality (Lo et al., 2022), online marketers must comprehend the factors that influence impulse purchase decisions within this context.

2. Overview of Past Studies on Impulse Purchases in Livestreaming Commerce

The phenomenon of impulsive buying, particularly in the context of internet shopping, has gained significant interest among scholars and is now considered an important area of study (Chen, 2022; Goel et al., 2022). Among the factors investigated in the context of live streaming impulse purchase studies are social presence (Ming et al., 2021), IT affordance (Mo et al., 2021), live streamer appearance (Li et al., 2022), attributes of the anchor (Lo et al., 2022; Li et al., 2022), and marketing strategy (Rahma and Ridanasti, 2023; Huo et al., 2023). Table 1 provides a summary of previous research on live streaming commerce impulse purchases, together with a specific focus on live streaming platforms.

Table 1: Summary of Related Research in Live Streaming Commerce Impulse Purchase.

Author	Theory	Variables	Platform
Li et al (2022)	Social presence and social facilitation theory	Social Presence of Broadcasters Social Presence of Viewers Social Presence of Livestreaming	Taobao Live
Mo et al (2021)	IT Affordance	Visibility Expressiveness Guidance shopping Trading affordance	Taobao Live, Jingdong, Pinduoduo, Tiktok
Chen et al. (2022)	Marketing Strategy	Person Product Place	Not specify
Lin et al. (2022)	Psychological Situation	Demand Convenience Interactivity Playfulness	Not specify
Lo et al., (2022)		Content **Anchor** Audience	Not specify
Hung et al. (2022)		Perceived transaction value Perceived acquisition value Social presence of live streaming platform Social presence of viewers Social presence of streamers Telepresence	Facebook Live
Li et al. (2022)	Interaction Quality	Responsiveness Professionalism Informativeness Personalization	Not specify
Ming et al., (2021)	Social Presence	Social presence of live streaming platform Social presence of viewers Social presence of streamers Telepresence	Not specify
Rahma et al., (2023)	Marketing Stimulus	**Perceived anchor attributes** Perceived scarcity Immersion	Tiktok Live
Leong et al. (2022)		**Attractiveness** Expertise Promotion Scarcity Product Price	Facebook Live Instagram Live Tiktok Live Lazada Lazlive Shopee Live
Huo et al. (2023)		Social presence Sales promotion	Not specify
Lee and Chen et al. (2021)	SOR	**Attractiveness** Trustworthiness Expertise Product usefulness Purchase convenience	Live streaming commerce
Li et al. (2023)		**Live streamer attractiveness** Interaction	Live shopping

According to the above table, streamer and anchor characteristics are well-known aspects that have been studied in impulse purchase behaviour in livestreaming commerce (Li et al.,2022; Lo et al.,2022; Rahma et al., 2023; Leong et al.,2022). Consequently, it has been observed that the previous literature contains a multitude of definitions for anchors and streamers. Based on the definition by Sanjaya (2023), streamers are individuals who aid in the marketing of a product and may also be the product's vendor. Anchors, on the other hand, can be defined as a group of people who lead live marketing activities, demonstrating product expertise and encouraging consumers to click and purchase products (Li et al., 2024).

Even though streamers and anchors are defined differently, they serve the same goal in livestreaming. They are responsible for executing marketing actions such as demonstrating, communicating, and encouraging individuals to buy products. To facilitate the article evaluation, the authors will use both words (anchor and streamer) to discuss how anchor or streamer features influence impulse purchase decisions in livestreaming commerce.

Anchor or Streamer Characteristics and Impulse Purchase Decision in Livestreaming Commerce

Anchors' characteristics have a major impact on consumer psychology, altering their views and purchasing decisions in the live streaming e-commerce environment (Zhu et al., 2021). According to Li et al. (2024), anchor characteristics can be defined as the characteristics of anchors that they displayed during the livestreaming session. Characteristics of anchors have become crucial factors affecting customers' buying decisions in live streaming (Guo et al., 2022). Currently, live streaming e-commerce businesses recognize the crucial role of anchors' characteristics in competing for consumers' attention (Li et al., 2024). One of the most important anchor characteristics in livestreaming is anchor attractiveness (Xu et al., 2020; Guo et al., 2022); anchor product knowledge (Chen et al., 2024); and anchor professionalism (Sun and Qu, 2024; Mo et al., 2024). These are determinants that have been studied before in the context of livestreaming commerce.

Additionally, it is important to highlight that streamers and anchors are crucial to live-streaming commerce since they aid in the process of helping viewers comprehend products. They also participate in product testing, introductions, and audience engagement through real-time Q&A sessions to promote and facilitate product sales (Li et al., 2024). Consequently, the following discussion in this article review will focus on a more comprehensive examination of the overview of anchor or streamer characteristics, with a particular emphasis on the professionalism and attractiveness of anchors or streamers. This article review will also discuss ways in which these attributes affect the impulsive purchase decision in the context of livestreaming commerce.

Overview of Anchor or Streamer Attractiveness

Erdogan (1999, p. 299) defines attractiveness as a "positive stereotype associated with a person, not only on physical attractiveness, but also on other characteristic elements such as athletic ability and personality." Conversely, Li et al. (2024) define anchor attractiveness as the ability of streamers to draw viewers in, primarily through their external appearance. To be specific, anchor attractiveness can be divided into physical attractiveness, external appearance, and social attractiveness (Zhu et al., 2021; Li et al., 2024). According to Dong et al. (2023), an anchor's superior appearance and image can create a visual impact, be aesthetically pleasing, and make watching a livestream a delightful form of entertainment. The attractiveness of anchors also acts as a visual cue that influences consumer trust which affects the tendency to purchase (Ma, 2023; Zhu et al., 2021).

According to literature, the attractiveness factors have become one of the popular topics in the fields of e-commerce (Fei et al., 2021), social commerce (AlFarraj et al., 2021), and livestreaming (Wei and Xi, 2023). Thus, it is suggested that the attractiveness factors should not be ignored and require much attention from online marketers who rely heavily on the anchor or streamers in selling and promoting their products. At the same time, these attributes also require further investigation as the purchase decision of customers in livestreaming relies heavily on recommendations of anchors or streamers.

Previous research has shown a variety of results related to the significance of attractiveness attributes. For example, based on the study by AlFarraj et al. (2021), they have found that the attractive social media influencers have positively influenced customers' purchase decisions towards dermatology products. Streamer attractiveness also has been found to impact viewer stickiness in livestreaming (Wang et al., 2024). The

physical appearance and voice attractiveness of streamers have also been found to reflect consumers' intention to watch e-commerce livestreaming based on findings by Fei et al. (2021). Hence, based on an experimental study conducted by Peng et al. (2020) by using seller profile picture, it was found that seller who have appeared to be visually appealing has more credibility and sociability. It matches the finding by Ert and Fleischer (2020), where they found that the physical attractiveness of Airbnb hosts in online photographs has influenced the trustworthiness of customers.

Anchor or Streamer Attractiveness and Impulse Purchase in Livestreaming Commerce.

Fireworker and Friedman (1977) suggest that an attractive anchor can attract viewers' attention, which later influences customer purchase decisions (Park and Lin, 2020). It has also been proven that customers put more trust in attractive people as they believe these people tend to give persuasive information (Patzer, 1983). Thus, the attractiveness of the anchor has become one of the factors contributing to customer trust (Ohanion, 1990). Previous scholars have found that streamer attractiveness has an influence on consumer impulse buying decisions in livestreaming commerce (Leong et al., 2022). Charismatic streamer also influences impulse purchase decisions (Li et al., 2024). In a study conducted by Su and Qu (2024), clothing selling in livestreaming requires the streamer or anchor to try on the product. Therefore, external beauty through face and body has been found to stimulate impulse purchase in livestreaming commerce for clothing sales. It matches findings by Gao et al. (2021), in which they found that the attractiveness of streamers has an influence on buying behavior and attitude of consumers.

Previous studies have also shown that a relationship occurs between streamer trust, attractiveness and perceived enjoyment, which considerably impacts viewers' purchase intentions. According to Huang et al. (2021), anchor attractiveness led to influence trust among livestreaming audiences. Trust also acted as a mediating factor between physical attractiveness and purchase intention (Ma, 2023). In addition, attractive streamers can create an enjoyable shopping experience, which influences impulse buying decisions (Lee & Chen, 2021). According to Wang et al. (2023), trust may not directly influence impulse buying but it affects emotional connection through attractive streamers. Furthermore, the “beauty premium” offered by attractive streamers influences buying decisions as attractiveness influences emotional response (Shi et al., 2024). Based on the study by Leong (2022) and Li et al. (2024), streamer attractiveness has affected perceived enjoyment and arousal, which are very critical in influencing impulse purchases. Finally, according to Li et al. (2024) and Chen & Li (2023), the attractiveness of anchors not only enhances pleasure emotions but also triggers impulse buying.

Overview of Anchor or Streamer Professionalism

Previous literature has found the significant influence of professional knowledge and skills, especially for sales personnel in a retail context (Sweeney et al., 1997). Anchor professionalism can be defined as a level of expertise in communicating knowledge, skills, and experience to livestreaming viewers (Li et al. 2024) Anchor professionalism is also likely defined by the ability to communicate effectively with the audience, which includes clear articulation, engaging dialogue, and the ability to answer questions in real-time, which enhances the interactive experience of live streaming e-commerce (Lo and Cheng, 2023). According to a study by Lo and Cheng (2023), anchor professionalism has played a significant role in enhancing user intimacy and can also improve consumer satisfaction in the live-streaming e-commerce industry. This suggests that the more professional the anchor, the closer and more connected users feel during the live stream sessions.

Previous literature has extensively discussed the importance of professionalism, especially in enhancing loyalty. It is found that professionalism impacts viewers' interest and mutual understanding, thus promoting customer loyalty (Lyu et al., 2021). Professionalism also increases customers' interest, validation, and mutual understanding, which later promotes loyalty and intimacy (Lyu et al., 2021). In addition, as mentioned by Qi and Xiaoli (2024) in their study, the professionalism of anchors plays a role in lessening customer loss and building customer loyalty through boosting perceived value and flow experience among customers.

Besides, streamers' professionalism through expertise and credibility significantly influences consumer trust and satisfaction, which is very important to promote online stickiness and repurchase intentions (Meng and Lin, 2023). Previous studies have confirmed that the streamer's professionalism influences trust levels, which in lead to influences purchase intentions. For example, in promoting fitness equipment, professionalism has

been found to influence consumer trust (Xue & Ma, 2024). Similarly, for eye health products, professionalism encourages purchase intention through trust and health views (Zilong, 2023). Finally, for beauty products, it is found that when combining anchors' professionalism with perceived reputation and interactivity, it will significantly boost customers' purchase intentions (Lei et al., 2024).

Anchor or Streamer Professionalism and Impulse Purchase in Livestreaming

According to the literature, professionalism and impulse purchases in livestreaming have been studied broadly by scholars. A study of beauty products shows knowledgeable anchors are perceived as a professionalism, which boosts purchase intentions (Lei et al., 2024). According to Yu et al. (2022) live streamers' professionalism demonstration when discussing food or restaurants, strongly influences viewers' impulse purchases. Another study conducted by Shao (2024) on the characteristics of influencers and live content has found that professionalism is one of the factors that create consumer attachment which impacts impulse buying decisions.

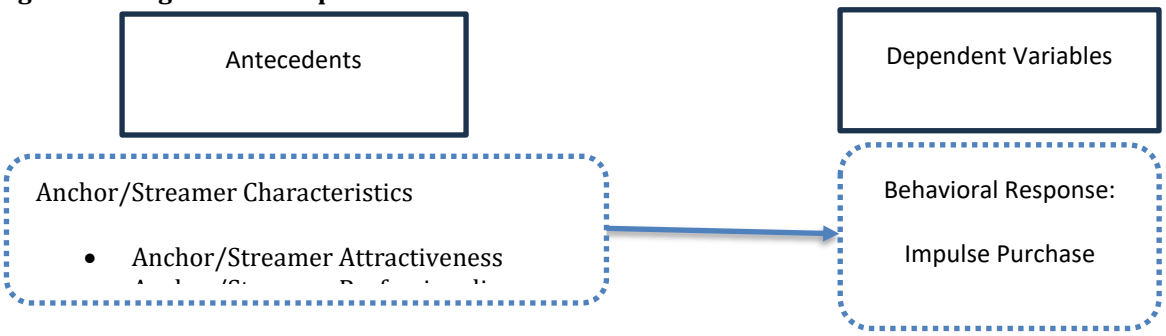
According to Liu et al. (2022), professionalism also influences impulse buying because it can enhance the sense of presence and emotional engagement. This is because, professional anchors are believed to create pleasurable emotions in customers which are critical drivers of impulse buying behavior. In other words, the pleasure emotional responses are facilitated by the anchor's capacity to engage with the audience, thus raising the likelihood of impulse purchases (Chen & Li, 2023).

Scholars also have confirmed the anchor's professionalism, which comprises expertise and the ability to engage the audience is significantly influences trust and impulse purchases. For example, according to Yang et al. (2022), in agricultural products livestreaming, professionalism enhances customer trust, which in turn boosts impulse buying intentions. In addition, professional anchors are perceived as credible sources that can enhance consumer trust and increase the likelihood of impulse purchases (Zhu et al., 2021; Rui, 2022). Furthermore, Li et al. (2024) and Liu et al. (2023) claim streamer professionalism (expertise and trustworthiness) significantly influences consumers' impulse buying intentions. This is due to professional streamers being believed to be more credible and knowledgeable. This matches findings by Mo & Santirojanakul (2024), where they found that when professional anchors are credible and reliable, it increases consumer trust and makes viewers more prone to act impulsively.

3. Designing an Integrated Conceptual Framework

In this article review, a suggested conceptual framework has been developed to incorporate the elements of anchor/streamer attractiveness, anchor/streamer professionalism, and impulse purchases. Figure 3 presents the framework.

Figure 3: Integrated Conceptual Framework



Definition of Terms

Anchor

Anchors can be defined as a group of people who lead live marketing activities, demonstrating product expertise and encouraging consumers to click and purchase products (Li et al., 2024).

Streamer
Streamers are individuals who aid in the marketing of a product and may also be the product's vendor (Sanjaya 2023).

Attractiveness
Erdogan (1999, p. 299) defines attractiveness as a "positive stereotype associated with a person, not only on physical attractiveness, but also on other characteristic elements such as athletic ability and personality".

Professionalism
Professionalism as a level of expertise in communicating knowledge, skills, and experience to livestreaming audiences Li et al., 2024).

Impulse Purchase
Unplanned, sudden, and persuasive purchasing behavior (Ming et al., 2021).

4. Practical Implications

Based on the well-discussed topics of anchor or streamer attractiveness and professionalism, there are a few practical implications that may be investigated for application by those who are directly or indirectly involved in marketing via livestreaming operations.

Anchor or Streamer Attractiveness
Firstly, for anchor or streamer attractiveness. With the significant benefits offered by streamer or anchor attractiveness, it seems very important for online marketers to consider recruiting anchors or streamers who have good visual appeal for their live streaming operations. Moreover, according to a study by AlFarraj et al. (2021), influencers who have good visual appeal are recommended to represent the brands. In addition, Zheng et al. (2020) also claim that the attractiveness of the anchor is also important as the first stage to build relationships with customers. Having said that, online marketers should seize the opportunity by capitalizing on the attractiveness of the anchor or streamer to build relationships with customers and represent the company's brands. The company may consider allocating some resources to recruit handsome and beautiful anchors or streamers, such as internet celebrities or opinion leaders, who will entice customers to buy while livestreaming. Key opinion leaders, for example, have been proven to become one of the determinants that influence the purchase decision of customers during livestreaming (He and Jin, 2022).

However, an over-reliance on physical attractiveness can overshadow other important attributes such as expertise and interactivity, which are crucial for promoting impulse purchase decisions in a livestreaming context. For instance, considering perceived product knowledge of streamers and the instant feedback on product information can drive both cognitive and affective involvement, leading to impulsive buying behavior (Gong & Jiang, 2023). Furthermore, real-time interactivity between streamers and viewers can foster a sense of engagement and immediacy, potentially leading to impulsive purchasing decisions (Masitoh et al., 2024). In addition, despite the benefits, attractiveness alone is not a guaranteed driver of purchase intentions. Literature shows that while attractiveness enhances brand image and engagement, it does not always increase purchase intentions (Nurfadilah and Ridanasti, 2023). As a result, it is suggested for online marketers to integrate attractiveness with other factors such as the nature of product endorsement, credibility and expertise of anchor or streamers. Thus, upon appointment, online marketers must ensure their anchors and streamers have interdependent elements such as interactivity, expertise, and attractiveness. Marketers can also leverage the benefits of streamer attractiveness on impulse purchasing by combining promotional strategies, including scarcity and limited-time offers. As pointed out by Miranda et al. (2024), the combination of an attractive streamer and promotional strategies can increase impulse purchases through fostering a sense of urgency.

Anchor or Streamer Professionalism
The literature shows that the anchor or streamer's professionalism has substantial implications for live streaming commerce. Enhancing anchor or streamer professionalism might be one of the strategies that online marketers should consider in improving consumer satisfaction, trust, increasing sales and building customer relationships. According to Lo and Cheng (2023), during a livestreaming session, customers may feel a lack of

interest or confidence in the product or brand if they see the host appear unprofessional or unprepared. Therefore, livestreaming marketers should prioritize hiring professional anchors to enhance consumer engagement and drive sales. Professional anchors not only improve consumer trust and perceived value but also contribute to sustainable customer retention by enhancing the overall flow experience in live broadcast rooms (Qi & Xiaoli, 2024).

Anchor professionalism can be defined as an anchor's level of expertise in communicating knowledge, skills, and experience to livestreaming audiences (Li et al., 2024). Consequently, to demonstrate professionalism, anchors or broadcasters should know how to prioritize their proficiency in communicating product details, knowledge, and experiences. For anchors or streamers to effectively convey their expertise during livestreaming sessions, there are numerous strategies that will be proposed in this article. For example, anchors or streamers must continue to improve their understanding of the product's characteristics and increase their professionalism in recommending it. In addition, they can also expand their interactions with the viewers by using product demonstrations, setting up flash sales, and distributing coupons. Anchors or streamers also may share their personal, industry views or experiences when answering customers' questions to boost their professionalism appeal during a livestreaming session. Additionally, analyzing the common characteristics of viewers in livestreaming can also increase customer trust and impulse buying during a livestreaming session. For instance, if viewers are young women, anchors or streamers can appear more visually appealing, friendly and fashionable to attract these young consumers.

Furthermore, emphasizing anchor or streamer on standards training and development seems very important to enhance the professionalism of anchors and streamers during livestreaming sessions. However, it is important to note here that professionalism is not the only factor influencing consumer behavior in the livestreaming context. Other characteristics should be prioritized such as interactivity, attractiveness, and authority in shaping consumer perceptions and intentions (Zhu et al., 2021). Therefore, in conducting a comprehensive training program for anchors or streamers, the training program should encompass a holistic approach that includes all the important traits needed in a livestreaming environment.

5. Conclusion

In conclusion, professionalism and attractiveness of an anchor or streamer have a significant influence on customer impulse purchase decisions in the livestreaming field. Thus, livestreaming marketers should consider leveraging these elements in the livestreaming operation. Because of the dynamic and interactive livestreaming platform, leveraging these characteristics will also increase customer engagement and boost purchases. Due to numerous advantages, livestreaming marketers can also combine professionalism and attractiveness to establish a compelling presence, thereby fostering impulse purchases on the livestreaming platform. Integration of the attractiveness and professionalism factors is found to contribute to complimentary to one another.

However, despite of advantages offered by professional and attractiveness of the anchor or anchors, many other factors should be prioritized, such as social presence factors (Huo et al., 2023). Social presence factor has been found as one of the factors that has a significant influence on impulse purchase decisions. (Hung et al., 2022; Li et al., 2022). A study by Liu et al. (2023) found that the professionalism of streamers, together with a sense of presence can make the shopping experience more immersive and later influence impulse purchase decisions.

It should also be noted that the effectiveness of professionalism and attractiveness factors may be different based on the cultural and regional bases. It is found in a Thai setting, and the attractiveness of the streamer does not directly influence purchase intention in livestreaming. Factors like trustworthiness and entertainment are among the most important factors that influence purchase intention as studied by (Sawmong, 2022). On the other hand, a study in the context of Chinese livestreaming has also found that attractiveness is not the only factor that contributes to livestreaming success. According to Ye & Krijnen (2024), attractiveness should be combined with expertise and the ability to hold audience attention. In the Malaysian setting, it was also found that attractiveness is not a main factor that influences consumer behavior in livestreaming commerce. Based on a study by Ahmad et al. (2023), an interaction factor and streamer

reliability have a greater impact on impulse buying decisions and consumer trust in livestreaming. Furthermore, even in the context of Chinese showroom livestreaming, success is not guaranteed by attractiveness only. It should be combined with the expertise and ability of the streamer to hold audience attention (Ye & Krijnen, 2024).

Thus, to sum up, it demonstrates that, for livestreaming marketers to flourish in the worldwide livestreaming industry, they must rely not only on the anchor or streamer's attractiveness and professionalism but also on cultural characteristics. Live streaming marketers may have some control over professionalism and attractiveness, but the cultural factor is uncontrollable. Because of this, understanding a country's culture and how attractiveness and professionalism might affect customers' decisions within that country is essential for achieving worldwide success.

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The Impact of Digital Work on Work-Life Balance Among Lecturers in Private Higher Education Institutions in the Klang Valley: A Technology Affordance Perspective

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Abstract: The digital revolution has reshaped higher education, particularly in Malaysia, where work-life balance ranks among the lowest globally. The transformation to digital work has greatly affected both the professional and personal lives of lecturers, raising questions about its broader impact. This study set out to examine how digital work influences work-life balance based on the technology affordances theory and determine whether user experience moderates this relationship. The study, which utilised IBM SPSS, analysed the relationship among five technology affordances (communication, coordination, knowledge sharing, decision-making, and access to resources) and work-life balance, with user experience tested as a potential moderating variable. The results showed that lecturers generally had positive attitudes towards technology affordances, with coordination receiving the highest ratings, followed by decision-making and access to resources. The correlation analysis revealed statistically significant and moderately positive relationships between work-life balance and all five affordances. The regression analysis identified access to resources as the strongest determinant of work-life balance, while coordination and knowledge sharing also had meaningful positive effects. However, communication and decision-making tools made only minimal or statistically insignificant contributions. User experience was not found to moderate the relationship between technology affordances and work-life balance. Overall, this study highlights which technology factors matter most for supporting work-life balance in higher education. It also provides practical recommendations for institutions seeking to improve their digital work environments. The findings emphasise the importance of resource accessibility, user-friendly tool design, and the need for continuous training and a supportive organisational culture.

Keywords: *Digital work, Technology affordance, Coordination, Communication, Knowledge sharing, Decision-making, Access to resources, Work-life balance.*

1. Introduction and Background

The fast pace of digital technologies has significantly transformed the way organisations think about and carry out their work processes (Duan et al., 2022). Current innovative tools such as intelligent systems, large-scale data, connected devices, the Internet of Things (IoT), and other digital platforms, such as Webex and Microsoft Teams, have made off-site and flexible working more possible. This shift has become more important during the COVID-19 pandemic when businesses and educational institutions had little choice but to adopt remote work models to maintain their ongoing business operations (Nagel, 2020). In education, especially, the adoption of digital technologies marked a turning point, whereby virtual teaching and learning became the new norm, which offers new opportunities for student engagement and accessibility (Palumbo et al., 2021; Menon & Suresh, 2022). However, while these technological advancements improved flexibility and efficiency, they also introduced new emerging challenges, especially when it comes to sustaining a realistic balance between professional and private life (Panda & Sahoo, 2021).

A healthy balance between work and personal life is important for psychological health as it promotes career fulfilment and personal harmony (Aruldos et al., 2021; Selim et al., 2024). However, the adoption of digital work removes the boundaries between professional and personal domains, which can consequently lead to work-life conflicts and increased stress related to work. A study found that employees have become more subject to the pressure of continuous connectivity, emotional labour, and constant availability, which contribute to technostress and the phenomenon called "Zoom fatigue" (Duan et al., 2022). In higher education, lecturers have become highly impacted as the shift towards digitalisation has imposed greater responsibilities on them. This compels them to make use of online teaching tools while simultaneously juggling administrative and academic

responsibilities. Although digital tools have been widely adopted in Malaysia, little research has examined how these changes affect lecturers' work-life balance in non-public universities and colleges, especially from a technology affordance perspective (Ramachandaran et al., 2024).

Technology affordance theory provides valuable insights to understand this issue, suggesting that the features of digital tools shape user interactions and the outcomes that they experience (Zhao and Wagner, 2023). These affordances, such as information, interaction, and navigation, play a central role in shaping activities like communication, decision-making, and the sharing of knowledge (Shao et al., 2020). While digital tools offer a number of affordances that can enhance professional efficiency, they can potentially eliminate the distinction between professional and personal life, which raises questions about their implications on the well-being of workers (Bobsin et al., 2018). Thus, this study applied the technology affordance framework to explore how digital work impacts work-life balance among lecturers in private universities and colleges within the Klang Valley.

Malaysia has been ranked among the lowest by global standards and the growth of digitalisation has further added pressure on personal time (Drzewinski, 2023). In education, online work has amplified workload expectations for lecturers who need to simultaneously navigate online teaching, student engagement, and administrative duties remotely (Wong et al, 2023). Many educators report challenges in keeping their personal and professional lives apart, which eventually leads to heightened stress and reduced job satisfaction. Even with the increasing number of studies on work-life balance within Malaysian higher education institutions, most studies only focus on public institutions and offer limited insights into private institutions, especially in relation to the role of digital technologies (Husin et al., 2018; Lee, 2018).

This study aims to address the aforementioned gaps by evaluating how digital work affects work-life balance through the utilisation of technology affordance theory. It focuses on five key affordances (coordination, communication, decision-making, knowledge sharing, and resource access) to determine their influence on lecturers' work-life dynamics. Furthermore, it explores the moderating role of user experience in shaping these relationships. By addressing these aspects, this study seeks to contribute to developing strategic policies and institutional standards that foster a healthier work-life balance in the digital era, ensuring that the integration of technology enhances productivity without compromising employee well-being.

Research Questions

- What is the perceived implication of technology affordance for coordination on work-life balance?
- What is the perceived implication of technology affordance for communication on work-life balance?
- What is the perceived implication of technology affordance for knowledge sharing on work-life balance?
- What is the perceived implication of technology affordance for decision-making on work-life balance?
- What is the perceived implication of technology affordance for access to resources on work-life balance?
- How does user experience moderate the relationships between the five technology affordances and work-life balance?

Research Objectives

- To examine the perceived influence of technology affordances on the work-life balance of employees engaged in digital work within the private higher education sector.
- To investigate how technology affordances relate to work-life balance in digital work settings, with user experience functioning as a moderating variable.

2. Literature Review

Work-life balance (WLB) reflects a person's capacity to ensure a healthy balance between work duties, family obligations, and private life, in a way that fosters overall well-being (Aruldos et al., 2021; Aman-Ullah et al., 2022). However, the growth of digital work, which evolves from traditional telework to flexible off-site work models, has blurred the line between career and private duties (Duan et al., 2022; Ruiner & Klumpp, 2022). To

address this issue, technology affordance theory offers a meaningful framework to explore how digital tools influence work-life balance, especially through five core affordances, which are coordination, communication, knowledge sharing, decision-making, and access to resources (Azizi et al., 2022; Shao et al., 2020). In this study, these five affordances are conceptualised as independent variables, while work-life balance is the dependent variable and user experiences, on the other hand, act as the moderating variable.

Technology Affordance for Coordination

Coordination affordance refers to how digital technologies assist individuals in organising tasks and collaborating more effectively, especially in the context of working from home (Bobsin et al., 2018; Duan et al., 2022). In education settings, lecturers adapt their pedagogical approaches by incorporating digital tools that support the coordination of academic responsibilities and the sharing of knowledge (Menon & Suresh, 2022). Coordination is important for certain tasks that require a high degree of interdependence among colleagues. Digital tools can help reduce challenges associated with distributed teams, such as diminished trust, limited knowledge exchange, and increased interpersonal conflict (Jamal et al., 2021). A number of studies have proven that digital technologies can enhance work coordination by fostering better flexibility, mobility, and the sharing of knowledge, which in turn can influence work-life balance in a positive manner (Chen et al., 2019; Deng et al., 2023). By making it easier for employees to balance professional obligations with personal duties, digital tools are capable of supporting better work-life balance (Duan et al., 2022). Accordingly, the first hypothesis (**H1)** of this study is proposed as follows:

H1: The availability and use of technology affordance for coordination in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.

Technology Affordance for Communication

Communication affordance refers to how digital technologies can assist in enabling the exchange of information and interpersonal interaction, which can consequently strengthen communication across both personal and professional domains (Duan et al., 2022). In the educational context, these technologies improve engagement between teachers and students as well as support engaging learning environments (Menon & Suresh, 2022). In the work environment, they facilitate real-time connectivity and support the process of decision-making among employees (Panda & Sahoo, 2021). Moreover, with the growing availability and use of mobile devices and high-speed internet, workers can balance their work and personal responsibilities with improved flexibility, but these tools may diminish the boundaries between work and personal life (Alwis et al., 2022). When used effectively, communication technologies can fix and strengthen team collaboration and employee satisfaction, which in turn may contribute to improved work-life balance (Shipman et al., 2023). Based on these insights, the second hypothesis (**H2**) of this study is proposed as follows:

H2: The availability and use of technology affordance for communication in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.

Technology Affordance for Knowledge Sharing

Knowledge sharing involves the exchange of task-related information and proficiency to help individuals solve issues, generate ideas, as well as work together more effectively (Duan et al., 2022). Digital technologies, especially social media and online platforms, are capable of facilitating knowledge sharing by connecting people and organisations, promoting creativity, and improving collaboration among employees (Bobsin et al., 2018; Prata-Linhares et al., 2023). The shift to digital platforms during the COVID-19 pandemic emphasised the essential role of these technologies in transforming how knowledge is shared in the education sector and beyond (Khaleghi et al., 2022). Digital tools can help enhance the speed and effectiveness of the transfer of knowledge and subsequently assist organisations to improve the quality of work among their employees (Deng et al., 2023). Additionally, these technologies support autonomy and collaboration, which can help improve work-life balance by enabling individuals to coordinate their professional and personal responsibilities more effectively (Duan et al., 2022; Kalra & Baral, 2020). Drawing on the aforementioned findings, the third hypothesis (**H3**) of this study is proposed as follows:

H3: The availability and use of technology affordance for knowledge sharing in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.

Technology Affordance for Decision Making

Decision-making affordance places emphasis on the role of digital tools in supporting informed decision-

making by providing users with the right tools and information to analyse data, evaluate alternatives, and make reasonable decisions (Duan et al., 2022). In higher education, technologies like social media and remote tools (e.g., Zoom, Webex, Microsoft Teams) play an important role in decision-making processes, especially during the shift to digital operations (Marcinkevicius & Vilkas, 2023). These tools allow for hierarchical decision-making, assist in collaborative input, and streamline the dissemination of information (Freeman et al., 2021). Meanwhile, in business settings, digital applications such as issue management systems and business intelligence platforms help businesses enhance decision-making by integrating data analysis and supporting data-driven practices, thereby reducing reliance on intuition solely (Wang et al., 2020). Hence, the fourth hypothesis (**H4)** is proposed as follows:

H4: The availability and use of technology affordance for decision-making in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.

Technology Affordance for Accessing the Resources

Affordable technology makes it convenient for organisations to get access to both internal and external resources, which enables them to reach broader audiences and helps achieve their goals (Bobsin et al., 2018). In the education sector, technological developments provide students and lecturers more opportunities to use learning materials beyond their local contexts (Menon & Suresh, 2022). However, the effectiveness of these technologies likely depends heavily on their appropriate utilisation, whereby misuse and underuse of the technologies may hinder their intended benefits (Jain & Jain, 2022). Technology also serves an important role in enabling remote work by providing access to files, facilitating communication, and managing resources (Jamal et al., 2021). Studies indicate that access to digital resources can improve productivity, performance, and job satisfaction, but excessive reliance on such tools may also lead to fragmentation of work and increased stress (Cochis et al., 2020). When applied effectively, digital tools may provide greater flexibility, accelerate access to resources, and promote a healthier work-life balance. Accordingly, the fifth hypothesis **(H5)** of this study is formulated as follows:

H5: The availability and use of technology affordance for access to resources in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.

The Moderating Effect of User Experience Level

User experience serves as an important moderating factor in the relationship linking technology affordances and perceived satisfaction, as prior experience tends to make individuals more responsive to system functionality and service quality (Shao et al., 2020). Zhao and Wagner (2023) argued that cognitive responses to technology are shaped by user experience. This finding aligns with the results by Prata-Linhares et al. (2023), who demonstrated that hands-on and meaningful learning experiences can help enhance individual growth. Furthermore, the adaptation level theory further suggests that as individuals gain experience, their reactions to technology tend to evolve (Zhao & Wagner, 2023). Previous studies also demonstrate that user experience strongly influences how individuals perceive the quality and usefulness of technological systems (Shao et al., 2020). Consequently, this evidence implies that the user experience factor is critical in determining how the identified technology affordances affect work-life balance. This leads to the formulation of the sixth hypothesis **(H6)** of this study:

H6$_a$: User experience is positively associated with technology affordance for coordination in supporting work-life balance.

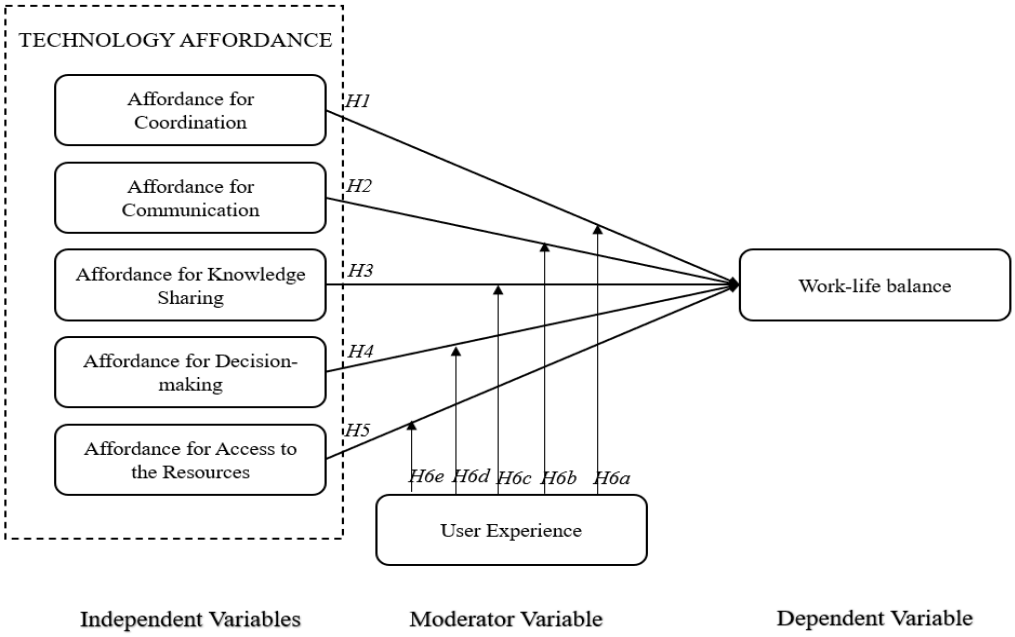
H6$_b$: User experience is positively associated with technology affordance for communication in supporting work-life balance.

H6$_c$: User experience is positively associated with technology affordance for knowledge sharing in supporting work-life balance.

H6$_d$: User experience is positively associated with technology affordance for decision-making in supporting work-life balance.

H6$_e$: User experience is positively associated with technology affordance for accessing resources in supporting work-life balance.

Figure 1: The Research Framework



3. Research Methodology

This study used a quantitative survey approach to investigate how digital work affects work-life balance among lecturers in private universities and colleges in the Klang Valley. This method was chosen as it facilitated the collection of empirical data to confirm the relationships identified in the literature. The study focused on lecturers from private universities and colleges, with an estimated population of 10,500 individuals. A technique named purposive sampling was employed to identify and select respondents who fulfilled specific inclusion criteria. To ensure statistical adequacy, the G*Power software was utilised to determine the minimum required sample size of 118 respondents. The individual lecturer served as the unit of analysis, which aligns with the study's objective of understanding personal experiences of work-life balance.

Data collection was carried out using a structured questionnaire, which is divided into four sections that cover demographics, technology affordances, work-life balance, and user experience. A five-point Likert scale was employed to measure all responses. The Statistical Package for the Social Sciences Version 26 (SPSS 26) was used to analyse the related data through multiple regression techniques, which align with the study's purpose of exploring the relationships between variables. The hypotheses were tested through multiple regression analysis. Table 1 describes a summary of the analysis of data corresponding to the study's research questions.

Table 1: Summary of Data Analysis

Research Question	Section from questionnaire	Data Analysis
RQ1: What is the perceived implication of technology affordance for coordination on work-life balance?	Section B1: Technology Affordance for Coordination Section C: Work-Life Balance	**Descriptive Analysis** **Pearson Correlation Analysis** **Multiple Regression Analysis**
RQ2: What is the perceived implication of technology affordance for communication on work-life balance?	Section B2: Technology Affordance for Communication Section C: Work-Life Balance	**Descriptive Analysis** **Pearson Correlation Analysis** **Multiple Regression Analysis**
RQ3: What is the perceived implication of technology	Section B3: Technology Affordance for Knowledge Sharing	**Descriptive Analysis** **Pearson Correlation**

affordance for knowledge sharing on work-life balance?	Section C: Work-Life Balance	**Analysis** **Multiple Regression Analysis**
RQ4: What is the perceived implication of technology affordance for decision-making on work-life balance?	Section B4: Technology Affordance for Decision-Making Section C: Work-Life Balance	**Descriptive Analysis** **Pearson Correlation Analysis** **Multiple Regression Analysis**
RQ5: What is the perceived implication of technology affordance for access to resources on work-life balance?	Section B5: Technology Affordance for Access to Resources Section C: Work-Life Balance	**Descriptive Analysis** **Pearson Correlation Analysis** **Multiple Regression Analysis**
RQ6: How does user experience moderate the relationships between the five technology affordances and work-life balance?	**Section B: Technology Affordance** **Section C: Work-Life Balance** **Section D: User-Experiences**	**Multiple Regression (Hierarchical) Interaction Analysis**

Pre-test

A pre-test has been conducted to assess the clarity and reliability of the survey instrument before being distributed. The pre-testing process involved two academic experts and three industry professionals who reviewed the instrument for comprehensibility and relevance. Content and face validity were established through evaluations by five subject matter experts, while reliability was assessed by employing Cronbach's alpha.

4. Results

The study targeted 118 lecturers from non-public universities and colleges in the Klang Valley, with the questionnaire distributed through email, messaging applications, and social media platforms between 9 October and 22 December 2024, which yielded 155 responses. To ensure data accuracy, a filtering process was employed to exclude nine irrelevant responses, followed by data cleaning to address issues, such as missing values, straight-lining, and outliers. No missing data were identified; however, two responses exhibiting straight-lining and two statistical outliers were removed. The final sample size comprised 142 valid responses, exceeding the minimum required sample size of 118.

Means and Standard Deviations after Factor Analysis

Table 2 illustrates both means and standard deviations for all variables. The independent variables, which represent the technology affordance, include coordination, communication, sharing of knowledge, decision-making, and access to resources. Work-life balance acts as the determining dependent variable.

Table 2: **The Means and Standard Deviations**

No.	Variables	N	Mean	Standard Deviation
Independent Variables				
1	Coordination	142	4.32	0.93
2	Communication	142	3.93	0.61
3	Knowledge Sharing	142	4.18	0.52
4	Decision-Making	142	4.27	0.55
5	Access to Resources	142	4.21	0.59
Dependent Variable				
1	Work-Life Balance	142	3.81	0.93

As seen in Table 2, the descriptive analysis showed that respondents reported a moderate level of work-life balance (mean = 3.82, SD = 0.93). Among the five technology affordances, coordination obtained the leading

mean score (mean = 4.32, SD = 0.61), followed by decision-making (mean = 4.27, SD = 0.59), access to resources (mean = 4.21, SD = 0.63), and knowledge sharing (mean = 4.18, SD = 0.55). Communication was rated the lowest (mean = 4.18, SD = 0.52), despite receiving a positive rating. These results indicate that respondents generally perceive a substantial level of technology affordances in their work environments, with coordination being the most valued dimension.

Normality test

Table 3 summarises the factor analysis results, including the normality score for each variable. The results show that all variables are normally distributed, with skewness values falling between -2 to +2 and kurtosis values ranging between -7 and +7.

Table 3: Normality assessment of variables following Factor Analysis

No.	Variables	Skewness	Kurtosis
	Independent Variables		
1	Coordination	-1.248	4.638
2	Communication	-0.1	0.376
3	Knowledge Sharing	-0.232	-0.268
4	Decision-Making	-0.774	2.071
5	Access to Resources	-0.737	1.291
	Dependent Variable		
1	Work-Life Balance	-0.675	-0.527
	Moderator Variable		
1	User Experiences	-1.296	5.116
	Standard Error	**0.203**	**0.404**

Reliability after Factor Analysis

Reliability refers to the consistency of observations, either across different observers or over repeated instances. In this study, reliability was evaluated with Cronbach's alpha, which measures how consistently items within a scale are related to one another. A higher alpha score indicates stronger reliability: above 0.9 is excellent, 0.8 to 0.9 very good, 0.7 to 0.8 good, 0.6 to 0.7 moderate, and below 0.6 poor.

Table 4: Reliability Analysis following Factor Analysis (n=142)

No.	Variables	Number of Items	Cronbach's Alpha from the actual study (n=142)
	Independent Variables		
1	Coordination	4	0.887
2	Communication	6	0.658
3	Knowledge Sharing	5	0.739
4	Decision-Making	4	0.857
5	Access to Resources	4	0.838
	Dependent Variable		
1	Work-Life Balance	2	0.799
	Moderator Variable		
1	User Experience	4	0.883

The reliability analysis using Cronbach's alpha illustrated that most dimensions exhibited good to very good internal consistency. The affordance for coordination (α = .887), decision-making (α = .857), access to resources (α = .838), and user experience (α = .883) exhibited very good reliability. Meanwhile, knowledge sharing (α = .739) and work-life balance (α = .799) exhibited good reliability, with certain items removed to improve consistency. Communication (α = .658) showed moderate reliability. Overall, the results demonstrated acceptable to excellent reliability levels.

Pearson Correlation Analysis

Table 5 illustrates the Pearson correlation analysis results between the independent variables (coordination, communication, knowledge sharing, decision-making, and resource access) and the dependent variable (work-life balance). This analysis was carried out to explore the magnitude and direction of the relationships between the variables. The findings shed light on how these affordances affect the work-life balance of lecturers in private universities and colleges.

Table 5: Pearson Correlation Analysis

Correlations						
	WLB	**CD**	**CM**	**KS**	**DM**	**AR**
Work-life Balance **(WLB)**	1					
Coordination **(CD)**	.456**	1				
Communication **(CM)**	.430**	.593**	1			
Knowledge Sharing **(KS)**	.438**	.574**	.625**	1		
Decision-Making **(DM)**	.386**	.711**	.653**	.608**	1	
Access to Resources **(AR)**	.480**	.599**	.525**	.490**	.701**	1
**. Correlation is significant at the 0.01 level (2-tailed).						

Multiple Regression Analysis

As shown in Table 6, the multiple regression analysis illustrated the link between work-life balance and the five identified technology affordances.

Table 6: Multiple Regression Analysis

Independent Variables	Standard Coefficients Beta	t	Sig.
Coordination	0.208	1.946	0.054
Communication	0.15	1.466	0.145
Knowledge Sharing	0.188	1.919	0.057
Decision-Making	-0.203	-1.637	0.104
Access to Resources	0.327	3.214	0.002
R Square	0.32		
F	12.798		
Sign. of F Value	<0.01		
df	5		
	136		
Durbin Watson	2.049		

The multiple regression analysis illustrated in Table 6 showed that the model accounted for 32.0% of the variance in work-life balance (R^2 = .320), which reflects a moderate level of explanatory power. The model was statistically significant, as shown by the F-statistic (F = 12.798, p < 0.01), which indicates that the independent variables collectively contribute meaningfully to variations in work-life balance among respondents. Furthermore, the Durbin-Watson statistic (2.049) showed that the residuals did not exhibit serious autocorrelation.

Among the five technology affordance variables, access to resources (β = .327, t = 3.214, p = .002) was identified as the strongest and most significant predictor of work-life balance. This result highlights the critical role of digital tools that facilitate timely and efficient access to essential resources in promoting a healthier work-life balance for lecturers engaged in digital work environments. Coordination (β = .208, t = 1.946, p = .054) showed a marginally significant positive association with work-life balance. This suggests that digital tools supporting task coordination may contribute positively to work-life balance, although the result is slightly above the conventional significance threshold.

Similarly, knowledge sharing (β = .188, t = 1.919, p = .057) also displayed a marginally significant positive effect, implying that platforms enabling effective knowledge dissemination may ease workload pressures and support better work-life harmony, despite the p-value exceeding the typical cut-off for significance. On the other hand, technology affordance for communication (β = .150, t = 1.466, p = .145) and decision-making (β = –.203, t =

−1.637, p = .104) were not statistically significant. The negative beta value for decision-making affordance suggests a potential inverse relationship with work-life balance, implying that certain decision-making technologies may contribute to increased work complexity. However, this result warrants further investigation.

Hierarchical Regression Analysis

This study investigates the relationship between technology affordances and work-life balance, with particular attention to user experience as the moderating variable. Table 7 illustrates the analysis of the hierarchical linear regression model to answer Research Question 6, which examines how user experience affects the relationship between all key technology affordances and work-life balance.

Table 7: Hierarchical Regression Analysis

Model	Predictor Variables	R^2	ΔR^2	F Change	β Coefficients	t-values	p-values
6	Coordination	.323	0.003	0.123	0.219	1.833	0.069
	Communication				0.139	1.247	0.215
	Knowledge Sharing				0.193	1.737	0.085
	Decision-Making				-0.194	-1.474	0.143
	Access to Resources				0.329	3.013	0.003
	User Experiences X Coordination				0.224	0.736	0.463
	User Experiences X Communication				-0.2	-0.099	0.921
	User Experiences X Knowledge Sharing				0.019	0.237	0.813
	User Experiences X Decision-Making				-0.142	-0.41	0.683
	User Experiences X Access to Resources				-0.044	-0.172	0.864

The study analysed user experience variables and their interaction with technology affordances (coordination, communication, knowledge sharing, decision-making, and access to resources) to predict work-life balance. The results showed no significant increase in the explained variance, suggesting that 32.3% of the variation in perceived work-life balance is explained by the combined effects of technology affordances and user experience interaction terms. Coordination affordance showed a marginally significant effect, while knowledge sharing affordance exhibited a borderline significance. Access to resources was the strongest significant predictor, while communication was non-significant. User experience did not significantly moderate any of the relationships between individual technology affordances and work-life balance. These findings point out that while technology features, like collaboration, knowledge sharing, and access to resources, are influential, user experience does not amplify their effects on work-life balance as hypothesized. This contradicts the proposed hypothesis and points to the need for further investigation into how user experience interacts with digital tools in academic settings. Further research is required to understand the role of user experience in this particular context.

Discussion

The Pearson correlation analysis, as illustrated in Table 5, revealed several significant positive associations between technology affordances and work-life balance, with all correlations statistically significant at the 0.01 level ($p < .001$). Among the five technology affordances examined, access to resources demonstrated the strongest correlation with work-life balance ($r = .480$), indicating a moderate positive relationship. This finding underscores the critical role of technological access to essential resources in supporting lecturers' ability to manage both their professional and personal responsibilities.

Technology affordance for coordination also exhibited a moderate positive correlation ($r = .456$), suggesting that improved technological coordination mechanisms are associated with enhanced work-life balance. Similarly, knowledge sharing ($r = .438$), communication ($r = .430$), and decision-making ($r = .386$) affordances displayed moderate positive correlations with work-life balance. Although slightly weaker, these relationships indicate that digital tools facilitating information exchange, communication, and decision-making contribute positively to maintaining a healthy work-life equilibrium.

In contrast, the multiple regression analysis, as shown in Table 6, refined these findings by identifying which technology affordances significantly predicted work-life balance when the effects of other variables were controlled. The regression model explained 32.0% of the variance in work-life balance (R^2 = .320), and was statistically significant (F = 12.798, p < .01), suggesting a meaningful collective impact of the independent variables. Notably, access to resources (β = .327, p = .002) emerged as the most significant predictor, highlighting the importance of resource availability in digital work environments among lecturers. Coordination (β = .208, p = .054) and knowledge sharing (β = .188, p = .057) exhibited marginal significance, indicating a possible positive effect that warrants further exploration. Meanwhile, communication (β = .150, p = .145) and decision-making (β = −.203, p = .104) were not statistically significant predictors, with the latter even suggesting a potential negative association.

These findings align with Duan et al. (2023), who reported that coordination and knowledge sharing affordances were significantly related to improved work-life balance and job performance, while communication and decision-making affordances showed no significant effects in their regression model. Similarly, Gupta et al. (2024) emphasised that streamlined and coordinated access to digital resources, particularly for administrative tasks, plays an important role in reducing workload and supporting work-life balance among lecturers. This shows how important resource access is as an important technological affordance in academic settings.

Additionally, Fadhil et al. (2023) highlighted that the lack of defined boundaries when utilising digital tools can affect lecturers in a negative manner, especially women, by allowing professional duties to interfere with their personal time. This may explain why some affordances, like communication and decision-making, demonstrated non-significant or marginal effects in the regression results. Similarly, Alhosani et al. (2023) added that although technology affordances can create new opportunities for teaching and flexibility, their effectiveness may likely depend on organisational support and infrastructure availability. These contextual factors likely shape the strength of each affordance's contribution to work-life balance. In addition, Gorrell (2023) emphasised that the rapid digital transformation in higher education has led to growing technostress among academic staff. The increased cognitive and emotional demands may undermine the anticipated benefits of affordances like communication and decision-making, which could explain their limited predictive value.

Overall, the analyses illustrate that all five technology affordances are positively connected to work-life balance when looking at the correlational level. However, only access to resources demonstrated a strong predictive effect in the regression model. These findings suggest that although various technological features are able to support work-life balance, access to essential digital resources is very impactful and meaningful. The findings also imply that the impact of coordination, communication, and decision-making tools may depend more heavily on contexts. This warrants the need for further research to understand the organisational and individual factors that may mediate or moderate these relationships. In practice, higher education institutions should prioritise the adoption of technologies that support both access to resources and knowledge-sharing processes to promote a healthier work-life balance for academic staff.

Summary of Hypotheses

The hypotheses in this study have been designed to explore the relationship between the availability and utilisation of the aforementioned technology affordances in the workplace and work-life balance perceptions among individuals. The analysis used both Pearson's correlation and multiple regression methods to figure out the significance of these relationships. A summary of the hypotheses is provided in Table 8.

Table 8: **Summary of Hypotheses**

H	Hypotheses	Result
H1	The availability and use of technology affordance for coordination in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.	Accepted
H2	The availability and use of technology affordance for communication in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.	Rejected

H3	The availability and use of technology affordance for knowledge sharing in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.	Accepted
H4	The availability and use of technology affordance for decision-making in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.	Rejected
H5	The availability and use of technology affordance for access to resources in the work environment may have a positive and significant association with individuals' perceptions of work-life balance.	Accepted
$H6_a$	User experience is positively associated with technology affordance for coordination in supporting work-life balance.	Rejected
$H6_b$	User experience is positively associated with technology affordance for communication in supporting work-life balance.	Rejected
$H6_c$	User experience is positively associated with technology affordance for knowledge sharing in supporting work-life balance.	Rejected
$H6_d$	User experience is positively associated with technology affordance for decision-making in supporting work-life balance.	Rejected
$H6_e$	User experience is positively associated with technology affordance for accessing resources in supporting work-life balance.	Rejected

5. Managerial Implications and Recommendations

This study, which aimed at exploring the association between technology affordances and work-life balance has generated several directions for future studies. The analysis revealed that user experience did not have a significant effect on the association between technology affordances and work-life balance. Future research should therefore examine other possible moderators and mediators, including organisational culture, workload demands, and personal differences, to gain a clearer understanding of the factors that shape this relationship.

Moreover, it is also important to explore the potential negative impacts of digital work environments on academic staff. Variables, such as technostress and boundary blurring, may interact with technology affordances in ways that affect work-life balance. Looking at these negative effects may offer a broader picture of how digital tools impact lecturers' overall well-being.

The current study focused exclusively on lecturers from private higher education institutions within the Klang Valley region of Malaysia. Future research should expand the scope to include different professional sectors and regions to explore whether the findings hold across various occupational, cultural, economic, and institutional contexts. Comparative studies between public and private higher education institutions may also reveal distinct patterns in how technology affordances affect work-life balance. Future research that addresses these gaps can help strengthen both theory and practice in using technology affordances to promote a healthier and balanced digital work environment.

Conclusion

This study investigates how digital work influences the work-life balance of lecturers across private universities and colleges in the Klang Valley region of Malaysia. It focuses on five key technology affordances: coordination, communication, knowledge sharing, decision-making, and access to resources. The results show that access to resources is the most significant predictor of work-life balance, demonstrating a strong positive relationship. Coordination and knowledge sharing exhibit marginally significant positive effects, while communication and decision-making do not show a statistically strong influence on work-life balance. Furthermore, this study reveals that user experience did not exhibit a moderating role in the relationships between these affordances and work-life balance.

The findings contribute to the technology affordances framework by identifying the most critical technology affordances influencing work-life balance in higher education settings. They also challenge assumptions about the role of user experience and draw attention to the organisational and contextual factors that shape how

digital tools are utilised. On a practical level, the study offers clear guidance for higher education institutions, which are to prioritise access to resources, design user-friendly tools, offer sufficient training and support, and cultivate a supportive organisational culture to promote a healthier work-life balance. Despite its contributions, the study is not without limitations. Future research should put more emphasis on examining other moderating and mediating factors, such as technostress, as well as exploring different professional contexts, regional settings, and the interrelationships among affordances. Overall, this study reinforces the important role of technology affordances in influencing work-life balance and offers significant insights for researchers and practitioners in the field of digital work and organisational well-being.

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The Relationship between Role Ambiguity and Burnout in Malaysia's Public Healthcare Sector: A Quantitative Study of Medical Doctors

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Abstract: Medical doctors in Malaysia's public healthcare system frequently contend with excessive workloads, unclear expectations, and competing responsibilities. These workplace conditions can lead to role stressors, which are significantly correlated with burnout. Burnout, in turn, may negatively affect not only the medical doctors' mental health but also the quality of patient care. Despite growing concerns, empirical research on the link between role stressors, specifically role ambiguity and burnout among Malaysian public healthcare doctors remains limited. This study aims to address the gap by examining the relationship using a quantitative approach. This quantitative study employed a cross-sectional survey design involving 471 medical doctors from public hospitals across Malaysia. Standardized instruments were used to measure role (using the Role Stressor Scale) and burnout (using the Maslach Burnout Inventory). Data were analyzed using SPSS and PLS-SEM, employing descriptive statistics, correlation analysis, and multiple regression to examine the strength and direction of the relationships between variables. A total of 471 medical doctors from eight state hospitals across Malaysia participated in the study, representing various grades and clinical departments. The measurement model demonstrated good convergent and internal reliability, with all constructs exceeding recommended thresholds (Average Variance Extracted [AVE] > 0.50 and Composite Reliability [CR] > 0.70). Structural model analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM) revealed that role ambiguity significantly influenced burnout. Bootstrapping with 5,000 resamples confirmed the significance of the path from role ambiguity to burnout, with a path coefficient of 0.147 and a t-value of 4.207. The findings point to a clear link between role ambiguity and burnout among medical doctors in Malaysia's public healthcare sector. This highlights the need for practical organisational efforts such as providing clearer job descriptions, ensuring balanced workloads, and offering effective stress management support. Tackling role-related stress not only supports the mental well-being of healthcare professionals but also helps strengthen the overall quality of care delivered to patients.

Keywords: *Role ambiguity, burnout, Peninsular Malaysia, state hospitals, medical doctors, PLS-SEM*

1. Introduction and Background

Burnout is no longer a new phenomenon within the healthcare system. Cases continue to rise steadily, posing a significant impact, particularly on frontliners and healthcare professionals. Globally, the effects of burnout are evident. For instance, in China, Yuan et al. (2023) and Wang et al. (2024) found that work-related stress not only reduced the quality of care provided but also increased healthcare professionals' intention to leave their jobs due to burnout. The results indicate that burnout affects healthcare professionals regardless of age, gender, marital status, length of service, or departmental placement (Lee, Sim, & Tuckey, 2024). This suggests that the negative effects of burnout can occur across all levels of employment within the healthcare system. Moreover, this issue is not limited to developed countries; it also poses a significant challenge in developing nations, irrespective of their technological capabilities or healthcare infrastructure.

As a developing country, Malaysia's healthcare system has played a pivotal role in enhancing the quality of health services. In the Malaysian context, primary care doctors, including general practitioners (GPs), medical officers (MOs), and family medicine specialists, serve as the main providers of general medical care to patients. These professionals are often burdened with substantial workloads and responsibilities, which contribute to prolonged occupational stress. Such stress has been linked to negative outcomes, including work delays, absenteeism, hypertension, musculoskeletal disorders, and cardiovascular conditions (Shahrudin et al., 2025). Efforts to enhance the quality of health services have encountered several challenges. However, emerging

evidence from Huang et al. (2024), Mohd Yunus and Mahajar (2015) and Sulaiman et al. (2023) suggests that the healthcare system is gradually addressing these barriers. Despite these improvements, one critical issue remains unresolved: the well-being of healthcare professionals continues to be at risk, with burnout emerging as a significant and ongoing concern. (Ali et al., 2021).

According to Yusof and Zolkefley (2024), nearly one-third of medical officers employed in public hospitals in Malaysia are experiencing symptoms of depression and anxiety. These mental health outcomes have been strongly associated with burnout, which is predominantly attributed to prolonged exposure to role-related stressors, specifically, role ambiguity, role conflict, and role overload. (Fadli et al., 2024; Zakaria et al., 2021). According to a report by *Free Malaysia Today*, approximately 67 percent of Malaysian workers are experiencing severe levels of burnout, primarily attributed to long working hours and a lack of work-life balance. (Ismail & Qi, 2025; Ragu, 2024). Such role stressors impose excessive psychological and emotional demands on healthcare professionals, fostering persistent uncertainty, incompatible job expectations, and overwhelming workloads. Collectively, these factors substantially elevate the risk of burnout among medical personnel (Ali, N. et al., 2021; Sinnathamby et al., 2025). Furthermore, the implications of burnout extend beyond mere physical exhaustion and diminished occupational performance (Lee et al., 2025). When inadequately managed, burnout may progress into more severe psychological conditions, including clinical depression and anxiety disorders. These mental health issues not only undermine the overall well-being of healthcare providers but also compromise essential cognitive functions such as clinical judgment and decision-making. As a result, burnout poses a direct threat to the quality and safety of patient care, underscoring the urgent need for systemic.

Although burnout among healthcare professionals has been widely studied globally, the specific contribution of individual role stressors, particularly role ambiguity, remains insufficiently explored within the Malaysian public healthcare context. Most local studies on burnout have primarily focused on broader organizational or emotional demands, often giving limited attention to the specific impact of unclear job roles and expectations. Majid, Roslan, and Suryanto (2024) identified several organizational factors contributing to burnout among nurses in Malaysian public hospitals; however, role ambiguity was only briefly mentioned and not explored as an independent variable. Similarly, Mohamed (2025) investigated role ambiguity among healthcare professionals but focused primarily on its relationship with alienation rather than burnout. This limited attention to the direct pathway between role ambiguity and burnout highlights a crucial research gap, especially given the growing complexity and fluidity of roles in Malaysia's public healthcare system. Addressing this gap is essential for targeted interventions and more nuanced human resource management practices. Therefore, this study aims to quantitatively examine the direct relationship between role ambiguity and burnout among medical doctors in Malaysia's public healthcare sector, to provide clearer insights into the underlying factors contributing to this ongoing issue.

2. Literature Review

Role ambiguity: According to House and Rizzo (1972) and Rizzo, House, and Lirtzman (1970) defined role ambiguity as the clarity of the individuals who possess the roles that require them to perform appropriately, in which they are particular about their duties, authority, time allocation, relationship with others, and ability to predict sanctions as they clearly understand their roles that direct them to behave accordingly. In layperson's terms, role ambiguity has been illustrated as a degree of individual insecurity in job anticipation (Akanji, 2012; Ferro et al., 2024; Tharmalingam & Bhatti, 2014). Role ambiguity occurs in several conditions. First, role ambiguity happens if the job is vague when employees conduct their work due to uncertainty about their roles on how to complete the task, such as they have insufficient information on how to do it. Another role ambiguity situation is where they cannot predict or evaluate their responsibility when performing their roles. Various research shows a positive relationship between role ambiguity and the health of employees (Alyahya et al., 2021; Faraji et al., 2019; Ferro et al., 2024). Therefore, role ambiguity affects an employee during their job performance by creating dissatisfaction, nervousness, worry, anxiety, distorted reality, and extra concerns. Consequently, they will perform less, henceforth jeopardizing their health status, such as burnout (House & Rizzo, 1972; Maisonneuve et al., 2024; Rizzo et al., 1970; Tharmalingam & Bhatti, 2014; Wen et al., 2020). Evidence-based samples among healthcare professionals indicate those burnout symptoms are more likely to emerge when role ambiguity is excessive (Huang et al., 2024). Specifically, a survey of 148 Australian

salespeople who directly interacted with clients experienced burnout when role ambiguity was high. Other studies confirm that professionals who provide service to others tend to experience burnout over time due to role ambiguity (Fadli et al., 2024; Peiro et al., 2001; Putri et al., 2025; Yunus & Mahajar, 2015; Zohar, 1997). Therefore, the following hypothesis is proposed:
H1: There is a positive relationship between role ambiguity and burnout

3. Research Methodology

This study employed a quantitative, cross-sectional research design to examine the direct relationship between role ambiguity and burnout among medical doctors in Malaysia's public healthcare sector. A purposive sampling technique was used to ensure the selection of respondents with relevant exposure to occupational stressors in clinical settings. The target population consisted of medical doctors serving in six clinical departments, such as general medicine, orthopaedic, O&G, general surgery, paediatric and emergency medicine across twelve state hospitals located in Peninsular Malaysia. The sample included medical doctors from various job grades, ranging from UD41 to UD56, to capture diverse experiences and responsibilities associated with different career levels. A total of 997 structured questionnaires were distributed to potential respondents. Data were collected using a self-administered questionnaire, comprising items adapted from validated instruments. The construct of role ambiguity was measured using the scale developed by Rizzo, House, and Lirtzman (1970). The role ambiguity scale consists of 6 items, each rated on a seven-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Sample items include: *"I do not have clear, planned goals and objectives for my job", "I do not know that U have divided my time properly", "I do not know that U have divided my time properly", "I do not know that U have divided my time properly", "I do not know what my responsibilities are", "I do not know exactly what is expected from me", "I do not feel certain about how much authority I have done on the job", and "The explanation is not clear of what has to be done."* The internal consistency reliability of the role ambiguity scale in this study was measured using Cronbach's alpha, yielding a value of 0.87, indicating high reliability.

The construct of burnout was assessed using the abbreviated version of the Maslach Burnout Inventory (aMBI) by McManus, Winder and Gordon (2002) It is specifically designed to measure burnout among professionals in human service and healthcare settings. The instrument consists of 9 items grouped into three dimensions: Emotional Exhaustion (3 items), Depersonalization (3 items), and Personal Accomplishment (3 items). Respondents rated each item on a seven-point Likert scale ranging from 1 "Never" to 7 "Every day", reflecting the frequency with which they experienced each described condition. Sample items include *"I feel emotionally drained from my work"* (Emotional Exhaustion), *"I feel I treat some patients as if they were impersonal objects"* (Depersonalization), and *"I have accomplished many worthwhile things in this job"* (Personal Accomplishment). In the present study, the aMBI demonstrated high internal consistency, with Cronbach's alpha coefficients of 0.87.

SPSS Version 26 was used to compute descriptive statistics, while PLS-SEM Version 3.3.2 was employed to test the hypotheses and to validate the structural model. Ethical approval for the study was obtained from the Medical Research Ethical Committee (NMRR-19-1500-48412) and the Human Research Ethics Committee of USM (JEPeM Code: USM/JEPeM/19050334), and informed consent was collected from all participants. The confidentiality and anonymity of respondents were strictly maintained throughout the research process.

4. Results

As illustrated in Figure 1, data were collected from eight state hospitals across various states in Peninsular Malaysia. These hospitals were selected from a total of twelve state hospitals in the region, of which only eight agreed to participate in the study. A total of 997 questionnaires were distributed to eligible medical doctors serving in key clinical departments. Of these, 488 responses were returned, yielding a response rate of approximately 48.9 percent. After screening for completeness and consistency, 471 responses were deemed usable for analysis and included in the final dataset.

Figure 1: List of Participating Hospitals

No.	State Hospital	Questionnaire Distributed	Questionnaire Received
1	Hospital Kuala Lumpur	130	49
2	Hospital Melaka	70	64
3	Hospital Tuanku Jaafar, Negeri Sembilan	150	64
4	Hospital Sultanah Bahiyah, Kedah	141	74
5	Hospital Pulau Pinang	131	77
6	Hospital Tuanku Fauziah, Perlis	70	51
7	Hospital Tengku Ampuan Afzan, Pahang	120	39
8	Hospital Raja Perempuan Zainab II, Kelantan	185	70
	Total	997	488

Based on Table 1, which presents the demographic profile of the respondents, the majority were female medical doctors, comprising 63.1% of the sample. In terms of race, 58.6% identified as Malay, followed by 27.2% Chinese, 13.0% Indian, and 1.3% from other ethnic backgrounds. Regarding educational attainment, the majority held an MBBS degree (87.3%), while 10.4% possessed a Master's degree, 1.3% a PhD, and 1.1% reported other qualifications. In terms of marital status, 58% of the respondents were single, 41.2% were married, and 0.8% reported other statuses. The majority were appointed at the UD41 grade level (56.3%), while the lowest proportion was at the UD55/UD56 levels (3.4%). Concerning departmental distribution, the highest number of respondents were from the Emergency Medicine Department (32.7%), whereas the lowest participation was recorded from the Orthopedic Department, with only 4.0% of respondents.

Table 1: Demographic Profile

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Males	174	36.9%
Females	297	63.1%
Total	**471**	**100%**
RACE		
Malay	276	58.6%
Chinese	128	27.2%
Indian	61	13%
Others	6	1.3%
Total	**471**	**100%**
EDUCATIONAL LEVEL		
MBBS or equivalent	411	87.3%
Master or equivalent	49	10.4%
PhD or equivalent	6	1.3%
Others	5	1.1%
Total	**471**	**100%**
MARITAL STATUS		
Single	273	58%
Married	194	41.2%
Others	4	0.8%
Total	**471**	**100%**
JOB GRADE		
UD41	265	56.3%
UD43/44	67	14.2%
UD47/48	79	16.8%
UD51/52	23	4.8%

UD53/54	21	4.5%
UD55/56	16	3.4%
Total	**471**	**100%**
Department		
General Medicine	85	18%
Orthopedic	19	4%
O&G	31	6.6%
General Surgery	40	8.5%
Pediatric	142	30.1%
Emergency Medicine	154	32.7%
Total	**471**	**100%**

As presented in Table 2, the study evaluated the measurement model through factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). The CR values indicated strong internal consistency, with role ambiguity and burnout demonstrating reliability coefficients of 0.929 and 0.838, respectively. In line with Henseler, Hubona and Ray (2016), internal consistency can be assessed through indicator loadings, where values of 0.70 and above are generally considered acceptable. The loading values for both role ambiguity and burnout met this criterion, with most items exceeding the 0.70 threshold. Furthermore, AVE values were above the recommended cut-off of 0.50, suggesting adequate convergent validity (Byrne, 2016). Specifically, all AVE scores in this study were above 0.60. According to Hair, Risher, Sarstedt and Ringle (2019), factor loadings are acceptable even if a few items fall slightly below 0.708, provided that the overall model meets the required reliability and validity benchmarks. In this study, no item had a loading below 0.708, thereby supporting the adequacy of the measurement model.

Table 2: Measurement Model for the Second-Order Constructs Outer Loadings Values, Composite Reliability (CR), and Average Variance Extracted (AVE)

Constructs	Items	Loadings	AVE	CR
Role Ambiguity	RA1	0.793	0.685	0.929
	RA2	0.808		
	RA3	0.840		
	RA4	0.871		
	RA5	0.865		
	RA6	0.785		
Burnout	EE	0.853	0.633	0.838
	DPN	0.722		
	RPA	0.807		

Table 3 presents the results of the structural model analysis. The evaluation of the structural model was conducted by examining the path coefficients to determine the significance and relevance of the hypothesized relationships, using a bootstrapping technique with 5,000 resamples. This approach follows the recommendations of Ramayah, Jacky, Chuah, Ting and Memon (2018) as well as Wong (2013). The path coefficient for the relationship between role ambiguity and burnout was 0.147, with a corresponding t-value of 4.207. Furthermore, the bootstrapped confidence intervals at the 99% and 90% levels did not include zero within the lower and upper bounds, indicating a statistically significant effect. These results confirm a positive association between role ambiguity and burnout. Hence, Hypothesis 1 (H1) was supported.

Table 3: Hypothesis Testing for Direct Path

Hypothesis	Std Beta	Std Error	*t-values*	*p-values*	BCL LL	BCI UL
H1: Role Ambiguity ->Burnout	0.147	0.035	4.207	0.000***	0.071	0.225

*p<0.01

Discussion

The findings of this study confirm a statistically significant positive relationship between role ambiguity and burnout among medical doctors in Malaysia's public healthcare sector, thus supporting Hypothesis 1. With a path coefficient of 0.147 and a t-value of 4.207, the data demonstrate that increased ambiguity in job roles is associated with higher levels of burnout. This supports the tenets of Role Theory and the Job Demands-Resources (JD-R) Model, both of which suggest that unclear roles function as job demands that contribute to strain and emotional exhaustion. In line with earlier studies by Schaufeli and Buunk (2003) and Ahmad et al. (2020), the findings reinforce the notion that role ambiguity disrupts professional efficiency and heightens psychological stress, particularly in high-pressure environments such as public hospitals. Theoretically, they extend the application of established occupational stress frameworks to the Malaysian public healthcare setting, confirming the relevance of JD-R constructs in this context. Practically, the findings highlight an urgent need for hospital administrators and policymakers to address role ambiguity through clearer job descriptions, improved communication of responsibilities, and structured orientation programs. Interventions such as mentoring systems and role clarification training could serve to alleviate burnout and improve workplace morale. Additionally, demographic insights such as the predominance of young, single medical doctors at the UD41 level and the high representation from departments like Emergency Medicine suggest that early-career professionals in high-stress units are particularly vulnerable to burnout.

5. Managerial Implications and Recommendations

The findings of this study have important managerial implications for healthcare administrators and policymakers in the Malaysian public sector. The positive relationship between role ambiguity and burnout highlights the need for improved clarity in job expectations, especially for medical doctors working in high-pressure environments. Hospital management must prioritize clear and consistent communication of roles, responsibilities, and reporting lines, particularly for early-career doctors, such as those at the UD41 level, who may lack the experience to navigate ambiguity effectively. One practical recommendation is for the Ministry of Health (MOH) and hospital administrators to standardize job descriptions and clinical protocols across departments to minimize confusion and inconsistency in task assignments. Regular role clarification meetings, interdepartmental briefings, and performance feedback sessions should be institutionalized to ensure alignment between expectations and actual responsibilities. Additionally, the implementation of structured onboarding programs and mentorship systems can provide junior doctors with guidance and support in navigating their roles, which may reduce the likelihood of burnout due to uncertainty or lack of direction.

Furthermore, hospitals should consider incorporating stress management workshops and resilience training into professional development initiatives. Such programs can help medical professionals build coping strategies to manage work-related ambiguity and pressure. The high burnout risk among doctors in departments like Emergency Medicine, as seen in this study, suggests a need for targeted interventions in high-stress units, such as rotating shifts, increased staffing, or peer support groups. At the policy level, the MOH should explore institutional frameworks that promote psychological safety, encourage open communication, and empower doctors to voice concerns about unclear roles or excessive demands without fear of repercussions. Establishing formal channels for feedback on role-related issues will enable continuous improvement and responsiveness to frontline staff needs. By addressing role ambiguity proactively, hospital management can help create a healthier work environment, reduce doctor burnout, and ultimately improve the quality of patient care and staff retention in Malaysia's public healthcare system. These contextual elements warrant further exploration. However, several limitations must be acknowledged. The use of cross-sectional data limits causal inferences, and reliance on self-reported questionnaires may introduce response bias. Furthermore, the sample was drawn from only eight public hospitals and examined a single role stressor, which constrains generalizability. Future research should adopt a longitudinal design and incorporate additional predictors such as emotional labor, organizational support, and personal resilience to provide a more comprehensive understanding of burnout. Comparative analyses involving private healthcare professionals or rural hospitals may also enhance the applicability of the findings across different healthcare contexts.

Conclusion

This research investigated how role ambiguity contributes to burnout among medical doctors in Malaysia's public healthcare sector. The findings provide empirical support for a significant positive relationship between

unclear role expectations and increased levels of burnout, reinforcing the conceptual foundations of Role Theory and the Job Demands-Resources (JD-R) Model. These results are particularly relevant given the demanding and complex nature of clinical environments within the public health system. The study offers both theoretical and managerial contributions. Theoretically, it extends the application of established occupational stress frameworks to the local healthcare context. From a practical perspective, it highlights the need for interventions that reduce ambiguity in job roles through improved communication, standardized role definitions, and structured support systems for healthcare professionals, particularly those at the early stages of their careers or serving in high-intensity departments.

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A Qualitative Investigation of the Empowerment Operationalization in Malaysian Banking

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Abstract: Although empowerment is often discussed in organisational theory, how it is operationalised in practice—particularly in banking institutions—remains underexplored. This study examines the enactment of empowerment in two Malaysian banks, emphasising the viewpoints of senior managers who are pivotal in defining its significance and implementation. Using semi-structured interviews with 12 senior managers and employing thematic analysis, the study reveals four interconnected dimensions that operationalise empowerment: institutionalisation (formal policies), communication (explicit delegation and information flow), capacity building (training and readiness support), and scope and differentiation (variation according to role, rank, and proximity to operations). The findings indicate that empowerment in banking is not a uniform process but rather a context-dependent practice influenced by managerial interpretation and shaped by the specific functional realities of various job roles. Employees closer to frontline operations were found to acquire greater empowerment, indicating a strategic differentiation of authority. The study enhances theoretical knowledge by filling a significant void in comprehending the dynamics of empowerment operationalisation within structured service environments. From a pragmatic standpoint, it provides bank leaders with actionable insights to embed empowerment into career development, augment flexibility in decision authority, and conduct periodic role-specific empowerment audits to ensure alignment between empowerment design and operational demands.

Keywords: *Empowerment Operationalization, Banking, Qualitative, Managers, Malaysia.*

1. Introduction and Background

Empowerment is widely recognised as a vital management approach that facilitates organisational development in today's demanding and challenging corporate landscape. Empowerment has gained prominence due to businesses' necessity to drastically decrease overhead costs, enhance efficiency, and implement significant cost-cutting measures to maintain competitiveness (Kinlaw, 1995). Laschinger et al. (2009) assert that empowerment effectively fosters healthy work conditions within businesses. It is considered a validated idea for enhancing organisational utilisation of personnel (Kinlaw, 1995). In a parallel vein, Smith (2000) emphasises that enhancing customer proximity, optimising service delivery, fostering continuous innovation, augmenting productivity, and achieving a competitive advantage are unattainable unless organisations discover novel methods to empower their personnel, underscoring the significance of empowerment as an essential component of the contemporary business landscape driven by the need to navigate uncertainty and change. A significant body of empirical research has repeatedly demonstrated numerous beneficial consequences of empowerment at both the employee and organisational levels. The effects encompass elevated job satisfaction (Dewettinck & Ameijde, 2011; Seibert et al., 2004), enhanced organisational commitment (AlHammadi & Abu Elanain, 2024; Kuo et al., 2010; Llorente-Alonso et al., 2024), improved job performance (Hall, 2008), increased innovative behaviour (Abd. Ghani & Raja Hussin, 2008; Al Daboub et al., 2024; Alwali, 2024; Pieterse et al., 2010), heightened competitiveness (Ergeneli et al., 2007) and augmented managerial effectiveness (Spreitzer, 1995).

Despite robust claims that empowerment serves as an effective instrument for organizational development (e.g., Biron & Bamberger, 2010), some critics contend that while empowerment appears beneficial in theory, it does not practically empower employees. Smith (2000) argues that the insufficient utilisation of empowerment results in failure. Forrester (1995) asserts that numerous businesses have not realized the potential of empowerment; yet, he maintains that empowerment remains a valuable concept and emphasises the necessity for its application. Academic research has provided explanations for the causes of empowerment failure in organizations. Poor or superficial implementation of the process is identified as one of the contributing factors (Lincoln et al., 2002; Modise, 2023). Quinn and Spreitzer (1996) articulate that “executives believed workplace empowerment was beneficial; nonetheless, they experienced significant dispute regarding both the definition of empowerment and its implementation inside their organizations…such disputes frequently occur in modern

companies and constitute a principal factor for the potential failure of empowerment initiatives" (p. 6). This underscores important implications for future research on the operationalisation of empowerment, and the present study aims to address it, thereby establishing its objective.

2. Literature Review

The Concept of Empowerment: Two predominant perspectives on empowerment are emerging from the literature. Some highlight empowerment as a managerial instrument or strategy inside businesses. Common management techniques associated with empowerment include job autonomy (e.g., Hackman & Oldham, 1976), participative management (e.g., Block, 1990), job enrichment (e.g., Herzberg, 1966), employee involvement (e.g., Bowen & Lawler, 1992), self-managing teams (e.g., Seibert et al., 2004), and self-leadership (e.g., Manz & Sims, 1991). Some perceive empowerment as an individual's psychological condition, which typically pertains to their perspective and experience of being empowered (Anak Juan & Mohd Yusof, 2024; Greasley et al., 2005).

The empowerment concept in management techniques is embedded in the organisational context and is typically viewed as measures undertaken by organisations to distribute power and decision-making (Djunaedi et al., 2023; Hechanova et al., 2006). Ahearne et al. (2005) define empowerment as a method or series of procedures that involve delegating responsibilities throughout the hierarchy to enhance employees' decision-making authority about their principal work tasks. A literature analysis indicates that this perspective is frequently characterized as a structural approach to empowerment (Cho & Faerman, 2010; Evans et al., 2024; Mills & Ungson, 2003). This viewpoint is considered a traditional perspective and is occasionally referred to as the relational approach to empowerment (Ergeneli et al., 2007) or role empowerment (Logan & Ganster, 2007; Nguyen & Doan, 2023).

Kanter's (1977) ethnographic research provides a foundational theoretical basis for understanding structural empowerment (Knol & Linge, 2009). According to Kanter (1977), the structural components within the workplace have a more substantial effect on employee attitudes and behaviors than individual traits or prior socialisation (Ning et al., 2009). Kanter (1977) identifies power as a key structural factor influencing organizational behaviors and attitudes, further viewing it as an opportunity for information, support, and resources (Spreitzer, 2008). Her theory asserts that access to these critical organizational resources—such as information, support, essential resources, and learning opportunities—is central to fostering empowerment (Loughman et al., 2009).

Kanter's framework suggests that structural empowerment aims to create more democratic workplaces by redistributing power across the hierarchy, thereby extending authority to lower levels of the organization (Spreitzer, 2008). Within this framework, power is understood as formal authority or control over organizational resources (Conger & Kanungo, 1988). Menon (2001) proposes that power is the driving force behind structural empowerment, viewing it as a strategy that allocates power and decision-making authority throughout the organisation, achieved by enhancing delegation along the hierarchy. Several studies exploring the structural view of power (e.g., Ergeneli et al., 2007; Greasley et al., 2008) emphasize empowerment through employee involvement in decision-making, which aligns with the principle of shared authority (Conger & Kanungo, 1988).

In contrast, the psychological perspective on empowerment focuses on the individual's experience of empowerment, emphasizing the emotional state that employees must experience for interventions to be effective rather than on specific management practices aimed at empowering them (Dewettinck & Ameijde, 2011). This approach pertains to employees' perceptions of their own empowerment (Ergeneli et al., 2007; Orgambídez et al., 2024; Thomas & Velthouse, 1990). It is viewed as an internal mindset that employees hold regarding their organisation, rather than as a direct action taken by the organisation towards its staff (Dee et al., 2003).

Conger and Kanungo (1988) were pioneers in examining empowerment from a psychological perspective. Based on Bandura's self-efficacy theory, they define empowerment as a motivational notion aimed at assisting individuals rather than simply assigning tasks. They propose that empowerment entails more requirements beyond mere delegation and involvement. Conversely, Thomas and Velthouse (1990) argue that empowerment

is a complex concept that cannot be defined exclusively in terms of self-efficacy. Their research expands upon Conger and Kanungo's paradigm by defining empowerment as intrinsic task motivation, manifested through four cognitive characteristics that pertain to employees' attitudes toward their work (Spreitzer, 2008). The cognitive aspects encompass meaningfulness, competence (self-efficacy), choice, and impact. Spreitzer (1995) further delineates these characteristics as meaning, competence, self-determination, and influence (Chiang & Jang, 2008). The term "meaning" denotes an individual's inherent engagement with a particular task (Thomas & Velthouse, 1990) and encompasses the alignment between job requirements and one's beliefs, attitudes, and behaviors (Hackman & Oldham, 1980). Spreitzer (1995) defines competence as an individual's assurance in their capacity to execute task-related activities proficiently. The third component, self-determination, refers to an individual's perception of autonomy or choice in initiating and maintaining work behaviors and processes (Hancer & George, 2003; Pradhan et al., 2017). Carless (2004) defines impact as the level of personal control over organizational outcomes or the conviction that one can effect change at work, while Spreitzer (1995) characterizes impact as the degree to which an individual can affect strategic, administrative, or operational results within the workplace.

Empowerment and Banking: Empowerment is viewed as a crucial strategy for achieving service quality and customer satisfaction in service-oriented organizations, such as banks (Kyei-Frimpong et al., 2024; Lashley, 1996; Snipes et al., 2005). Empowerment is proposed as an effective strategy for service-oriented organizations to manage their distinctive interactions with customers (Bowen & Lawler, 1992). Empowerment equips frontline personnel with adequate responsiveness and flexibility to meet the evolving demands of consumers, hence facilitating the delivery of service excellence (He et al., 2010; Snipes et al., 2005). Holden (1999) perceives banking as an intensely competitive sector. Competitive challenges and global advancements are expected to continue influencing the evolution of the banking sector in the future (Aziz, 2007). Research indicates that businesses functioning in volatile environments, such as banking, frequently gain advantages from empowerment (Bowen & Lawler, 1992; Kim & Kleiner, 1996). Moreover, empowerment fosters committed employees who can adapt and be creative in confronting environmental changes (Ratmawati, 2007). Practitioners also recognize the significance of empowerment in banking. Aziz (2002), in her capacity as Governor of the Central Bank of Malaysia, sees successful banking institutions as those that foster a culture of empowerment. Patterson (1996), in his role as Chairman and Chief Executive Officer of the Palmetto Bank in the United States, deems empowerment essential for the survival of banks and views it as pivotal for future success. Tschohl (1998), founder and President of Service Quality in Minneapolis, emphasises the importance of empowering frontline bank personnel to address customer needs and concerns promptly and courteously. A multitude of empowerment studies are present in various service organisations (Bartram & Casimir, 2007; Chiang & Jang, 2008; He et al., 2010; Kuo et al., 2010; Tomé Pires et al., 2025). However, research within banks seems to be limited (Ratmawati, 2007; Samad, 2007; Zakaria, 2011), despite the claim that banks should emphasize empowerment to achieve their goals of enhanced performance and service quality (Ratmawati, 2007; Sarkar, 2009). This justifies the choice of banks as the organisational context for the study.

3. Research Methodology

The study is deemed exploratory and, hence, adopts a qualitative approach. Johnson (2008) emphasizes that, in addition to adhering to the general plan of the interview, the semi-structured style enables the interviewer to explore interviewees' responses more thoroughly. Crucially, it allows for the freedom to formulate further questions during the interview, thereby facilitating a comprehensive exploration of the study's aims and fostering a more informal and conversational atmosphere (Hermawan, 2005; Ruslin et al., 2022; Saunders et al., 2009). Consequently, the study employed semi-structured interviews as the research method. Sixteen interview questions were utilised; of these, eleven were sourced from D'Souza (2001), while the researcher devised the remaining five to contribute further information to the study. Following the requirements of the ethics committee, each interview schedule included a participant information sheet and a consent form. The former aimed to enlighten participants on the study's overview and emphasize the significance of the interview, while the latter indicated the interviewees' confirmation of participation.

A pilot study was executed for the semi-structured interview. Peat et al. (2002) contend that the pilot research methodology facilitates the identification of ambiguous and complex inquiries while also assuring that responses can be understood in alignment with the necessary information. Five participants, comprising

professionals in managerial positions from both the private and public sectors, were selected to assess the interview questions. The pilot project did not involve interviews; instead, the interview schedule, which comprised a participant information sheet, consent form, and interview questions, was provided to participants via email. They were requested to provide feedback regarding the clarity of the instructions and interview questions. Participants were instructed to respond to the interview questions in bullet points rather than providing extensive comments to ensure their answers aligned with the intended meaning of the questions (Peat et al., 2002). The participants stated that the interview questions were clear and did not present any difficulties in their responses. Furthermore, their answers demonstrated a pattern of similarities. Therefore, no alterations were made to the interview questions.

A formal invitation to partake in the study was dispatched to 13 domestic banks via their respective human resources department heads. The procedure culminated with two banks agreeing to participate in the study. Each human resources department selected six senior managers for the interviews, resulting in a total of 12 senior managers participating in the study. Copies of the interview schedule, participant information sheet, and consent form were sent to each interviewee before the interview. All interviews were conducted in English, in person, at the participants' workplaces. At the beginning of each interview, the interviewee was informed of the interview structure and made aware that there were no right or wrong answers to the questions. Interviewees were assured that their remarks would be entirely discreet and anonymous. Ten respondents agreed to be recorded, whilst the other two rejected (notes were documented during the interviews). The interviews ranged from thirty to ninety minutes in duration.

The collected data were subsequently transcribed and documented in the interview notes (for unrecorded interviews). To ensure comprehension of the contents, all data were reviewed twice: initially, to gain a general understanding and subsequently to grasp the essence of the interviewees' thoughts. The researcher then initiated data analysis using thematic analysis approaches (Clarke & Braun, 2016; King, 2004; Miles & Huberman, 1994; Szolin et al., 2023). King (2004) emphasizes the flexibility of thematic analysis, where the researcher typically creates a list of codes (i.e., a template) that encapsulates themes identified a priori in the textual material, subsequently refining or enhancing the template during the reading and interpretation of the texts. A list of codes denoting the designated themes was created at the commencement of the inquiry. During the analytical process, the foundational template was modified to include additional sub-themes that emerged during the categorization phase, clarifying the established themes. The completed code template served as the foundation for achieving the research objective. The study exhibits methodological rigour through its careful question design, pilot testing, and iterative data processing, hence enhancing the trustworthiness of the findings.

4. Results and Discussion

The study exhibited a majority of male participants (N=10) compared to female participants (N=2). The majority of participants were employed at the head office across several departments, including compliance, finance, audit, risk management, human resources, operations, and administration, with just three participants representing branches in three states of Peninsular Malaysia. The participants' average age spans from 45 to 53 years, which is expected given that all are in senior management positions. The Malay ethnic group constitutes the majority in the sample (N=8). All twelve participants were assigned numbers for easy identification.

The thematic analysis revealed that the implementation of empowerment in the banks was notably similar. The findings resulted in four fundamental elements that explain how empowerment was operationalized in both banks. The themes showcase the institutionalization, communication, capacity building, and scope and differentiation of empowerment, all of which will be illustrated through narrative passages.

Empowerment Institutionalisation

The theme reflects the operationalisation of empowerment through formal documentation. Senior managers articulated that empowerment is codified in memos, internal circulars, and policies disseminated via the intranet or departmental briefings. These documents that underpin empowerment delineate the permissible and impermissible actions (procedural conduct) anticipated while exercising empowerment.

"A memo is distributed to department heads, providing explicit directives on empowerment."
(Senior Manager 4, Bank 1)

"We provide circulars and make information on empowerment accessible through our intranet. Additionally, verbal communication is utilised, and we hold meetings, training courses, and seminars."
(Senior Manager 7, Bank 2)

"Empowerment is conveyed unequivocally through written documents such as memos, policies, and procedures."
(Senior Manager 1, Bank 1)

"Support and assistance are provided through memos or procedures outlining what is permissible and impermissible in empowerment."
(Senior Manager 6, Bank 1)

"We have policies that clearly outline our approach to empowerment, detailing what we can and cannot do, as well as the expected conduct."
(Senior Manager 10, Bank 2)

Erstad (1997) highlights one of the deficits of empowerment as ambiguous responsibilities, contending that formal communication of empowerment policies is essential to mitigate this issue. Likewise, Smith and Mouly (1998) and Singh (2022) emphasise that effective organisational communication promotes empowerment within the workplace. Klagge (1998) posits that explicit expectations and a transparent internal communication mechanism must complement the execution of empowerment, whilst Fawcett et al. (1994) argue that structured policy communication is crucial for promoting empowerment. Yaacob (2009) asserts that "communication is essential because empowerment will hold no significance for employees if the parameters of what is permissible and impermissible are not explicitly delineated" (p. 108), highlighting the importance of formalizing empowerment boundaries in written documentation.

Moreover, empirical research corroborates the importance of structured communication in empowerment. Melhem (2004) discovered that empowerment was more efficacious among frontline bank personnel in Jordan when information dissemination methods were robust. Ashness and Lashley (1995) found in their research of service sector employees that the efficacy of empowerment initiatives was significantly contingent upon the articulation of policies and expectations. The findings align with the current study's data, indicating that empowerment in the two banks is institutionalised through formal documentation that delineates the nature, scope, and limitations of empowerment. The findings reinforce that policy-level communication is fundamental in operationalizing empowerment.

Empowerment Communication

The theme of empowerment institutionalization emphasises the formal documentation (policy-level dissemination), whereas the second theme—empowerment communication—centres on managerial actions aimed at informing and authorising staff in practice (interpersonal communication), as illustrated by the following quotes:

"There is a written communication stating that you are empowered. It clearly outlines the specific areas where you have this authority."
(Senior Manager 3, Bank 1)

"Typically, we inform those in empowered roles verbally; additionally, we also send out memos."
(Senior Manager 11, Bank 2)

"Initially, we will inform individuals in empowered positions via memos, and then during the meeting, I will provide a further briefing to the managers regarding their responsibilities."
(Senior Manager 6, Bank 1)

"I usually hold a meeting to inform them about the specific responsibilities I am delegating."
(Senior Manager 8, Bank 2)

The aforementioned findings emphasize that managerial communication serves as a vital catalyst for empowerment, as posited by Suadnya (2023). Although written institutional frameworks establish the foundation, it is via specific, context-sensitive communication—such as briefings and in-person instructions—that managers actively confer empowerment. This corresponds with Conger and Kanungo's (1988) model, which conceptualizes empowerment as a motivating process supported by managerial reinforcement. The utilization of various communication channels, integrating formal memos with verbal directives and interactive dialogues, illustrates a deliberate initiative by managers to guarantee communicative legitimacy and contextual comprehension, as indicated by the findings. This supports Spreitzer's (1996) assertion that empowerment relies on clarity and specificity to mitigate role ambiguity, as well as Fawcett et al.'s (1994) argument that repeated and layered communication enhances employee understanding and preparedness for empowerment. A recent quantitative study by Gehrau et al. (2024) indicated that communication significantly enhances empowerment. The outcomes of this study empirically reinforce the assertion that managerial communication is a crucial component of empowerment operationalization.

Empowerment Capacity Building for Empowerment

This theme reflects the assistance and preparedness phase in implementing empowerment within both banks. The majority of participants affirmed the presence of developmental initiatives that equip personnel for empowered responsibilities. Several of the remarks are as follows:

"Our empowerment training program covers managerial skills and their connection to empowerment. This program is offered at our training centre and in collaboration with an external consultant."
(Senior Manager 12, Bank 2)

"Our management development program includes various modules, one focusing on leadership, with an additional submodule dedicated to empowerment. All of our managers across the country are required to take part in this program."
(Senior Manager 8, Bank 2)

"Our empowerment training includes a 'buddy system,' where I, preparing for retirement, pair with a colleague. If my decision-making limit is MYR 200,000 and theirs is MYR 100,000, I will let them temporarily take over my authority. During this trial period, I will provide feedback to help with improvement. Ultimately, I will assess and report to management whether they are ready for additional responsibility. This approach is applied throughout the bank, with senior managers mentoring their managers, who then train their senior executives."
(Senior Manager 2, Bank 1)

Training is regarded as essential for the advancement of empowerment (Hammuda & Dulaimi, 1997; Modise, 2023). Implementing suitable training programs ensures that frontline staff possess the necessary personal attributes and competencies to manage empowerment effectively (Rafiq & Ahmed, 1998). Sykes et al. (1997) assert that extensive training is necessary to depart from conventional work practices and cultivate empowered employees. Managers can empower people by disseminating knowledge and providing pertinent training opportunities, which are integral to the empowerment process (Quinn & Spreitzer, 1996). A study conducted by Baird and Wang (2010) on factors affecting empowerment demonstrated that training significantly bolstered empowerment practices among Australian industrial firms. The discovery that training constituted a component of the empowerment process in the two banks examined in this study aligns with existing academic literature. The study specifically further positions training as a crucial feature in operationalising empowerment.

Empowerment Scope and Differentiation

This fourth theme delineates the scope and differentiation (variation) of empowerment conferred onto staff in the two banks. The results indicate that empowerment manifests in both financial and non-financial forms, with decision-making authority allocated across a range of operational and administrative domains. The following are such expressions:

"Some are authorised to approve financial claims, while others are responsible for managing personnel, which is non-financial."
(Senior Manager 1, Bank 1)

"Along with financial duties, there are instances where individuals are authorised to determine if the bank should initiate disaster recovery mode, a decision that is purely non-financial."
(Senior Manager 2, Bank 1)

"While empowerment is often linked to financial matters, it also extends to non-financial areas. For example, branch managers have the authority to hire staff, including clerical positions."
(Senior Manager 3, Bank 1)

"Two types of empowerment: financial and non-financial."
(Senior Manager 4, Bank 1)

"We are authorised to approve loans (financial) and also to recruit, transfer, and promote staff (non-financial)."
(Senior Manager 5, Bank 1)

"Branch managers have the authority to approve loans (financial) as well as other responsibilities, like approving medical leave or granting time off (non-financial) for staff attending urgent appointments."
(Senior Manager 7, Bank 2)

"Certain individuals are authorised to oversee policies and procedures (non-financial), while others are empowered to put these policies into action (both financial and non-financial)."
(Senior Manager 10, Bank 2)

The findings also reveal that empowerment is not uniformly distributed; instead, it is differentiated based on hierarchical rank and job function. Employees in senior positions possess greater decision-making capacity, while those in junior roles have more limited empowerment.

"Empowerment is influenced by two main factors: the job function and the individual's position in the organizational hierarchy."
(Senior Manager 1, Bank 1)

"Empowerment is closely tied to two elements: one's corporate rank and job role (function)."
(Senior Manager 3, Bank 1)

"Your empowerment is defined by your rank (grade) and your job role (function)."
(Senior Manager 6, Bank 1)

"Empowerment is primarily dependent on the job function."
(Senior Manager 4, Bank 1)

"Empowerment is allocated based on one's role in the bank. Higher positions come with greater authority (empowerment)."
(Senior Manager 7, Bank 2)

"Empowerment (authorization) is determined by one's position and responsibilities, regardless of whether the employee is temporary or permanent."
(Senior Manager 9, Bank 2)

Some participants affirmed that empowerment was significantly more pronounced among individuals with regular consumer interactions compared to those with less or no customer contact.

"The nature of the job influences empowerment. Employees in branch departments and Recovery officers, who have direct interactions with customers, are granted greater empowerment to perform their roles effectively."
(Senior Manager 1, Bank 1)

"We encourage empowerment at the lowest level possible, especially for those directly involved with customer-related challenges."
(Senior Manager 6, Bank 1)

"At the head office, we have less empowerment compared to those in operational roles at the branches."
(Senior Manager 9, Bank 2)

This fourth theme enlightens two key discoveries. First, the scope (extent) of empowerment is shaped by the type of decision-making required, particularly between financial and non-financial domains. Secondly, the differentiation (variation) of empowerment is contingent upon role, rank, and proximity to operational decisions. Empowerment was observed to be more pronounced among individuals at the operational frontlines or in elevated hierarchical positions. These two key findings align with the distinction made by Honold (1997), who argued that empowerment is only meaningful when it is aligned with the employee's capacity to influence outcomes within their area of responsibility. Similarly, Bowen and Lawler (2006) assert that empowerment should be contextually relevant, granting people authority proportional to the nature of the task and the associated organisational risk. There is substantial empirical evidence that corroborates these assumptions. Seibert et al. (2011) reported the hierarchical level as a key moderator in the efficacy of empowerment practices. Laschinger et al. (2004) discovered that structural empowerment predominantly benefits individuals in roles with direct control over processes and outcomes. A study by Wu et al. (2023) indicates that customizing empowerment to task relevance improves performance and accountability in the banking sector. Poudel and Lee (2024) demonstrate that individuals who are granted empowerment aligned with their tasks and organisational roles display increased organisational engagement and psychological ownership.

5. Managerial Implications and Recommendations

This study offers several important managerial implications for how empowerment is designed, communicated, and differentiated in complex, hierarchical service organisations such as banks. First, the identification of both financial and non-financial empowerment domains suggests that empowerment should not be treated as a singular concept but rather as a function-specific, risk-differentiated process. Prior research has highlighted that the effectiveness of empowerment depends on contextual alignment (Bowen & Lawler, 2006; Wu et al., 2023). This study confirms that different types of authority require distinct management protocols, particularly in regulated industries such as banking. Second, the discovery that empowerment requires clear communication and reinforcement by managers has significant implications for leadership practices. Although policies and standards offer structural support, the lack of direct, context-specific communication might hinder empowerment initiatives (Klagge, 1998; Men & Stacks, 2013). This indicates that empowerment is both a relational and structural process, with managerial intent and trust being crucial for its effective implementation (Spreitzer, 1996; Yao et al., 2024). Third, the discerned variation in empowerment according to job status, function, and operational proximity suggests that empowerment should be tailored rather than uniform. Personnel in operational positions, particularly those with significant customer interaction, were observed to possess increased decision-making authority, reinforcing the notion that empowerment should correspond with job requirements and proximity to the role (Poudel & Lee, 2024; Seibert et al., 2011). This challenges conventional top-down delegation models and necessitates more sophisticated frameworks that accurately represent the realities of real-time work.

The study outlines several key considerations worth noting in operationalising empowerment within organisations. First, empowerment should be regarded as a competency that employees cultivate progressively through a systematic, milestone-oriented framework. These milestones should be incorporated into performance management, leadership development, and promotion criteria. This approach corresponds with Laschinger et al.'s (2004) findings that structured empowerment contributes to professional growth and role

satisfaction. Secondly, rather than conceptualising empowerment as rigid authority thresholds, banks ought to implement adaptive empowerment mechanisms- flexible authority bands that expand or contract according to employee readiness, operational demands, or performance metrics. During periods of heightened consumer demand or limited managerial presence, competent personnel may be authorised to assume temporary expanded authority. This dynamic approach corresponds with the concept of empowerment as a situational and developing resource (Honold, 1997) and facilitates more agile, decentralised decision-making (Wu et al., 2023). Third, empowerment should be reviewed not only as an organisational policy but as a lived experience across different layers and units. Banks can implement periodic empowerment audits to evaluate if employees in designated positions—such as branch operations or headquarters—comprehend, embrace, and proficiently exercise their authority. These evaluations could reveal discrepancies and facilitate precise recalibration. Seibert et al. (2011) support customising empowerment to the organisational situation, facilitating a feedback loop that connects policy and practice. These recommendations emphasise the necessity of perceiving empowerment not merely as a policy or communication issue but as a strategic capability—dynamic, structured, and integrated into employee development. By using empowerment in this manner, managers can improve decision agility, employee ownership, and organisational responsiveness in service-oriented settings.

Conclusion

This study aimed to investigate the operationalisation of empowerment within Malaysian banking, recognising that managerial interpretations and implementations of empowerment significantly influence employees' experiences. Utilising semi-structured interviews with twelve senior managers from two local banks, the study discerned four interconnected elements of empowerment operationalisation: institutionalisation, communication, capacity building, and scope and differentiation. These elements represent both the structural conditions that formalise empowerment and the social and operational dynamics through which it is enacted.

The study advances the discourse on structural empowerment by demonstrating how institutional frameworks, such as policies and guidelines, are translated into action through explicit communication and developmental support. It underscores that empowerment is not uniformly distributed but rather varies according to role, rank, and operational proximity—particularly benefiting employees in customer-facing positions. These insights are particularly pertinent to the banking sector, where a balance must be struck between responsiveness, risk sensitivity, regulatory compliance, and employee autonomy. The findings indicate that empowerment in this context is more about managing and contextualising empowerment as a flexible, layered organisational resource.

This study theoretically enhances the limited yet expanding literature on the operationalization of empowerment in banking organisations, a context that is underexplored despite its intricate structural and service dynamics (Ahmad & Oranye, 2010; Ratmawati, 2007; Samad, 2007). The study advances theoretical understanding by demonstrating that empowerment is not solely a top-down initiative or a psychological condition but rather a managerially mediated and operationally dependent process influenced by institutional design and role proximity.

This study, although carefully designed, is nonetheless limited by certain constraints. The study employed a sample of domestic banks in Malaysia; hence, its findings are limited to that particular organisational context, namely the banking sector. Consequently, one must exercise caution when extrapolating the results to other organisational contexts and sectors, including foreign banks in Malaysia. All twelve participants were selected by their HR departments; therefore, their identities were already known, which may have raised concerns about their confidentiality. Some participants occasionally requested to speak 'off the record.' Two participants expressed dissent regarding the recording of the interview and were hesitant to disclose comprehensive details. This occurrence may have resulted in the underreporting of information that was potentially significant to the study.

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From Shelves to Screens: Conceptualizing Phygital Retailing in Supermarkets through the S-O-R Framework

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Abstract: This conceptual paper will explore a hybrid approach of phygital retailing, which merges physical and digital shopping experiences to enhance customer engagement and satisfaction. Retailers who want to meet the demands of today's consumers must comprehend the dynamics of physical encounters as retail settings change in tandem with technology. Retailers need to utilize cutting-edge technology that connects online and offline experiences. Physical shopping provides customers with distinctive value propositions. On the other hand, phygital retailing advantages by emphasizing the potential of digital sensing technologies and augmented reality to counter issues in digital purchasing, highlighting their role in creating immersive shopping experiences that mimic the appeal of in-person shopping while retaining the benefits of electronic convenience. This intersection of physical and digital spaces empowers retailers to engage customers on multiple sensory levels, leading to deeper emotional connections and increased purchase intention. Hence, the Stimulus-Organism-Response (S-O-R) theory is deemed appropriate to underpin the research framework. The S-O-R will explain how phygital retailing influences the customer's response, such as purchase intention. Moreover, the relationship between technology and consumer experience poses new opportunities for retailers because the emergence of phygital retailing represents a new strategy in how retailers interact with consumers. Considering positivism as a primary paradigm for this research, the quantitative approach is deemed an appropriate research method to test the proposed model with empirical results. Finally, the outcome of this proposed research framework will help the researcher and manager to explore and further understand the integration of technology with consumer behaviours in the retail setting. In conclusion, phygital retailing is urged to redefine consumer experiences by merging the tactile and immediate benefits of physical retail with the convenience and personalized nature of digital interactions. Retailers can effectively harness this fusion to create engaging, memorable experiences that drive customer loyalty and satisfaction in an ever-evolving retail environment.

Keywords: *Supermarket Innovation, Phygital retailing, P-A-D, Purchase Intention, S-O-R Framework*

1. Introduction and Background

COVID-19 has disrupted the traditional retail landscape into a new retail landscape. Lockdown and social distancing have pressured retailers to introduce new interaction methods in the customer journey. Moreover, the customers also desire less human interaction for safety and convenience in their purchases. Stan et al. (2024) mentioned that the interaction of technology during the COVID-19 pandemic has led to faster and safer customer service in business practices. Most retailers launched self-service technologies in their retail stores to enhance their customer experience through contactless payment, mobile commerce, virtual try-on, augmented reality, self-checkout and others. Therefore, the emergence of phygital retailing has fundamentally altered the retailing landscape, especially supermarkets, by blending the physical shopping experience with digital technology in innovative ways. This hybrid approach, called "phygital," leverages the strengths of both physical and digital channels to enhance consumer experiences, hence creating a seamless shopping journey that caters to evolving consumer preferences (Kumar et al., 2023).

While the retail industry continues to adapt to technological advancements and consumer expectations, employing frameworks such as the Stimulus-Organism-Response (S-O-R) model proves essential in understanding how these changes affect consumer behaviour and shopping experiences. In the context of supermarkets, the S-O-R framework provides a robust basis for analysing how various stimuli which ranging from store layout to digital interfaces to influence consumer perceptions and interactions (Pereira et al., 2023). Specifically, the stimuli can include the ambience of the store, promotional displays, and the integration

of digital tools like apps for online shopping. The organisms—consumers—then process these stimuli, shaping their emotional responses and cognitive evaluations, which ultimately drive their purchasing decisions and overall satisfaction (Wang et al., 2022). Sensory inputs both physical and digital domains must harmoniously converge to evoke positive shopping that is crucial in a phygital retail environment.

Recent consumer behaviour research highlights that the integration of visual merchandising and technology within supermarkets significantly impacts impulse buying and overall consumer engagement (Sahari et al., 2024). Digital signage and interactive displays as visual elements are not only capturing consumer attention but also crucial in forming their perceptions about product value and brand equity (KÖSEOĞLU & Tuncer, 2023). This interaction between stimuli and consumer response can lead to increased patronage intentions, vital for supermarkets aiming to enhance consumer loyalty in a fiercely competitive market (Tatua et al., 2023). As consumers increasingly demand flexibility and convenience, understanding the influences behind their purchasing behaviours through frameworks like S-O-R becomes paramount. This contextual understanding can guide supermarket retail management in leveraging both physical aspects and digital technologies to craft experiences that resonate with their target demographics (Kumar et al., 2023).

This paper aims to explore the characteristics of phygital retailing in the context of supermarkets through the lens of the S-O-R framework. The integration of traditional retail elements with digital innovations shapes the pleasure, arousal and dominance of customers in the retail environment, hence will influence their purchase intention. By examining these dimensions, the researchers try to provide a comprehensive understanding of the evolving nature of supermarket retail and the implications for future retail strategies.

2. Literature Review

The overview of supermarket innovation

The landscape of supermarket innovation is evolving rapidly, driven by advancements in technology that enhance operational efficiency through customer experience and engagement. Supermarket innovation aims to enhance customer experiences and meet the evolving preferences of consumers in a highly competitive landscape among retailers through phygital retailing. This approach blends physical and digital experiences to create a more immersive customer journey, enhancing satisfaction and engagement. A significant driver of supermarket innovation is the rise of phygital marketing strategies, which leverage advanced technologies such as artificial intelligence, augmented reality, and the Internet of Things (IoT). All these drivers were developed to enhance customer engagement. The concept of "digital convenience" is another facet of supermarket innovation that aims to streamline the customer journey. Dimitrova (2024) highlights how retail operations are increasingly adopting technologies to cater to consumer expectations regarding convenience throughout the shopping process. The trend towards integrating online and offline sales reflects a broader shift towards omnichannel strategies that enhance customer satisfaction. By providing various digital tools within physical stores, supermarkets can offer customers the convenience of digital solutions without losing the tactile experience of shopping.

Farahita & Kurniawati (2022) asserted that smart technologies facilitate retail transactions that do not require much of traditional interactions. On the other hand, it improves the overall shopping experience. For example, the integration of self-checkout systems and mobile applications demonstrates the movement towards automating shopping processes while maintaining consumer engagement. The integration of self-checkout systems has greatly streamlined the shopping experience and allows customers to process their transactions independently. Moreover, it will reduce queue times, which subsequently will improve overall satisfaction. In addition, mobile checkout solutions, where customers can scan products using their smartphones, are gaining traction, effectively decentralising the billing system and expediting the checkout process without the need for traditional cashier services. This trend aligns with the broader movement towards automating services within supermarkets, as evidenced by studies reflecting heightened convenience and preference for self-service technology among shoppers (Bauerová, 2019). Apart from that, the implementation of innovative store formats, such as automated supermarkets, indicates significant innovations within the supermarket sector. Zhao (2023) examines how these formats aim to maintain competitiveness and adapt to new consumer behaviours.

Technology has evolved and modified many of the retail activities. Supermarkets are experimenting with unmanned services that promise increased efficiency and cost-effectiveness, catering to a tech-savvy customer base that values speed and convenience. Wu (2024) highlighted the necessity for a different approach in the grocery sector through the innovative blend of online and offline interactions. The concept of new business models, like food delivery, underscores the importance of leveraging consumer proximity and real-time data to enhance revenue while delivering an unparalleled shopping experience. Thus, supermarket innovation relies heavily on the integration of digital technologies and innovative strategies that redefine the customer experience. By embracing phygital marketing, enhancing convenience through technology, and exploring new store formats, supermarkets are not only fostering customer loyalty but also adapting to the rapidly changing retail landscape.

The overview of phygital retailing

The emergence of omnichannel retailing, particularly post-COVID-19, has catalysed this transformation. Studies indicate that consumers have become increasingly tech-savvy and are looking for integrated shopping experiences where they can transition seamlessly between physical and digital realms (Lisnawati et al., 2023; Barbosa & Casais, 2022). Retailers are tasked with adopting strategies that not only combine multiple sales channels but also ensure a consistent and cohesive brand experience across these channels (Ahmed, 2023; Yin et al., 2022). For instance, the integration of technological tools—like mobile applications—into physical retail spaces allows customers to engage interactively, compare prices, and check stock availability in real-time, creating a more improved shopping journey (Khrais & Alghamdi, 2021). Sukheeja & Shekhawat (2025) discuss how phygital marketing merges physical and digital experiences, transforming consumer interaction with brands. Such innovations encourage supermarkets to create environments where customers can enjoy seamless transitions between online and offline shopping, hence enhancing overall shopping convenience.

Thus, the concept of a phygital store shift is driven by advancements in technology and the evolving preferences of consumers who demand seamless interactions in retail activities. Phygital retailing represents a transformative approach that integrates the physical and digital aspects into a seamless retail experience. Also, aiming to provide customers with a unified and enhanced shopping journey (Ryu et al., 2023; Solem et al., 2022; Lang & Bressolles, 2013). Phygital retailing can fundamentally reshape how consumers interact with retailers. This approach integrates technology and in-person experiences, enhancing accessibility and engagement while satisfying evolving consumer expectations. The key characteristics of phygital retailing include a hyper-focused customer experience, the incorporation of interactive technologies, and the agility of businesses to adapt to market changes. According to Gagné et al. (2024), the deployment of self-service technologies can significantly impact customer satisfaction and buying intentions, emphasising the necessity of a fluid omnichannel experience within retail. This seamless transition between online and physical shopping not only meets consumer expectations but also enhances overall satisfaction by enabling effortless interaction across multiple channels. Lawry (2022) highlights that luxury retail shoppers balance hedonic and status-driven goals through these integrated experiences and illustrating the need for a harmonious blend between physical and digital retail strategies.

The role of technology in phygital retailing is very important because interactive technologies enrich the customer experience while actively engaging users (Boudkouss and Djelassi 2021). Retailers are increasingly adopting these technologies to create memorable shopping experiences that extend beyond traditional retail paradigms. Sharma et al. (2024) note that research on habit development should include these technologies to facilitate personalised customer journeys in phygital environments. Hence, it will help retailers build long-lasting relationships with their consumers. Guzzetti et al. (2024) argue that phygital frameworks significantly redefine how consumers perceive luxury retailing, potentially positioning these approaches as disruptive innovations in the sector. Moreover, phygital retailing requires adaptive business models to accommodate the rapidly changing retail consumer landscape. As businesses adopt more consumer-centric strategies, the shift from traditional multichannel approaches to more sophisticated omnichannel strategies becomes evident. Purcărea et al. (2025) propose a framework that leverages data-driven insights and adaptive technologies to enhance the phygital shopping experience. This transition of adaptability allows retailers to remain competitive and responsive to consumer preferences, further reinforcing the dynamic nature of phygital retailing.

Indeed, phygital retailing embodies an innovative integration of physical and digital retail experiences, characterised by a seamless customer journey, the utilisation of advanced technologies, and a commitment to adaptability. As the retail landscape continues to evolve, the insights gained from phygital approaches will be invaluable for retailers striving to meet the needs and expectations of modern consumers.

The characteristics of phygital retailing (S)

Phygital retailing in supermarkets combines wide technological advancements that increase customer engagement and upgrade the shopping experience holistically. There are several key characteristics of this integrated approach, including click and collect, in-store reviews, augmented reality (AR), location-based push notifications, contactless payments, self-checkout, and self-ordering systems. Each of these elements plays a vital role in developing immersive, seamless interactions between physical and digital environments that cater to the evolving needs and preferences of consumers.

Click and Collect: The click and collect service offers customers the convenience of purchasing products online and picking them up at a physical store. This hybrid model reduces wait times and allows for greater efficiency. Wieland (2021) described that this approach caters to contemporary consumer needs by enabling them to research products online before making a purchase, thus combining the benefits of immediate physical access with the ease of digital shopping. Click and collect allows customers to buy products online and pick them up at a physical store or designated collection point. This approach effectively merges online shopping convenience with the immediate gratification of in-store purchases. This model resembles aspects of traditional retailing, making it an effective solution for consumers seeking flexibility and efficiency (Shahmohammadi et al., 2020). This hybrid strategy adopted by retailers can leverage inventory management systems to provide real-time stock data. It also ensures that customers find their desired items when they arrive in-store. For instance, Grab provides this service to Grab users, where customers can buy groceries through the Grab platform and choose to self-collect their order at the chosen supermarket.

In-Store Reviews: In-store reviews empower customers to make informed purchasing decisions by providing feedback from previous buyers right at the point of sale. The incorporation of interactive technologies in retailing serves to validate purchasing choices and enhances the overall confidence of consumers (Boudkouss & Djelassi, 2021). When customers encounter product reviews posted in-store, they are more likely to feel assured about their choices, especially for products and services perceived as risky or of high cost. Aw et al. (2021) reveal that the inclusion of interactive online reviews aids in promoting "webrooming," where consumers research products online before purchasing them in-store. This real-time customer feedback can enhance validation, reducing perceived uncertainty regarding product quality. By displaying reviews through digital interfaces or integrated mobile applications, supermarkets can tap into social proof to increase customer involvement and engagement, which will lead to satisfaction.

Augmented Reality (AR): The integration of AR happened through interactive tools such as augmented reality and digital kiosks that reinforce the in-store experience (Boudkouss & Djelassi, 2021; Prats, 2022). Retailers facilitate this integration by deploying technologies that allow customers to visualise products in a physical context while accessing additional information seamlessly via digital mediums. For example, interactive mirrors and touch screens enable consumers to virtually try products or personalise their shopping experience, thus enhancing engagement and satisfaction (Prats, 2022; Massi et al., 2025). All interactive features can be particularly beneficial in supermarkets, where customers can use their mobile devices to see how certain products look in their homes or to view additional product information through virtual overlays (Çakırkaya & Koçyiğit, 2024). Bonfanti et al. (2023) found that such immersive experiences engage consumers more effectively and can lead to higher conversion rates and consumer loyalty.

Location-Based Push Notifications: Molitor et al. (2025) define Location-based push notifications as providing retailers with the ability to deliver messages directly to consumers' smartphones when they are within a designated area or near a retail location. Utilising GPS technology, supermarkets can send personalised offers and notifications to customers' smartphones as they enter a store or navigate different aisles. These push notifications can guide consumers toward sales or promotions, thus enhancing the shopping experience with timely information. Kumar et al. highlight that such strategies significantly boost customer engagement by creating relevant and enjoyable in-store experiences tailored to individual shopping

behaviours (Kumar et al., 2023). For example, the customer will receive the notification of promotion, loyalty program, exclusive deal and so on.

Contactless Payment: The integration of contactless payment systems revolutionises the checkout process, allowing customers to complete transactions swiftly and securely using smartphones or contactless cards. Johnson and Barlow discuss how this convenience aligns with consumer preferences for ease of use and speed, especially in a post-pandemic world where hygiene concerns are heightened (Johnson & Barlow, 2021). Retailers can improve customer turnover rates with quick checkouts enabled by contactless systems. Park et al. (2022) identified that users' intentions to adopt contactless payment systems are significantly influenced by their satisfaction with the seamlessness of these transactions. Customers appreciate instant payments simply by tapping their cards or mobile devices at the point of sale, which eliminates cash handling and reduces queuing times.

Self-Checkout: Self-checkout systems provide customers with autonomy and control over their shopping experience. By allowing consumers to scan and pay for items without cashier assistance, supermarkets can reduce waiting times and enhance convenience, which is paramount in today's retail environment (Mikheev et al., 2021). Rashid et al. (2024) added that self-checkout can contribute positively to customer usage intention by reducing the wait associated with traditional cashier-operated checkouts, and Zaveri et al. (2022) affirmed that these systems can effectively mitigate long queues in supermarkets.

Self-Ordering Systems: Supermarkets are increasingly incorporating self-ordering kiosks, enabling customers to place orders for prepared foods or catering services directly from in-store systems. This not only speeds up the process but also allows customers to customise their orders precisely to their preferences, enhancing satisfaction (Marta & Wahyudib, 2023). Self-ordering systems will provide a touchscreen kiosk within the retail space (Weny et al., 2024), facilitate order customisation, and a user-friendly interface (Heriyanto & Husni, 2023) to encourage efficiency & speed.

Hence, the key characteristics of phygital retailing in supermarkets—including click and collect, in-store reviews, augmented reality, location-based push notifications, contactless payment, self-checkout, and self-ordering systems—collectively enrich the customer shopping journey. By seamlessly integrating digital tools within physical retail spaces, supermarkets can enhance customer satisfaction, drive engagement, and promote loyalty while staying competitive in a rapidly evolving retail landscape.

Mehrabian and Russell Theory (P-A-D Model) (O)

Mehrabian and Russell (1974) found that pleasure-arousal-dominance (PAD) is the dimension to measure emotions such as pleasure (happiness or satisfaction), arousal (feeling in stimuli) and dominance (feeling to control the situations). Customer pleasure might affect their happiness and satisfaction in influencing their purchase intention, especially in phygital retail. Shang et al. (2023) asserted that the background colours and music can increase pleasure perceptions among customers through an interactive approach in a phygital retail platform can make them excited about the platform. The attractive atmosphere in a digital environment can foster customer pleasure to have a joyful purchase experience. The attractive elements, such as interactive features, visual storytelling, and even ambient digital elements, contribute to creating an inviting online atmosphere that resonates with consumers on an emotional level (Rana et al., 2023). Vicente-Ramos & Cano-Torres (2022) discussed that engaging digital experience not only leads to immediate satisfaction but also encourages repeated engagement, showcasing the interconnectedness of experience design and consumer behaviour in an online retail setting. Furthermore, the immediate feedback provided by mobile payment technologies—such as auditory alerts confirming successful transactions—has been shown to improve transaction satisfaction and reinforce positive feelings associated with spending (Li et al., 2024). Additionally, Wang et al. (2022) asserted that through mobile payment, customers feel satisfied and convenient to spend their time on shopping activities.

Jiang et al. (2022) and Supriatna et al. (2023) supported that heightened arousal enhances emotional engagement among customers and drives them to make purchasing decisions more readily. The interplay between emotional arousal and customer experience is especially salient in contexts where sensory stimuli are involved. As these social cues involve human-like interactions, they can stimulate emotional arousal, thus

positively impacting customer attitudes and purchase intentions (Jiang et al., 2022). Besides that, the consumers are more inclined to engage in purchasing when their emotional needs are met (Supriatna et al., 2023). The emotional responses elicited from customer interactions are not only immediate but can also contribute to repeat purchases and lead to long-term loyalty. It can also reinforce the need for businesses to focus on enhancing emotional engagement strategies (Kosasih et al., 2022).

Customer perceived dominance can enhance the likelihood of making purchase decisions. Jeong et al. (2024) emphasised the impact of emotional experiences on consumers' brand attitudes in the context of luxury goods and found that positive emotional experiences can significantly influence intentions to purchase luxury items. This aligns with Alshohaib (2024), which indicates that emotional states, including feelings of dominance, directly affect online shopping behaviours and contribute to repeat purchase intentions when consumers feel empowered during their shopping experiences. In addition, Taghikhah et al. (2021) mentioned that consumers' willingness to pay a premium price is related to their perceived dominance over their product choices. When consumers feel they have sufficient control and understanding of the value of what they are purchasing, they are more likely to pay higher prices for these goods.

Purchase Intention (R)

Emotional engagement is critical in influencing purchase intention. Mele et al. (2021) emphasised that emotional and behavioural responses arise from various activities and interactions in the phygital environment, which in turn influence both the perceptions and decisions of consumers. Pusceddu et al. (2023) explained that emotions experienced while shopping are not only triggered by the physical environment but are also amplified through digital interactions, which can influence purchase decisions. Moreover, the use of sophisticated technologies, such as augmented reality (AR), can enhance the phygital experience by providing immersive and interactive opportunities for consumers. Johnson and Barlow (2021) found that the innovations in phygital marketing, including digital sensing and AR, can bridge the gap between the traditional in-person shopping experience and the digital landscape, enriching the consumer's overall shopping journey. This convergence supports higher purchase intentions as consumers feel more connected and engaged through personalised and immersive experiences (Yildiz, 2024)

The Stimuli-Organism-Response (S-O-R) & Proposed Conceptual Framework

The Mehrabian and Russell Theory, also known as the stimulus-organism-response (S-O-R) model, provides a framework for understanding consumer emotions and behavioural responses within retail environments. This theory posits that external stimuli (such as environmental factors) influence internal emotional states, which in turn affect consumer behaviours. In the context of modern retailing, particularly phygital retailing, this theory gains new relevance as digital technologies increasingly shape consumer experiences. In retail environments, factors such as store layout, decor, lighting, and interactive displays can affect consumer emotions. These factors aligned with the emotional dimension emphasised in Mehrabian and Russell's model. Guzzetti et al. (2024) suggest that properly designed phygital experiences can ignite emotions that significantly impact consumer engagement behaviour in luxury retail settings. Retailers that successfully integrate technology into the shopping environment are likely to evoke positive emotional responses, leading to enhanced satisfaction and repeat visits.

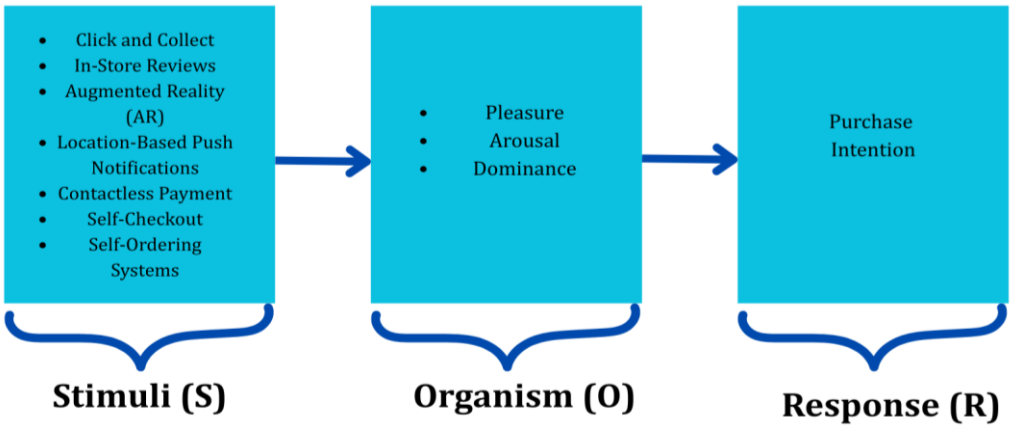
The customer's emotional responses dictate whether consumers engage with a retailer or abandon the shopping experience altogether. Moreover, the emotional engagement facilitated by innovative technologies such as augmented reality contributes to the overall organisational response within the consumer journey. Çakırkaya & Koçyiğit (2024) noted that digital marketing communications, particularly those that employ AR, can improve consumer involvement with brands, creating memorable interactions. This engagement is pivotal, as it transforms passive consumers into active participants in the retail experience, thereby facilitating stronger relationships between consumers and brands. Utilising the S-O-R model also aids in clarifying how different stimuli affect distinct emotional responses, leading to consumer behaviours such as impulse buying. Johnson & Barlow (2021) reinforce this perspective by reviewing the psychological intricacies behind consumer behaviours, explaining how phygital innovations can create moods conducive to purchasing. By combining physical and digital elements, retailers can create environments that encourage positive emotional responses, thereby increasing the likelihood of consumers making purchasing decisions. Furthermore, as noted by Mele et al. (2023), the continuous evolution of phygital retail requires a complex understanding of how stimuli and

emotions interact to guide consumer journeys. An effective phygital strategy incorporates elements designed to evoke specific emotional responses, thus dictating consumer behaviours in line with the S-O-R framework. Ultimately, integrating these insights into the broader marketing and retail strategies enables brands to cater to the emotional needs of consumers, fostering loyalty and enhancing the overall shopping experience.

Sivasothey et al. (2024) emphasise the enduring significance of the S-O-R framework in the service industry, demonstrating how environmental factors affect emotional states that drive consumer behaviour. This aligns with the findings of Chen et al. (2021), who applied the S-O-R model to identify how emotional evaluations influenced consumer responses in various contexts, including tourism experiences. The emotional engagement facilitated by such stimuli can generate profound effects on customer loyalty and satisfaction levels. Furthermore, emotional responses engendered by stimuli can control behaviours, reinforcing the significance of emotional states in the customer engagement process. Alsaggaf & Althonayan (2018) apply the S-O-R framework to investigate how emotional and cognitive responses mediate relationships influenced by service quality, showcasing how specific stimuli can steer customer loyalty intentions. The findings state that cultivating positive emotional states is vital for enhancing customer loyalty and retention. Additionally, Pambudi et al. (2023) extend the S-O-R model to elucidate how emotional responses linked to trust and perceived value can significantly impact purchase intentions, establishing a framework that connects emotional engagement to consumer behaviour effectively.

Thus, S-O-R theory is relevant for this research to analyse the consumer behaviour in phygital retail by focusing on the supermarket sector. The elements in phygital retail will be analysed to measure the stimuli that can affect customers' pleasure, arousal and dominance. This is essential to know whether the phygital environment can attract purchase intention among the customers in Malaysia.

Figure 1: Proposed Conceptual Framework



3. Research methodology

Considering positivism as a primary paradigm for this research, the quantitative approach is deemed an appropriate research method to test the proposed model with empirical results. Based on the previous studies and data collection methods that involve using certain instruments, such as a survey questionnaire, to gather quantitative data. (Salkind, N. (2013). For this study, the primary data will be from respondents who have experience as customers in phygital retail through a survey questionnaire, which may be written or oral; thus, for this research online survey is the most suitable method to gather the data. A survey questionnaire costs less than other methods and provides greater population coverage for this study. Given this orientation survey questionnaire must be developed to include all the construct variables in the research model.

Quantitative research methodology focuses on the collection and analysis of numerical data to understand patterns, relationships, and phenomena. In developing and executing a quantitative research study, several critical steps are typically followed, which can be articulated through the elements of problem formulation,

hypothesis development, sampling, data collection techniques, and statistical analysis. This study hypothesizes that the integration of digital elements in a physical retail setting enhances customer engagement. Kumar et al. (2023) substantiate this notion, demonstrating how phygital experiences can indeed transform customer engagement and shape their patronage intentions. Quantitative hypotheses formed in this manner are critical as they set the groundwork for statistical testing.

Sampling, which involves selecting a representative subset of the population and effective sampling methods of sampling ensures that the gathered data reflects the larger population's characteristics. This is especially pertinent in retail settings where consumer diversity can influence shopping behaviours (Bonfanti et al., 2023). The research must be explicit about the sampling strategy employed, as it critically affects the generalizability of the findings.

Data collection techniques in this quantitative research typically employ surveys, experiments, or observational methods. In the context of phygital retailing, surveys facilitated through digital platforms can effectively gather consumer experiences and interactions with retail environments. This method allows researchers to quantify variables, such as experiences of technology integration and its impacts on consumer engagement. Moreover, advances in artificial intelligence and digital technologies have opened avenues for novel data collection methods, enriching traditional approaches. Statistical analysis is the culmination of the quantitative research process. Analysing the collected data involves applying appropriate statistical tests to validate or refute the hypotheses. Techniques such as regression analysis, ANOVA, or structural equation modelling are frequently used to evaluate data and ascertain the strength of relationships between factors. For example, analyzing consumers' responses could reveal significant correlations between customer engagement and phygital retailing.

To summarize, a robust quantitative research methodology emphasizes a systematic approach encompassing problem definition, hypothesis formulation, careful sampling, and rigorous data collection and analysis. In the evolving context of phygital retailing, leveraging these steps helps understand intricate consumer behaviours and enhances the overall retail strategy.

4. Discussion

The concept of phygital retailing includes a blend of physical and digital experiences, which offers a transformative approach to customer engagement and shopping experiences. This convergence has generated interest across multiple disciplines, leading to a rich body of literature exploring its implications, mechanisms, and effectiveness within diverse contexts. Phygital marketing is a pivotal strategy that leverages both physical presence and digital technologies to enhance customer engagement (Sukheeja & Shekhawat, 2025). The necessity of integrating these dimensions to create compelling customer experiences. This notion is echoed by Purcărea et al. (2025), who argue that retailers must utilize data-driven insights and adaptive strategies to optimize phygital experiences, particularly in the context of evolving consumer behaviours. In examining specific consumer behaviours, innovative technologies influence customer experiences (Kumar et al., 2023). Hence, employs the Stimulus-Organism-Response (S-O-R) framework to elucidate the pathways through which phygital elements contribute to customer engagement. Similarly, Pusceddu et al. (2023) explore the typologies of customer experiences in high-tech retail environments, offering insights into how firms can manage and enhance these experiences through agile strategies. This research is deemed to present a unified perspective that the thoughtful integration of digital tools within physical stores can significantly bolster customer experience and engagement. Bartoli et al. delineate nine building blocks of phygital brand environments, demonstrating the complex interplay between consumer experiences, environmental features, and brand interactions (Bartoli et al., 2023). This framework suggests that thoughtful design elements within phygital environments can enhance relationship-building processes between brands and consumers, engendering deeper loyalty and emotional connections.

5. Managerial & Theoretical Implications

The implications of phygital retailing experiences encompass both managerial and theoretical dimensions, reflecting the increasing integration of physical and digital elements in consumer interactions. As organizations

navigate this evolving landscape, understanding and leveraging these dual modalities become paramount. The managerial implications of phygital environments require a strategic focus on enriching consumer journeys, enhancing customer engagement, and optimizing operational efficiencies.

From a managerial perspective, creating a phygital retailing experience involves recognizing the benefits derived from employing a variety of consumer touchpoints. This framework may indicate that customers who encounter multiple touchpoints throughout their shopping journey report enhanced purchase behaviours and overall experience. The ability to blend online elements, such as personalized recommendations and digital storefronts, with in-store experiences can create a richer, more satisfying shopping context that resonates with consumers (Kumar et al., 2023). Furthermore, in navigating the complexities of phygital environments, retailers must adopt flexible strategies that address the diverse needs and preferences of customers. Recent studies emphasize that the effective management of customer experience in phygital contexts not only enhances consumer satisfaction but also fosters loyalty. This necessitates implementing agile strategies that can adapt to varying customer responses in high-tech retail settings. Such approaches allow firms to harness both physical and digital characteristics, tailoring interactions to fit specific consumer demands and thereby enhancing the overall phygital customer experience. Theoretical insights about phygital environments further enrich our understanding of consumer behaviour in these hybrid spaces. This theoretical lens prompts further inquiry into how emotions, contextual factors and consumer touchpoints interact within phygital environments. By examining these dynamic interactions, researchers can better understand the elements that drive customer satisfaction and loyalty in a phygital context.

Moreover, as digital technologies continue to shape the retail landscape, the need for a systematic framework that delineates the components of phygital strategies becomes increasingly important. Identifying key aspects such as technological innovations, the role of physical spaces, and the implications of consumer interactions can inform both academic scholarship and practical applications within retail environments. Such frameworks will assist managers in leveraging insights from consumer behaviour studies to cultivate unique and pertinent phygital strategies that drive competitive advantage. Importantly, as phygital retailing matures, companies must focus on creating immersive and seamless experiences. The alignment of design principles to ensure sensory coherence between physical goods and digital services may significantly enhance customer interaction. This immersive approach not only augments the customer experience but also transforms consumer expectations regarding how products and services are marketed and delivered in a phygital framework.

Conclusion

The objective of this paper was to establish a future possible research framework to explain the phygital retailing profile, compare and explore the characteristics of customers who took part in these retail activities. In conclusion, the integration of physical and digital elements in retail poses both significant challenges and opportunities for managers. Understanding the dualistic nature of consumer experiences in phygital contexts can inform strategies that enhance engagement and operational effectiveness. Theoretical frameworks focused on phygital experiences will continue to evolve, demanding ongoing research to capture the richness of consumer interactions and the implications for retail management practices. The emergence of omnichannel retailing has reshaped consumer expectations and necessitated strategic adjustments among retailers. As consumers increasingly seek integrated shopping experiences, the need for retailers to adopt cohesive and consistent strategies across various channels becomes clear. Research suggests that a broad focus on data integration, supply chain optimization, enhanced engagement, and consistent branding is crucial for retailers aiming to thrive in the new normal.

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Assessing Perceived Benefits and Perceived Barriers to Students' Physical Activities

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Abstract: Physical activity is essential for maintaining individual health through indoor or outdoor activities. Whether the individual or group initiates it, the physical activity should be encouraged and included for students at the university. However, students encounter various barriers that hinder their engagement, including time limitations, a lack of motivation, and inadequate access to facilities. Nevertheless, they recognize the numerous benefits of physical activity, including improved mental and physical health, stress alleviation, and enhanced academic performance. This study investigates the relationships between perceived barriers, perceived benefits, and students' physical activity. A cross-sectional, quantitative approach was adopted, with data collected through structured online questionnaires. The sample comprised 150 students selected using convenience sampling. Data analysis was conducted using SPSS Version 23, employing descriptive and inferential statistical methods. The findings indicated a significant positive correlation between perceived benefits and physical activity, while perceived barriers did not demonstrate an important relationship. This study highlights the necessity for universities to improve access to facilities, offer flexible scheduling, and cultivate a supportive environment that promotes active lifestyles among students.

Keywords: *Students' Engagement, Motivation, Facilities*

1. Introduction and Background

Physical activity is crucial for maintaining overall health and well-being, especially in young adults. In the Malaysian context, university students face several challenges and barriers to engaging in physical activity, which are influenced by many factors. For example, a study at Universiti Kebangsaan Malaysia identified these barriers. It showed that the main barriers to sustaining an active student's lifestyle in university were often time limitations brought on by their academic obligations and a lack of parental engagement. Furthermore, it has been demonstrated that there is a significant drop in physical activity levels throughout the secondary school to university transition, which increases the hazards of sedentary behavior, including obesity and associated health problems (Othman et al., 2022). Numerous studies have found that university students frequently face obstacles when engaging in physical activity. Lack of time is among the most common obstacles, since students struggle to manage their academic obligations with extracurricular activities (Brown et al., 2012). Lack of desire frequently worsens this time constraint; students may struggle to maintain an active lifestyle without a strong sense of personal drive (Gyurcsik et al., 2006). Another major obstacle may be the scarcity of appropriate workout facilities. Off-campus options may be unavailable because of expense or distance, and university campuses may not always offer convenient or sufficient areas for students to participate in physical activity (Silva et al., 2022).

Social effects are also important in supporting and encouraging students to exercise regularly. One of the social effects is that peer pressure and a lack of social support can negatively impact students' physical activity levels. Students are discouraged or demotivated to self-exercise without being accompanied by many friends or family members (Salvy et al., 2008). Another social effect comes from environmental factors, such as bad weather, risk, and threats from the surroundings, for example, from any stranger while exercising in a location with fewer people. The weather conditions, such as heat, cold, or rain, might make it challenging or risky for them (Trost et al., 2002).

Despite these barriers, students understand that physical activity has many advantages. When students frequently exercise, there will be a reduction in the risk of obesity and diabetes, which is a common problem affecting students (Warburton, Nicol & Bredin, 2006). Moreover, physical activity has the potential to improve mental health. Evidence from Biddle & Asare (2011), who conducted a study about physical activity and mental health in children and adolescents, found that physical activity improved mood, increased cognitive performance, and lessened the symptoms of depression and anxiety (Biddle & Asare, 2011). Students may

benefit from any disease and mental health issues whenever they have the self-discipline to do physical activities and exercise to maintain health. Additionally, there is evidence linking physical activity to improved intellectual achievement. Regular exercise has been shown to enhance focus, memory, and academic performance in general (Dwyer et al., 2001). The link between academic achievement and physical exercise emphasizes encouraging students to have active lifestyles for their academic and health. Furthermore, many students say that exercising boosts their self-esteem and body image. Frequent exercise can result in physical changes like muscle growth and weight loss, improving a student's confidence and sense of self (Pronk & Kottke, 2009).

Personal characteristics, such as self-discipline and enjoyment of physical activity, are important (Dishman, Heath, Schmidt, & Lee, 2021). Students who regard exercise as pleasurable and intrinsically fulfilling are more likely to maintain regular physical activity. Likewise, people with higher levels of self-control and self-motivation are more likely to overcome obstacles and continue leading active lives. Students' physical activity is also greatly influenced by social networks. Peer, family, and friend support can motivate adolescents to remain active. As per Giles-Corti and Donovan (2002), engaging in group exercise courses or having a workout partner can provide a source of accountability and inspiration. Another crucial element is the facilities. The facilities, such as gyms and sports complexes, could encourage physical activity among students (Haskell et al., 2007) because all equipment, machines, rooms, and facilities encourage students to do physical activity in their free time. Universities that invest in providing the facilities, designing accessible, safe areas for physical exercise may encourage students to have physical activity and may gain the outcome not only students' health but also beyond that, such as academic performance and active participation in curriculum or activities organized by universities. For instance, universities organize fitness programs, such as Zumba and running programs, which can cultivate and promote physical activity (Warburton et al., 2006). Therefore, this study aims to investigate the most significant influence of perceived barriers and benefits on students' physical activity among local universities in Selangor.

2. Literature Review

Perceived Benefits of Physical Activity

Physical activity benefits among university students abound and have a central goal to aid in improving various aspects of life. Exercise on a regular basis has numerous advantages, mainly physical and mental health and overall quality of life. A clear benefit is increased physical appearance, thus an increase in self-confidence and self-esteem. Physical activity has been known to be related to good cardiovascular fitness, moderate control of weight, and high physical fitness levels, such as strength, flexibility, and stamina. These elements come in especially handy for students who have a sedentary lifestyle due to their studies. Research done by Warburton et al. (2006) suggests that physical activity has a role in decreasing chronic diseases such as heart disease and diabetes, even in the younger generation. Being physically active further helps raise energy levels that allow students to perform their daily functions better.

In addition, regular exercise plays a critical role in supporting mental health. Many reasons and factors cause students to experience stress, anxiety, and sleep difficulties due to academic pressures, so practicing frequent physical activity provides a way to minimize these situations. For instance, daily exercise, as mentioned by Rebar et al. (2015), may release endorphins, which can improve the mood of an individual from feelings of depression and anxiety. Additionally, physical activity is beneficial to enhance sleep quality, so that an individual is able to think rationally and maintain good emotional control. According to Brant et.al (2009), with physical activity, the students can manage positive sleep patterns and regulate their emotional well-being, which ultimately leads to giving more focus and increasing academic productivity.

Physical activity also fosters social interaction and contributes to academic success. Participating in group activities or sports helps students build friendships, develop teamwork skills, and expand their social networks (Mathunjwa et al., 2024). Beyond the social benefits, exercise has cognitive benefits that directly impact academic performance. Foley, Darcy, Hergesell, Almond, McDonald, and Brett (2024) demonstrated that regular physical activity enhances brain function, improving memory, attention, and problem-solving abilities. These benefits improve students' academic outcomes and create a balanced and fulfilling university experience. Promoting accessible exercise opportunities on campuses can encourage more students to reap these

multidimensional benefits. The benefits of engaging in physical activity are crucial aspects that directly impact students' physical activity. Studies indicate that if students actually comprehend and experience exercise's rewards, chances improve that they will adhere to consistent workout schedules. For example, noticing gains in physical looks and body structure can be a highly influential factor, in particular among those who take appearance concerns seriously (Jankauskiene et al., 2022). This encouragement tends to produce consistent physical activity participation. Furthermore, exercise's stress relief component is a pivotal factor among students experiencing school stress. Recognizing that activity can help mitigate stress and strain helps prompt others to incorporate exercise into daily life (Teuber, Leyhr & Sudeck, 2024). If students become aware of these rewards, they will be prone to place a higher importance on physical activity use, improving overall rates of use (Wiseman, 2024).

According to research, engagement in physical activity has a plethora of health benefits that greatly promote students to lead active lifestyles. Such rewards include weight loss, improved cardiovascular function, and the avoidance of numerous diseases (Curtin, 2024). If students become aware that regular exercise can improve their overall wellness and prevent chronic diseases, then they become more likely to seek out physical activity daily. Expanding beyond a physical state of wellness, exercise has great cognitive benefits too that include mood booster effects and a reduction in depression and anxious features (Wanjau et al., 2023). Students who receive these mental wellness benefits tend to be more committed to a regular workout schedule since it has a positive effect on overall wellness. By placing importance on these wellness effects and a friendly environment for physical activity, higher education institutions can inspire students to adopt a schedule of regular exercise. Such a tactic not only progresses wellness but also elevates the overall quality of life among students. Expanding on this research-based knowledge, a hypothesis was developed to further examine how these aspects affect student motivation and physical activity participation.
Hypothesis 1: Perceived benefits are significantly related to students' physical activities.

Perceived Barriers to Physical Activity
A physical activity, particularly in a university environment, is flexible for students to do by themselves or actively participate in any program organized by the university. However, there are many perceived barriers for students to do the physical activity, such as time limitations and the unavailability of activity spaces (Brown et.al, 2024; Rubio et.al, 2015). Many students complain of a lack of available facilities owing to the restricted operational hours of the gymnasium and sports facilities, which the majority of students are unable to access. Furthermore, the mere distance employed to access these facilities is said to be a barrier to seamless integration of physical activity within your everyday schedule. Psychological and social aspects account for more than just the actual gaps within the physical environment. Lack of initiative on the part of the students, as well as the insufficient persuasive power from their peers and close relatives, pushes down their readiness to engage in exercise. The constant pressure of assignments and mental exhaustion further exhausts the student's energy, making exercise foreign to them. Students' psychological barriers and emotional conditions affect the way they view and take part in physical activities. Improving mental health facilities, building mental health community support networks, and educating the public on mental disorders need simultaneous implementations (Estrada, 2024; Duffey et al., 2021)

Students' opportunity to exercise is dependent on how readily available the opportunity is. The distance students have to travel to exercise, the hours, and the exercise location have a big impact on students' willingness to participate (Koh et al., 2022). The distance and the way the exercise is structured often repel students from exercising and fail to maintain a routine, regardless of intrinsic motivation and the need to exercise. Data points to the fact that the greater the imbalance that students have to work on, in terms of academic, leisure, and physical activities, the less they tend to exercise (Raza et al., 2022; Deforche et al., 2015).

Combined, these investigations show that students who do not engage in psychological activities or have psychological impediments, whom secure access to exercise facilities do have a greater level of physical activity done, do not engage in physical activity, and do more exercise than other students do not engage in more exercise than students who have other students do not do students who engage in more exercise do more exercise do not engage in more physical activity than other students do not do students who have more active do not students exercise do not engage in more active do not engage in more active do not exercise physical activity engage in more students have more active lifestyles. Meanwhile, Deforche et al. (2015) elaborate on

how students with available time to exercise and available exercise facilities available to them exercise much less than their peers, and also engage in physical activity that is much less than that of their peers. This gap in exercising and the available exercise schedules often leads students to neglect exercising altogether, since it becomes less favorable to engage in the activity. This activity, however, is something that a lot of students struggle with accomplishing on a day-to-day basis. Bridging these gaps of access to exercise facilities and setting aside time to exercise more frequently could boost physical activity in students at a university. Therefore, based on this understanding, the following hypothesis was developed:
Hypothesis 2: Perceived barriers are significantly related to students' physical activities.

3. Research Methodology

The purpose of the study is causal research and hypothesis testing, which is to determine the reasons for the relationship between the variables. The research identifies 150 students from selected local universities in Selangor to complete the survey for data collection on students' physical activity and its perceived barriers and benefits. A sample is a specific group of individuals or units selected from a larger population to collect data. The sample size is always less than the total size of the population (Bhandari, 2020). Using G*Power, the researcher set the effect size at 0.15 (medium effect), α at 0.05, and power at 0.80; thus, the sample size is 68. Some investigators power their studies for 90% instead of 80%, and some set the threshold for significance at 0.01 rather than 0.05 (Andrade, 2020). Figure 2 shows the sample size calculation using G*Power software. The questionnaire included modified and unique items based on earlier research by Dinc et al. (2019) and Alkhawaldeh et al. (2024), as shown in Table 1.

Table 1: Items Measurement

Variables	No of Items	Sources
Perceived Benefits		Alkhawaldeh et al. (2024)
Social Interaction	3	
Life Improvement	4	
Preventive Health	4	
Physical Performance	8	
Perceived Barriers		
Exercise Milieu	5	
Time Expenditure	3	
Physical Exertion	4	
Family Discouragement	13	

According to Table 2, the demographic data shows that women represent 89.0% of the total respondents, while men make up just 11.0%. This implies that women heavily dominate the sample. Regarding faculty representation, the Faculty of Business and Management accounts for almost half of the participants (47.3%), with the Faculty of Health Science coming in second with 36.3%. Smaller percentages are contributed by other faculties like education (3.3%), accounting (5.5%), architecture, planning, and surveying (5.5%), and hotel management and tourism (2.2%). A significant concentration of participants with backgrounds in business and health sciences is evident from this distribution. Most respondents (60.4%) said they exercised 1-2 times per week, while 24.2% said they exercised 3-4 times per week. With 2.2% exercising five to six times a week and another 2.2% exercising daily, only a small percentage of the sample reported higher activity levels. Remarkably, 11.0% said they never work out. Just 9.9% of people do high-intensity aerobic workouts, whereas the vast majority (59.3%) do low-intensity aerobic exercises. According to this pattern, most people engage in some physical activity, but it is typically low to moderate in frequency and intensity. Although there is potential for improvement in consistency and intensity, the data show that the population is generally health-conscious and somewhat aware of the value of physical activity. Strong representation from the faculties of business and health may impact these trends, as business students may be more sedentary due to their academic workload. In contrast, health science students may be more conscious of physical wellness. The data indicate potential areas for encouraging more frequent and vigorous physical activity, particularly among less active groups, and reveal a gender-skewed, moderately active population that prefers low-intensity exercise.

Table 2: Demographic Factor Analysis

Classification		Frequency	Percentage (%)
Gender	Male	10	11.0
	Female	81	89.0
Faculty	Faculty of Business and Management	43	47.3
	Faculty of Health Science	33	36.3
	Faculty of Education	3	3.3
	Faculty of Accountancy	5	5.5
	Faculty of Architecture, Planning and Surveying	5	5.5
	Faculty of Hotel Management and Tourism	2	2.2
How many times have you exercised in a week?	Never	10	11.0
	1-2 times a week	55	60.4
	3-4 times a week	22	24.2
	5-6	2	2.2
	Everyday	2	2.2
Types of physical activity	Aerobic exercise (Low intensity)	54	59.3
	Aerobic exercise (High intensity)	9	9.9
	Strength training	8	8.8
	Flexibility exercise	11	12.1
	Balance exercise	9	9.9
How much time do you spend on each session?	Less than 10 minutes	22	24.2
	10-20 minutes	24	26.4
	20-40 minutes	24	26.4
	40-60 minutes	14	15.4
	More than 60 minutes	7	7.7

4. Results

All three variables shown in Table 3, perceived barriers, perceived benefits, and students' physical activity, were within acceptable ranges of skewness and kurtosis, according to the descriptive statistics, indicating that the data are roughly normally distributed. The skewness for the 29 items in the perceived benefits scale, which ranges from -1.354 to -0.224, indicates a slight to moderate negative skew, indicating that responses tended to lean toward higher agreement or positive perception of benefits. Within acceptable bounds for normalcy, the kurtosis values range from -0.043 to 4.318, representing distributions primarily mesokurtic (normal) to slightly leptokurtic (peaked). The 14-item Perceived Barriers scale has skewness values ranging from 0.113 to 2.187, indicating a mild to moderate positive skew. This suggests that although responses to some items may have been more variable, participants generally expressed less agreement with perceived barriers. This variable's kurtosis ranges from -0.948 to 4.404, which is within the acceptable range for normal data in behavioral research, even though it contains values above 3 (indicating some peaked distributions). Lastly, the 13-item Students' Physical Activity survey has skewness values ranging from -1.009 to -0.136 and kurtosis values between -0.774 and 0.872. This shows a symmetrical distribution with comparatively flat curves, suggesting that responses to various physical activity-related items follow consistent patterns. All three variables' normality suggests that parametric statistical analyses can be used effectively. The patterns show that students generally recognize the benefits of physical activity, perceive relatively few barriers, and report moderate engagement in physical activities. These findings and the skewness and kurtosis results indicate that the data are well-suited for additional inferential testing. These findings are important for developing successful health promotion strategies in educational settings.

Table 3: Normality Assessment

Variable	No. of Items	Skewness	Kurtosis	Strength Association
Perceived Benefits	29	-1.354 to -0.224	-0.043 to 4.318	Normal
Perceived Barriers	14	0.113 to 2.187	-0.948 to 4.404	Normal
Students' Physical Activity	13	-1.009 to -0.136	-0.774 to 0.872	Normal

According to Cronbach's alpha values, as shown in Table 4, the reliability analysis of the three primary variables, consisting of perceived benefits, perceived barriers, and students' physical activity, shows that all constructs have high internal consistency. For perceived benefits, 29 items showed the result reliability as Cronbach's alpha of 0.946, indicating all items were highly reliable. For perceived barriers, there were 14 items, and the Cronbach's alpha was 0.917, indicating a high level of reliability. Similar to Students' Physical Activity, the Cronbach's alpha of 0.942 indicates an outstanding internal consistency. These high reliability coefficients, which are all significantly higher than the generally recognized cutoff of 0.70, imply that the survey instrument is reliable and that the items in each construct are closely related. Overall, the findings support the reliability of the items and variables of students' perceived benefits, perceived barriers, and physical activity behavior, which is methodologically sound and dependable.

Table 4: Reliability Analysis

Variable	No. of Items	Cronbach's alpha	Remarks
Perceived Benefits	29	0.946	Reliable
Perceived Barriers	14	0.917	Reliable
Students' Physical Activity	13	0.942	Reliable

Table 5 shows the results of descriptive statistics that show interesting trends in the attitudes and actions of the students. Perceived benefits have a mean score of 4.207 and a comparatively low standard deviation of 0.469. Given the low variability of responses, it can be inferred that students generally have a moderately high perception of the advantages of physical activity. The idea that students understand the value of physical activity is supported by the fact that most seem to agree strongly with its perceived benefits. With a mean score of 2.217 and a standard deviation of 0.779, perceived barriers, on the other hand, indicate a lower degree of agreement with physical activity barriers. This implies that students generally report fewer barriers to physical activity, but the higher standard deviation shows that responses vary widely. While some students may perceive fewer difficulties, others may encounter substantial obstacles. Lastly, students participate in physical activity at a moderate frequency, as indicated by the mean score of 3.913 for students' physical activity and a standard deviation of 0.684. The lower standard deviation indicates that respondents' activity levels follow a fairly consistent pattern, with most students probably participating in regular but moderate physical activity. Overall, the findings show that students maintain moderate physical activity levels while acknowledging the advantages of physical activity and perceiving fewer obstacles. These results point to possible areas for intervention, including encouraging more frequent physical activity by addressing individual barriers and highlighting the advantages for those who might be less active.

Table 5: Descriptive Analysis

Variables	Mean	Std. Deviation
Perceived Benefits	4.207	0.469
Perceived Barriers	2.217	0.779
Students' Physical Activity	3.913	0.684

Pearson Correlation: Correlation analysis results are shown in Table 6, which shows the presence and strength of a connection between two or more measurable variables. This study uses correlation analysis to determine whether there are relationships between the independent variables (perceived benefits and perceived barriers) and the dependent variable (students' physical activity level). Hair et al (2010) suggested that the coefficient values less than 0.3 are considered low, 0.3 to 0.66 are moderate, and more than 0.61 are strong. With a p-value of 0.001 and a coefficient of 0.676, the findings demonstrate that Perceived Benefits have a positive and statistically significant** effect. Higher perceived benefits are linked to a higher likelihood or

intensity of the measured outcome, indicating a strong and consistent positive relationship. Conversely, Perceived Barriers have a p-value of 0.223, which is not statistically significant, but a negative coefficient (-0.129). This is untrue, even though the table indicates that it is positive and significant. This study cannot conclude that perceived barriers significantly impact this model because the p-value is higher than the typical significance level of 0.05. Therefore, perceived barriers have no discernible effect on the outcome, whereas perceived benefits have a strong positive influence. Hence, hypothesis 1 was supported, and hypothesis 2 was not supported for this study.

Table 6: Pearson Correlation

Variables	Coefficient	P Value	Result
Perceived Benefits	0.676	0.001	Positive and significant
Perceived Barriers	-0.129	0.223	Positive and significant

Regression Analysis: Perceived benefits have a strong, positive, and statistically significant impact on the outcome, according to the regression results. A significant and dependable effect is indicated by the unstandardized coefficient (Beta) of 1.002, the standardized Beta of 0.687, and the t-value of 8.484 ($p < .001$). Therefore, Hypothesis 1 was supported. However, the standardized beta is 0.041, the unstandardized coefficient is 0.036, the t-value is 0.512, and the p-value is 0.610. Because of the weak and non-significant relationship between these values, Hypothesis 2 (H2) is not supported. The overall model is significant ($F = 37.342$, $p < .001$), suggesting that the predictors account for a sizable portion of the variation in the result. With an R2 of 0.459 and an Adjusted R2 of 0.447, the model appears to account for roughly 45% of the variance in the dependent variable, which is a significant amount for social science research. As a result, perceived advantages greatly influence the result, whereas perceived obstacles have little bearing. All things considered, the model is robust and statistically sound.

Table 7: Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Results
	Beta value	Std. Error	Beta			
Perceived Benefits	1.002	.118	.687	8.484	<.001	H1 Supported
Perceived Barriers	.036	.071	.041	.512	.610	H2: Not Supported
F value	37.342					
Significant	<.001					
Adjusted R^2	.447					
R^2	.459					

Discussion

The findings indicate a significant positive relationship between perceived benefits and students' physical activity levels. This suggests that the advantages of engaging in physical activity are essential and directly affect students' involvement in exercise. When students recognize and experience these benefits, they are more motivated to maintain consistent exercise routines. For example, the desire to improve physical appearance and body shape can strongly motivate students concerned about their looks (Jankauskiene et al., 2022). This aspiration to enhance their appearance can drive them to engage in regular physical activities. The results of these studies illustrate that students' perceptions of the benefits associated with physical activity can significantly influence their overall engagement in exercise. Additionally, many respondents agree that the greater the perceived benefits, the more likely students are to partake in physical activities. Psychological factors such as body image, stress, and self-efficacy, defined as one's belief in their ability to exercise, also motivate students to engage in physical activities (Brown, Henderson, & Stern, 2024). By promoting these benefits and fostering an environment that supports physical activity, universities can encourage students to exercise regularly, ultimately leading to improved health and well-being.

In addition, the study's findings suggest that perceived barriers to physical activity have little effect on students' engagement in physical activity. The weak correlation between these perceived barriers and physical activity levels indicates that they are not a significant factor for the students involved in the research. Specifically, local

students from the selected local university do not face substantial challenges related to these barriers. Moreover, students' awareness of the benefits of physical activity may account for the diminished significance of perceived barriers. Many students recognize the mental and physical health benefits of staying active, such as reduced stress, improved mood, and enhanced physical strength (Teuber et al., 2024). This awareness likely outweighs any minor inconveniences or barriers, motivating them to pursue an active lifestyle. It is important to note that these findings may be context-specific. Factors like accessible facilities, a supportive campus atmosphere, or cultural influences could lessen the impact of perceived barriers for this group of students. In light of these findings, universities should consider expanding their focus to address additional factors influencing students' physical activity, such as enhancing intrinsic motivation or fostering social support. By gaining a deeper understanding of the unique dynamics within this population, institutions can develop more targeted and practical strategies to promote physical activity.

5. Managerial Implications and Recommendations

The significance of the study on university students' physical activity is multifaceted, addressing critical aspects of public health, educational outcomes, and policy development. Firstly, the study highlights the prevalence of physical inactivity among university students, a growing global concern. By identifying that less than half of the students engage in regular physical activity, the study underscores the urgent need for interventions to promote healthier lifestyles. This finding is consistent with global trends, where a significant proportion of young adults fail to meet the recommended physical activity, leading to increased risks of obesity, cardiovascular diseases, and mental health issues. Secondly, the study provides valuable insights into the perceived barriers and benefits of physical activity among university students. Understanding these perceptions is crucial for designing effective health promotion programs. The study reveals that students recognize the benefits of physical activity, such as improved physical appearance and reduced stress, but also face significant barriers like a lack of accessible exercise facilities and inconvenient schedules. These insights can help universities and policymakers develop targeted strategies to overcome these barriers, such as improving infrastructure and offering flexible exercise schedules. Thirdly, the study's findings on the demographic factors influencing physical activity are significant for tailoring interventions. The research shows that younger students, those who are single, and those with a normal body weight are more likely to be physically active. Additionally, students who perceive their health as excellent are more inclined to engage in physical activities. These demographic insights can guide the development of personalized interventions that consider the specific needs and characteristics of different student groups, thereby enhancing the effectiveness of health promotion efforts.

Moreover, the study emphasizes the importance of self-perceived health status as a predictor of physical activity. Students who rate their health as excellent are significantly more likely to be physically active. This finding suggests that interventions to improve students' self-perception of their health could be an effective strategy to increase physical activity. Programs focusing on enhancing students' awareness of their health status and promoting positive health behaviors could lead to better engagement in physical activities. Additionally, the study identifies specific perceived benefits and barriers to physical activity, which have important implications for program design. Students reported that improved physical appearance and stress reduction were primary motivators for engaging in exercise, while lack of accessible locations and inconvenient schedules were noted as significant barriers. Understanding these motivations and deterrents provides a clear pathway for universities to develop more accessible and appealing physical activity programs. By aligning physical activity opportunities with students' identified benefits, universities can encourage greater participation while addressing logistical issues, which can help to reduce perceived barriers and promote a culture of health within the campus environment. Thus, according to earlier research, students who are self-conscious about their appearance may find that the advantages of physical activity, such as an improvement in body form and attractiveness, greatly motivate them (Jankauskiene et al., 2022). They may be motivated to participate in physical activities regularly to improve their appearance. Additionally, the psychological advantages, such as improved mood and fewer signs of worry and despair, also lead to increased levels of physical exercise (Wanjau et al., 2023). Because exercise improves their general well-being, students who experience these mental health benefits are more likely to keep up their exercise regimen. By emphasizing these advantages and fostering an atmosphere encouraging physical activity, academic institutions can motivate students to exercise frequently, enhancing their health and overall well-being.

Lastly, the study has significant implications for policy and practice in higher education institutions. By providing comprehensive data on the physical activity and associated factors among university students, the study offers a strong evidence base for developing health promotion policies. Universities can use these findings to implement policies that create supportive environments for physical activity, such as incorporating physical exercise into the curriculum, improving access to exercise facilities, and promoting a culture of health and wellness on campus. These policy changes can improve students' well-being and foster a healthier, more active university community. Based on the previous findings, students' physical activity can be significantly impacted by perceived barriers such as a lack of exercise facilities, complex timetables, and the distance to exercise places. For example, students become less motivated to be physically active when they believe that there are not enough locations to work out or that these venues are not conveniently accessible or scheduled (et al., 2022). A study also showed that students who depend on community or university resources may have fewer possibilities for physical activity due to limited access to exercise facilities like gyms or sports fields (Raza et al., 2022). Therefore, to overcome these barriers, the university may make exercise facilities more accessible by making campus fitness centers more valuable and accessible. This would encourage more students to engage in physical activity. To accommodate a variety of student schedules, this can involve extending the hours that gyms and sports facilities are open and ensuring that all students have easy access to them (Johannes et al., 2024). In addition, by establishing fitness clubs or encouraging group activities, the institution can create a friendly environment that will increase motivation by offering social support. Exercise with peers increases accountability, helps students stick to regular exercise schedules, and makes physical activity more enjoyable (Brown et al., 2024).

Conclusion

The research emphasizes that self-assessed health condition is a vital indicator of physical activity in university students. Individuals who consider their health to be excellent are substantially more inclined to participate in regular physical exercise. This discovery highlights the significance of initiatives focused on enhancing students' views of their health to promote more active living. Initiatives that enhance health awareness and encourage healthy behaviors can successfully boost involvement in physical activity. Moreover, learners recognize improved physical appearance and stress alleviation as key incentives for exercising, whereas obstacles like restricted access to nearby facilities and conflicting schedules impede their activity. Improving facility accessibility, extending operational hours, and offering social support via fitness clubs and group activities can enhance motivation and increase participation. Working out with friends promotes responsibility and enhances the enjoyment of exercise. The study's results indicate that perceived advantages greatly enhance student involvement in physical activity, while perceived obstacles such as distance to facilities and time limitations do not substantially hinder participation. This could be attributed to strong awareness of the advantages of exercise and helpful campus resources, reducing the impact of obstacles.

Consequently, universities ought to focus on programs that emphasize the mental and physical health benefits of exercising, including stress reduction and enhanced well-being. Health promotion initiatives utilizing workshops, online platforms, and peer-led activities can strengthen these messages. Adaptive scheduling, inclusive exercise initiatives, and a friendly campus atmosphere will further promote a culture of wellness and fitness. Consistent input from students can help keep these programs relevant and effective, ultimately promoting healthier, more active lifestyles that improve both student well-being and academic success. Research indicates that physical activity has a positive impact on self-esteem and mental health in university students, with moderate to intense exercise yielding more significant advantages. Men generally exhibit greater levels of physical activity and self-esteem; however, these differences diminish among students participating in intense exercise. Organized exercise plans, particularly those that include social interaction and group involvement, can enhance mental health and maintain active engagement among various student groups (PMC, 2025; Brown et al., 2024).

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Determinants of University Students' Absenteeism: The Role of Financial, Parental and Institutional Factors

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Abstract: Financial issues, university environment, and parental issues have been investigated as factors influencing absenteeism among full-time undergraduate students in a local university in Selangor. An online survey was conducted among 350 students from a local university in Selangor. The survey respondents reported that most of them had absenteeism during their studies. The data collected was then analyzed and applied to a structural equation model (SEM) using Partial Least Squares, and the model consisted of a measurement and structural model. The finding revealed that parental issues do not significantly influence absenteeism among local university students. The results revealed that financial problems and elements of the university environment, like lecture quality, class participation, and support networks, significantly influenced absenteeism. In contrast, parental problems like family expectations, home conflicts, or guardians' pressure did not significantly influence students' attendance. This implies that even if students might experience pressure at home, these elements have less impact than their financial condition and the daily academic surroundings they negotiate. These findings emphasize the need to enhance financial support mechanisms and create a more interesting academic environment to lower absenteeism and support student retention.

Keywords: *Absenteeism, Financial Issues, University Environment, Parental Issues, Education.*

1. Introduction and Background

Absenteeism denotes being absent or unavailable in the educational setting for a full day. The absenteeism among students rises when they fail to attend the classroom or learning environment due to various factors, including insufficient consumable resources, absence of qualified academic staff for supervision, or lack of necessary equipment (Babakhanian et al., 2022). In addition, absenteeism refers to the practice of being frequently absent from the educational environment (Akkus & Çinkir, 2022). Students who cannot attend college or university classes are referred to as absent. Furthermore, students' absenteeism is associated with various contributing factors, including family background, behavioral issues, lack of motivation, and financial, structural, social, and environmental conditions (Gao et al., 2023). Absenteeism may result from factors such as disinterest in studies, disciplinary actions in school, household responsibilities, or peer influence (Sahin, 2023). Moreover, Sosu et al. (2021) found that financial issues constitute the primary concern and significant reasons for student non-attendance in classes, as many cannot pay university fees, cover expenses, or allocate funds for university activities.

Academic performance, retention rates, and overall student achievement can be adversely affected by the chronic problem of student absenteeism at universities (Bapela, 2024). Many full-time undergraduates at a nearby institution in Selangor have complained of absenteeism while enrolled in classes. Financial concerns, the university environment, and challenges relating to parents are some of the underlying elements that preliminary research points to as contributing to this problem (Gana, Rad & Stoian, 2023). Students may be less likely to regularly attend lessons if they are financially stressed, for example, because they cannot afford transportation, food, or academic resources. Similarly, students may be less inclined to attend lectures if they perceive their university atmosphere is uninteresting or unsupportive, with low-quality teaching, low motivation, or inadequate academic support (Perera, 2021). Problems at home, such as arguments or unreasonable expectations, can also strain children emotionally, which might diminish their dedication to schoolwork. New evidence suggests that parental influence could not substantially affect student absenteeism, contrary to previous notions regarding the role of family-related concerns (Gana, Rad & Stoian, 2023). These

findings highlight the critical necessity of investigating the significant influence of financial issues, university environment, and parental issues on absenteeism among students at local universities.

2. Literature Review

Financial Issues: Students from low socioeconomic levels (SES) have many obstacles to regular university attendance. Many studies support a clear relationship between financial difficulty and absenteeism. Researchers, including Ansari et al. (2020) and Mirzaei et al. (2020), have all found that financial hardships are a significant factor causing students to miss class, often regularly. These students are caught in a web of external responsibilities and constraints directly affecting their educational involvement; they are not just bored or indifferent. Financial difficulty often drives students to assume adult obligations beyond their years. Older children may have to look after younger siblings in low-income homes while parents work long hours or several jobs to support the family. Though anchored in survival, this dynamic disturbs the child's learning schedule. Furthermore, many students must help financially with the housework part-time or seasonally. Although the family depends on this work to survive, it can interfere with class hours and leave students too tired or absent to attend classes. Sometimes, students might put income above education just because the immediate financial gain seems more urgent than the long-term value of a degree, especially in settings where educational success does not guarantee upward mobility. Therefore, this study recognized the psychological effects of poverty. Particularly when students believe their efforts will not likely result in a significant change in their situation, students from low-SES backgrounds often suffer from stress, anxiety, and a lack of motivation. This hopelessness can lower involvement and raise absences. Furthermore, lacking basic needs like appropriate food, transportation, learning facilities, or internet access can directly or indirectly cause absenteeism among university students. Hence, the hypothesis of this study is developed as follows:
Hypothesis 1: Financial issues positively and significantly influence students' absenteeism.

University Environment: The university environment is a significant factor in absenteeism among local universities. For example, the student's social environment. According to Khan et. al (2024), students are more likely to skip class if they hang out with friends who struggle academically, are chronically absent, have substance abuse problems, or are criminals. On the other hand, when there are insufficient activities for students in the institution, the lack of suitable attire for the classroom, the too strict discipline, the student's sense of inadequacy toward the lesson (Majeed et. al, 2019), the teachers' or instructors' attitude toward the student could lead to absenteeism. School climate, administrator attitudes, learning styles, cultural differences, relationships with teachers, classmates, school, and curriculum could be why students dislike the institution (Guzman & Doronio, 2025).
Hypothesis 2: University environment issues positively and significantly influence students' absenteeism.

Parental Issues: One of the main practical elements influencing students' attendance is the parental issue; thus, it is crucial. Studies show that students' absenteeism at a rate of five percent is influenced by their family background. Due to family pressure and inadequate preparation of the student for school, students may be absent to draw attention from their families. Home environment, low-income family control, indecisiveness in education, bad parenting, economic conditions, lack of respect in society, drug addiction of family members, such as alcohol and drugs, children having to work, absence of a mother or father, death, marriage, and birth reasons, such as rapid changes in family members.
Hypothesis 3: Parental issues positively and significantly influence students' absenteeism.

3. Research Methodology

Quantitative research was conducted to investigate the significant influence of financial issues, university environment, and parental issues on absenteeism among 351 local universities. A convenience sampling technique was applied to distribute an online survey to the respondents. The items' measurement of absenteeism, financial issues, university environment, and parental issues was validated by previous research, with a reliability greater than 0.7. The five-point Likert scale was applied as 1- Strongly Agree, 2- Disagree, 3- Neutral, 4- Agree, and 5- Strongly Agree. The data collected was analyzed using the Structural Equation Model with Partial Least Squares. The analysis is divided into measurement and structural models. A measurement model assesses the convergent and discriminant validity of the items' measurement. Further, the structural

model assessed the study's hypotheses, including the Path coefficient and the effect size for each relationship. Table 1 shows the respondents' demographic profile. There is an imbalance in gender responses in the sample, with 66.1% of individuals identifying as female and 33.9% identifying as male. The survey primarily covers individuals in the normal age range for higher education undergraduates, as indicated by the fact that the majority of respondents (69.5%) are between the ages of 21 and 23. The percentage among those aged 18–20 (13.4%), 24-26 (12.5%), and 27 and up (4.6%) is much smaller. When broken down by faculty affiliation, most participants (42.2%) are affiliated with the Faculty of Business and Management. While the creative arts and dentistry departments each contribute just 1.4%, other significant faculties include accounting (11.4%), education (10.8%), and health sciences (9.7%). This suggests that different academic fields have varied enrolment or participation rates. The fact that all respondents admitted to missing class at least once shows that this cohort deals with absenteeism. The study's conclusions can be better understood in light of these demographic data, pointing to potential future research directions, especially in gender, age, and faculty-specific variables impacting absenteeism.

Table 1: Demographics Factor Analysis

Demographic Factors		Frequency	Percent
Gender	Male	119	33.9
	Female	232	66.1
	Total	351	100.0
Aged		Frequency	Percent
	18-20 years old	47	13.4
	21-23 years old	244	69.5
	24-26 years old	44	12.5
	27 years old and above	16	4.6
	Total	351	100.0
Faculty		Frequency	Percent
	Faculty of Accountancy	40	11.4
	Faculty of Pharmacy	23	6.6
	Faculty of Business and Management	148	42.2
	Faculty of Education	38	10.8
	Faculty of Health Sciences	34	9.7
	Faculty of Dentistry	5	1.4
	Faculty of Medicine	17	4.8
	Faculty of Hotel and Tourism	26	7.4
	College of Built Environment	15	4.3
	College of Creative Arts	5	1.4
	Total	351	100.0
Have you been Absent from Class?		Frequency	Percent
	Yes	351	100.0

4. Results

Measurement Model

The assessment of the measurement model assesses the factor loading, composite reliability (CR), average variance extracted (AVE), and the heterotrait-monotrait (HTMT) ratio of correlations. Recent studies suggest that the factor loading should be greater than 0.7, and AVE should have a minimum value of 0.50, meaning that a construct explains at least half of the variance in its components (Guenther, Guenther, Ringle, Zaefarian & Cartwright, 2023). Figure 1 and Table 2 illustrate the factor loadings for items measuring four key constructs: absenteeism, university environment, financial, and parental issues. All six items (DV1–DV6) show strong factor loadings for the construct of absenteeism, ranging from 0.704 to 0.815, indicating that these items are

dependable markers of the absenteeism construct and reliable for measuring absenteeism. Compared to the item of the university environment construct, which consists of seven items (EU1–EU7) with factor loadings between 0.644 and 0.801. These findings support the validity of the university environment scale by implying that it is suitable for strong relationships between the items and the underlying construct. Regarding financial issues, item FI1 was deleted because of a low factor loading of 0.321, and FI2 also has a relatively low loading of 0.409, which may indicate some measurement concerns; nevertheless, the remaining items (FI3–FI5) show good loadings (0.76, 0.821, and 0.781, respectively), so they effectively capture the financial issues construct. Seven items (PI1–PI7) total the parental issues construct; all show strong factor loadings from 0.68 to 0.807, verifying their relevance and dependability as item measurements of parental problems. Apart from the low-loading items in the financial issues construct, the factor analysis results show that most items are strong indicators of their respective constructions, supporting the validity and dependability of the measurement model applied in this study.

Table 2: Factor Loading

Constructs	Items	Factor Loading
Absenteeism	DV1	0.754
	DV2	0.741
	DV3	0.815
	DV4	0.704
	DV5	0.715
	DV6	0.719
University Environment	EU1	0.699
	EU2	0.772
	EU3	0.667
	EU4	0.784
	EU5	0.708
	EU6	0.801
	EU7	0.644
Financial Issues	FI1	0.321 (Deleted Item)
	FI2	0.409
	FI3	0.76
	FI4	0.821
	FI5	0.781
Parental _Issues	PI1	0.68
	PI2	0.745
	PI3	0.807
	PI4	0.767
	PI5	0.783
	PI6	0.778
	PI7	0.797

The following analysis represents the convergent validity result as stated in Table 3. The table presents reliability and validity statistics for four constructs: Absenteeism, Financial Issues, Parental Issues, and University Environment. Cronbach's alpha and composite reliability (rhoa and rhoc) are metrics of internal consistency, reflecting the degree of interrelatedness among the items within each construct. A Cronbach's alpha and composite reliability rating over 0.7 is typically considered satisfactory. First, Cronbach's alpha for Absenteeism is 0.837, with composite reliability ratings of 0.843 (rhoa) and 0.88 (rhoc), signifying robust internal consistency and dependable measurement. The Average Variation Extracted (AVE) is 0.551, exceeding the suggested minimum of 0.5, indicating that the construct accounts for almost half the variation of its indicators.

Next, the financial issues construct has a Cronbach's alpha of 0.679, marginally below the generally accepted standard of 0.7, indicating limited internal consistency. Nonetheless, the composite reliability values (0.75 and 0.796) and an AVE of 0.507 are satisfactory, signifying that the concept exhibits sufficient reliability and convergent validity. Furthermore, the parental issues measure demonstrates high reliability, as evidenced by Cronbach's alpha of 0.882 and composite reliability scores of 0.886 and 0.909. The AVE is 0.587, significantly exceeding the criterion, affirming robust convergent validity. The university environment exhibits substantial dependability, evidenced by a Cronbach's alpha of 0.852, composite reliability scores of 0.878 and 0.887, and an AVE of 0.529. Therefore, all constructs satisfy the minimum criteria for reliability and validity, with parental issues, university environment, and absenteeism exhibiting notable reliability and validity, as assessed in this study.

Table 3: Convergent Validity

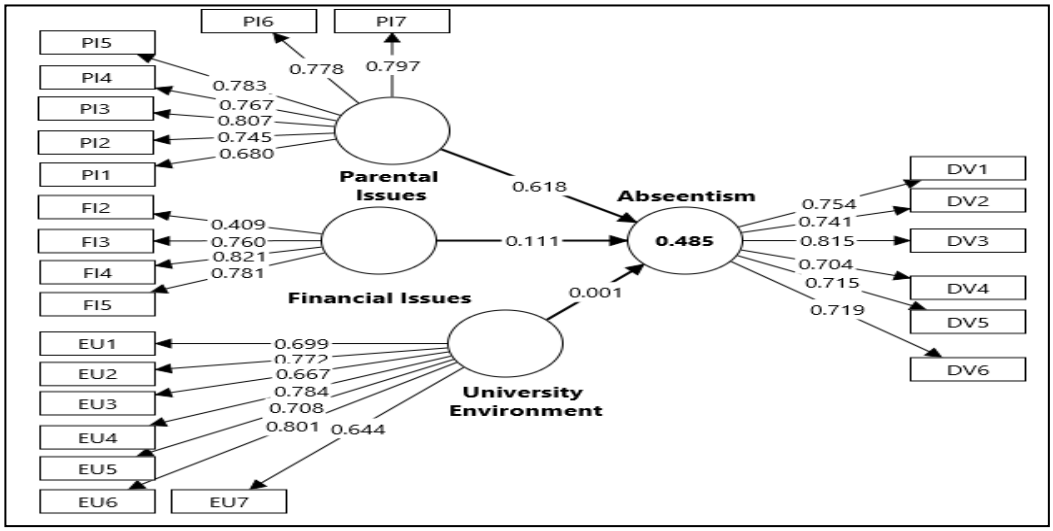
Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Absenteeism	0.837	0.843	0.88	0.551
Financial Issues	0.679	0.75	0.796	0.507
Parental Issues	0.882	0.886	0.909	0.587
University Environment	0.852	0.878	0.887	0.529

The correlation matrix in Table 4 illustrates the interconnections among the four primary constructs in the study: absenteeism, financial issues, parental issues, and university environment. The findings reveal that Parental Issues exhibit the most significant relationship with Absenteeism, demonstrated by a substantial correlation coefficient of 0.797. This indicates that students facing greater parental challenges are considerably more prone to report absenteeism, underscoring the critical impact of family dynamics on student attendance. Furthermore, a significant correlation exists between parental and financial issues (0.789), suggesting that students encountering financial hardships also deal with parental challenges, potentially increasing their likelihood of absenteeism. The analysis reveals a moderate positive correlation between financial issues and absenteeism (0.624), suggesting that financial stress plays a significant role in student absences. The university environment exhibits comparatively lower correlations with absenteeism (0.212), financial issues (0.289), and parental issues (0.297). The observed lower values indicate that, although the university environment contributes to the situation, its direct influence on absenteeism and other related constructs is less significant than familial and financial factors. The findings indicate that factors related to parental and financial circumstances play a more significant role in absenteeism compared to the university environment. The findings highlight the necessity of tackling familial and financial obstacles to effectively lower student absenteeism rates, while acknowledging that enhancements to the university environment, although advantageous, may produce relatively minor impacts. The results offer important guidance for university decision-makers and advisors, highlighting the necessity for thorough support frameworks considering socio-economic and family influences alongside institutional measures.

Table 4: Heterotrait-Monotrait (HTMT)

Constructs	1	2	3	4
1. Absenteeism				
2. Financial Issues	0.624			
3. Parental Issues	0.797	0.789		
4. University Environment	0.212	0.289	0.297	

Figure 1: Measurement Model



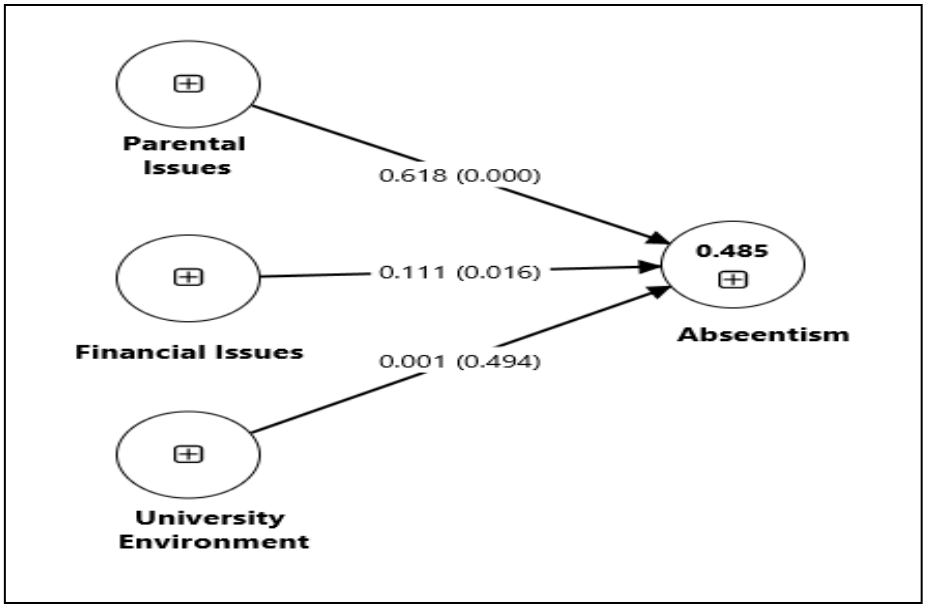
Structural Model

Table 5 outlines the structural relationships among financial issues, parental issues, and the university environment regarding student absenteeism. It employs beta coefficients, standard deviations, t-values, p-values, and confidence intervals to assess the significance and strength of these associations. The correlation between financial issues and absenteeism is positive and statistically significant, indicated by a beta coefficient of 0.111, a t-value of 2.146, and a p-value of 0.016, which falls below the conventional threshold of 0.05. This finding provides evidence for the hypothesis (H1) that financial difficulties are associated with higher absenteeism rates, albeit with a relatively modest effect size. Conversely, parental issues demonstrate a notably stronger and statistically significant positive correlation with absenteeism, evidenced by a beta coefficient of 0.618, a t-value of 10.989, and a p-value below 0.001. The 95% confidence interval for Parental Issues (0.521 to 0.706) underscores the strength of this relationship. Consequently, the evidence indicates that parental issues are a significant predictor of absenteeism (H2), establishing it as the most influential factor among those analysed. Conversely, the university environment exhibits a minimal and statistically non-significant influence on absenteeism (beta = 0.001, t-value = 0.016, p-value = 0.494), as evidenced by a confidence interval that encompasses zero, suggesting an absence of a substantial effect. The findings indicate that the hypothesis concerning the impact of the university environment on absenteeism (H3) lacks support. The collective findings indicate that financial and, notably, parental issues elevate the probability of absenteeism, whereas the university environment appears to lack a direct significant impact. The findings highlight the necessity of considering socio-economic and family-related factors to effectively mitigate absenteeism, since relying solely on institutional factors may not yield adequate results.

Table 5: Structural Model

Relationship	Beta	STDEV	T Values	P values	F Values	LL	UL	Result
Financial Issues -> Absenteeism	0.111	0.052	2.146	0.016	0.013	0.024	0.195	H1: Supported
Parental Issues -> absenteeism	0.618	0.056	10.989	0.00	0.403	0.521	0.706	H2: Supported
University Environment -> Absenteeism	0.001	0.042	0.016	0.494	0.00	-0.059	0.074	H3: Not Supported

Figure 2: Structural Model



Discussion

Examining the financial, parental, and university environmental issues that shape student absenteeism helps one to fully understand and justify the results, which show that financial and parental issues are major predictors of absenteeism. In contrast, the university environment is not supported. The financial difficulties create significant obstacles to academic involvement since students who are struggling financially may be forced to look for part-time jobs, battle with basic needs like their own needs and transportation, or suffer from increased stress and anxiety about their financial future (Pedroso, Alcarde, Gordon, & Ponesto, 2023). These demands can take away from their concentration on their studies and cause more absenteeism since students prioritize immediate financial concerns over classroom attendance. Moreover, parental problems, which are the most important determinant in this study, can cover a variety of difficulties, including conflict within the family, lack of parental support, strong expectations, and even parental health and financial instability (Marlow & Rehman, 2021). Students having parental issues could suffer from emotional pain, low motivation, or more household chores, all of which would affect their regular attendance in class. The close relationship between financial and personal problems implies that these elements often co-occur and aggravate their negative influence on students' educational involvement. On the other hand, the absence of a notable correlation between the university environment and absenteeism could suggest that institutional elements, including facilities, teaching quality, or extracurricular activities, are less immediate than personal and family-related challenges. Improvements in university infrastructure and support systems could also have already reached a point where they no longer significantly affect students' daily decisions to attend classes, or they could be seen as less important than the urgent reality of their home and financial situation.

5. Managerial Implications and Recommendations

The implications of this study should guide focused solutions towards addressing the underlying causes of absenteeism and their connection to financial and parental obligations. Universities could first increase financial support programs, including need-based scholarships, emergency grants, reasonably priced meal programs, and subsidized transportation, to help relieve the financial strains forcing students to choose between employment and study (Summer, McCoy, Trujillo, & Rodriguez, 2025). Personalized counseling and financial literacy seminars could help students properly handle their resources even more. Second, realizing the significant impact of family dynamics, institutions should fund thorough counseling and mental health programs offering students coping mechanisms and emotional support to negotiate parental problems (Jiang, 2024). By forming alliances with local businesses, one can help students and families dealing with more general socioeconomic issues, including health crises or unstable housing. Establishing peer support groups or mentoring initiatives can also give students resilience and a feeling of belonging, thus lessening their isolation

in the face of financial or family difficulty (Beals, Zimny, Lyons, & Bobbitt, 2021). Furthermore, helpful outreach initiatives involve parents and households, teaching them the value of regular attendance and providing tools to reduce family stress. Although the nature of the university environment did not show any apparent direct influence in this study, institutions should continue to develop in teaching quality, student involvement, and campus facilities since these could have long-term or indirect consequences (Bhardwaj, Zhang, Tan, & Pandey, 2025). Reducing absenteeism and improving student success requires a comprehensive, student-centered approach including financial aid, mental health support, family involvement, and community partnerships. The deeper personal and structural issues that students experience can be addressed by educational institutions, creating a more inclusive and encouraging learning environment that encourages regular attendance and academic success.

Conclusion

In conclusion, this study aimed to investigate the significant influence of financial issues, university environment, and parental issues on absenteeism among students at local universities. The finding revealed that financial and parental issues positively and significantly influence students' absenteeism. In contrast, the university environment did not significantly influence students' absenteeism. Education programs' success heavily depends on students' regular presence in class and on campus. Students' presence is crucial for the success of educational policies and reforms. The top management in higher learning institutions is responsible for determining the root causes of student absences and taking appropriate action to eliminate them. The absence seems to influence students' academic performance and society's welfare. Taking actions for students who have disciplinary issues, fail, and show absenteeism is one of the university's natural responsibilities (Hayran & Anik, 2021). Many studies (Conry & Richards, 2018; **Sahin, 2023)** agree that school absenteeism is a complicated problem influenced by several multidimensional elements at the individual, family, school, teacher, and community levels.

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Green Innovation Drivers and their Impact on Competitive Advantage, Operational and Environmental Performance in the Malaysian Automotive Industry

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Abstract: In recent years, environmental crises have been perceived by businesses as significant threats to their operations and long-term sustainability, forcing many businesses to adapt and incorporate environmentally friendly approaches. Due to the increasing importance of environmental issues and demand for environmentally friendly methods, green innovation has emerged as a pivotal strategy for companies to achieve sustainable growth and boost their business's sustainability efforts. The term 'green supply chain management' or 'supply chain environmental management' has only recently gained recognition from numerous companies; thus, only a few studies have been done on the relationship between greening the supply chain, green innovation, competitive advantage, operational, and environmental performance. The paper aims to bridge the significant gap by providing empirical evidence, which will allow the industrial implementation of green supply chains and green innovation to gain a competitive advantage in the global market. Through the findings, it will then improve operational and environmental efficiency. The information was gathered from 240 Malaysian companies in the automotive industry sector through a questionnaire survey. Structural equation modelling was utilized to analyze the data, and through the results, it is evident that greening the supplier through green innovation has a major impact on environmental performance. The results will contribute to facilitating automotive industry professionals in building a systematic blueprint to control and maximize the implemented green innovation practices towards increasing the overall productivity.

Keywords: *Green innovation, automotive industry, competitive advantage, performance, green supply chain management*

1. Introduction and Background

Green Supply Chain Management (GSCM) refers to the integration of environmental principles and practices into conventional supply chain management (SCM). It represents an evolution of traditional SCM by placing greater emphasis on environmentally responsible strategies. SCM involves the interconnected processes that manage the flow of goods and services from their origin to the end consumer (Mentzer et al., 2001; Mukhamedjanova, 2020). In contrast, GSCM expands this function by aligning economic, environmental, and social objectives through the systematic coordination of key inter-organizational business activities, ultimately enhancing the long-term performance of both the organization and its partners (Ageron et al., 2012). GSCM is recognized as a strategic initiative that not only promotes ecological practices but also improves environmental and operational outcomes across all management levels (Zhu et al., 2006). Furthermore, GSCM incorporates environmental considerations into various stages of the supply chain, including product and service design, procurement, manufacturing, distribution, and end-of-life product management, thereby contributing to sustainable competitive advantages (Srivastava, 2007).

The growing importance of Green Supply Chain Management (GSCM) is increasingly evident, particularly in response to mounting environmental pressures such as global warming and industrial pollution. GSCM offers substantial benefits to organizations, aligning with corporate social responsibility (CSR) objectives. Beyond fostering eco-friendly practices, GSCM also enhances stakeholders' environmental consciousness. At its core, GSCM aims to minimize waste by maximizing efficiency. According to Carter and Rogers (2008), effective management of resources and suppliers can reduce production costs, encourage recycling, and support the reuse of raw materials. As a progressive and increasingly adopted practice, GSCM is particularly prevalent among companies striving to elevate their environmental performance. Businesses are integrating GSCM not only to gain a competitive edge but also as a strategic response to the growing emphasis on global sustainability.

Therefore, it is reasonable to assert that GSCM contributes meaningfully to environmental preservation by promoting more sustainable and adaptable industrial practices. Additionally, GSCM presents opportunities for local industries to enhance their competitiveness within the sector, especially in comparison with other developing nations. Nevertheless, concerns remain regarding the direct impact of GSCM on Malaysian manufacturers, particularly if the structural and quality standards required for effective implementation are not adequately met.

Green innovation has recently gained the supposed attention and momentum, albeit with several challenges that can be seen as hindering factors in adopting the innovation into the local automotive production landscape. Local automotive manufacturers often have difficulties in embracing green innovation approaches due to limited environmental awareness, inadequate technical expertise in this area, and unwillingness to adapt or be afraid of changes, especially among companies with a traditional approach tendency. According to Abdullah et al. (2016), the internal barriers, including knowledge barriers and inflexibility to adapt and adopt, have significantly affected the green innovation initiative in the local industry. The limited availability of sustainable materials and insufficient charging stations for electric vehicles are some of the examples that become a hindering element for Malaysia's transition into a more environmentally friendly nation. Thus, integration of green practices across the supply chain can increase the overall performance quality in the Malaysian automotive sector (Khairani et al., 2017).

The study will help to ascertain whether adopting these environmental measures towards automotive-related suppliers can be considered worthwhile for automotive-related suppliers, in the context of environmental and economic considerations. The relationship between GSCM practice in both economic and environmental performances may be moderated by other organizational practices. The fact that enthusiasm for green manufacturing is expanding tremendously within research and industrial communities shall be highlighted.

2. Literature Review

Through literature findings, it was proven that there is a positive relationship between GSCM, competitive advantage, and environmental performance. The study then extends the GSCM framework to include 'operational performance' to the new GSCM framework. According to Azavedo et al (2011), the green supply chain influenced three crucial elements: economic (competitive advantage), environmental, and operational. As the current study attempts to see the influence of GSCM in triggering more competitive dynamics in the local automotive industry, operational performance, as mentioned by Azavedo et al (2011), is influenced by the supply chain framework. In addition, Wang et al (2014) in their study also included 'operational performance' in the supply chain framework, to see whether green innovation influences not only economic and environmental performance, but the overall operational performance of the companies.

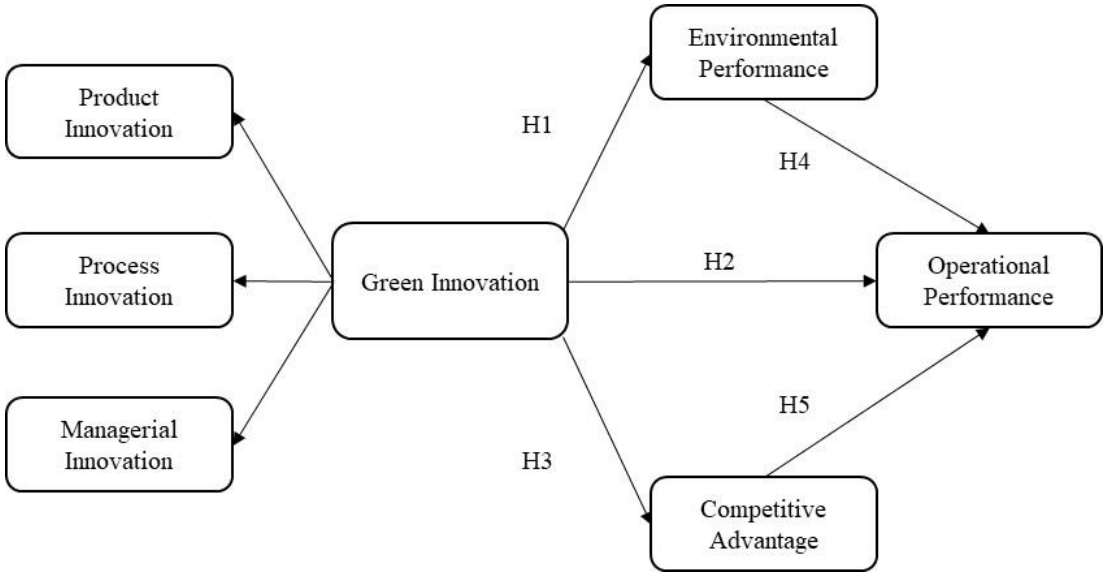
Despite the impressive contribution made by the approach focusing on GSCM, the effort is still in vain, as it tends to be overlooked in the operational context. There is no evidence that shows the association between GSCM and operational; however, can GSCM possibly make a positive contribution towards the operational process? Answering the critical question would pave a path or way to identify significant implications that are heavily bound by the concern of companies that operate in rapidly changing contexts, as they prefer a flexible working approach rather than an efficiency-focused approach (Fisher, 1997; Christopher & Towill, 2000). For example, a company that values flexibility would avail itself to a substantial increase in revenue by providing a necessary quantity of green products to the market.

GSCM can also be labelled as a key organizational capability in supporting effective operational strategies. Klassen and Angell (1998) examined the relationship between manufacturing flexibility and managing the environment; however, flexibility was treated as an amalgamated construct. In another study by Liu et al. (2016), the study delved into the association between GSCM and operational performance in the automotive sector, but like the previously mentioned study, GSCM was viewed as a single integrated construct. The multi-dimensions of GSCM may be concluded as how the roles played by GSCM are changing according to the adoption of a specific operational performance. Hence, the current need to investigate was whether GSCM will efficiently contribute to the operational process, especially taking into consideration the GSCM multi-dimensional nature. The current study will address the gap guided by the primary research question: What is the role played by the

GSCM in the operational performance's successful adoption?

The impact of GSCM antecedents is operationally diverse, perhaps due to different manufacturing processes, raw materials, conversion processes, product characteristics, and reverse logistics activities (Routroy, 2009). The following production process characteristics were identified to the elements that determine the greening of supply chain: (i) the process's capacity to make use of certain materials; (ii) the possibility of putting together reusable or remanufactured components into the system; and (iii) the design for waste minimization (energy, water, raw materials and non-product output) (Sarkis, 2003). Therefore, the effect of green practices on operational performance must be assessed to have information about the competitive priorities related to a company's operations. Zhu and Sarkis (2004,2006) further added, it is pivotal to do an economic performance review, as the review is the 'trigger that pulled' the business to look forward in the effort to implement environmental management practices. For that reason, it is, again, crucial to have sufficient details about costs, efficiency, environmental costs, and revenues.

Figure 1: Research Framework



Hypothesis 1: Green innovation has a positive influence on environmental performance
Hypothesis 2: Green innovation has a positive influence on operational performance
Hypothesis 3: Green innovation has a positive influence on competitive advantage
Hypothesis 4: Environmental performance has a positive influence on competitive advantage.
Hypothesis 5: Operational performance has a positive influence on competitive advantage

3. Research Methodology

Measures and data collection procedure

The data were collected from 240 automotive companies utilizing a structured survey questionnaire. The design of the questionnaire is based on the established constructs from prior studies in the related context, tailored specifically to the automotive industry. It includes a mix of closed-ended and Likert-scale questions to measure various dimensions, such as company profile such including size, years in operation, type of business, operational and strategic practices, as well as employee and organizational factors. Before the main data collection, a pilot test was conducted with a sample of 20 professionals from the automotive sector, and the pilot test sample was then excluded from the final sample. The purpose of the pilot test was to assess the clarity and relevance of the questionnaire, as well as to estimate the estimation of time to complete the overall set of questions. Through the pilot test, the feedback received includes minor revisions such as to improve wording and eliminate redundancy. The purposive sampling method only includes companies based on their relevance to the automotive sector and their willingness to participate in the study. Individuals with managerial positions and department heads are the main target sample as the key respondents due to their expertise and knowledge

of organizational practices. The survey was done both through an online platform and physically, depending on the companies' preferences within the stipulated times. Calls and follow-up were made to ensure the smoothness of the collection process and improve the response rate. Ethical considerations such as informed consent, voluntary participation, and confidentiality were strictly observed and done throughout the data collection process. This is to ensure the collection of reliable and validity of data, suitability for further analysis. Demographic data were also collected to enable subgroup analysis and enhance the generalizability of findings. The sample data will serve as the foundation for the analysis of key constructs such as innovation, performance, digital transformation, and organizational practices within the automotive industry.

4. Results and Discussion

Table 1: Respondents' profile

Company Profile	Frequency	Percentage (%)
Establishment Period		
Under 10 years	15	6.3
Between 10-20 years	82	34.2
Between 21-30 years	83	34.6
Between 31-40 years	31	12.9
Over 40 years	29	12.1
Number of employees		
100 - 300	6	2.5
Between 301 and 500	81	33.8
Between 501-800	71	29.6
Between 801-1000	53	22.1
1000 and above	29	12.1
ISO Certification		
Yes	234	97.5
No	6	2.5
Local Input		
Low quality	9	3.8
High price of local material when available	79	32.9
Non-availability of local materials	122	50.8
Insufficient local materials	14	5.8
Disappointment in delivery time	16	6.7
Others	0	0

Common Method Bias

The distortion of results caused by utilizing the same method to measure multiple constructs, potentially due to both inflating and deflating the relationship between variables. To address the risk of the common bias method, the current study applied several procedural and statistical approaches. The questionnaire was designed to reduce ambiguity by avoiding leading or loaded questions. To ensure the anonymity of the respondents the minimize the likelihood of social desirability responses. The questionnaire constructs were separated to reduce priming effects, with the scale formats varied to be used in any appropriate circumstances to limit response patterns. Harman's single-factor test was conducted as a post-hoc technique to assess the presence of bias. Through the test, all items' measurements were loaded into an exploratory factor analysis. The result then showed that no single factor accounted for most of the variance, indicating that common method bias was not a significant concern for the current study. By combining both procedural and statistical approaches, it helped to ensure the observed relationships between variables were not heavily influenced by methodological artifacts.

Measurement Model

The measurement model is assessed by evaluating construct and discriminant validity. In detail, construct reliability is assessed by using indicator reliability, Cronbach's alpha, composite reliability, and AVE. Meanwhile, discriminant validity will be examined by checking cross-loading and Fornell-Larcker. Table 2 presents the results of the measurement model assessment for both first-order and second-order constructs.

The model includes six key constructs, with all constructs demonstrating acceptable levels of composite reliability (CR). The values of the constructs range from 0.86 to 0.95, exceeding the recommended threshold of 0.70, indicating good internal consistency. AVE values ranged from 0.85 to 0.95, surpassing the minimum acceptable level of 0.50, which confirms the convergent validity of the constructs. The factor loadings for the constructs ranged from 0.54 to 0.87. Although most factor loadings were above the acceptable level of 0.60, a few were slightly lower, such as Managerial Innovation at 0.54 and Product Innovation at 0.56, but were retained due to the theoretical relevance and acceptable overall construct reliability and AVE. The results confirm that the measurement model is both reliable and valid, thus providing a strong foundation for the structural model analysis. The high AVE and CR values suggest that the constructs are measured accurately and consistently, enabling meaningful interpretation of relationships among constructs in subsequent analyses of the current study.

Table 2: Measurement Model

First-Order	*Second-order*	*Item*	*Description*	*Loadings*	*AVE*	*CR*
		CAV	Competitive Advantage		0.65	0.85
		ENV	Environmental Performance		0.87	0.95
		MANA	Managerial Innovation		0.54	0.89
		OPER	Operational		0.68	0.86
		PROC	Process Innovation		0.69	0.90
		PROD	Product Innovation		0.56	0.90

Evaluating the PLS SEM findings involves completing two crucial stages: the first includes evaluating the reflective measurement model and formative measurement models, or both. The evaluation of reflective models incorporates testing for indicator reliability, internal consistency, reliability, convergent validity, and discriminant validity (Hair et al., 2017). However, formative models incorporate two-level stage testing where the first stage tests for convergent validity, collinearity, significance, and relevance of indicator weights, while the second stage incorporates evaluation criteria relating to collinearity, R^2, predictive relevance, f^2, and Q^2 effect size, significance, and relevance of path coefficient (Hair et al., 2017). The formative construct refers to the index of the weighted sum of variables (Kenny, 2016). Furthermore, Kenny (2016) suggests that in some instances, the indicators are triggered by a construct, while in conventional latent variables (reflective constructs), the indicators can be attributed to latent variables. Similarly, Freeze & Raschke (2007) note that reflective measures are caused by latent constructs. Hence, in the context of the study, the items used by the researcher are reflective. Reflective measure simply means that the group of indicators measuring the same concepts is intercorrelated.

Table 3: **Discriminant validity**

	Green innovation	**Environmental performance**	**Operational performance**	**Competitive advantage**
Green innovation	0.53	0.65	0.84	0.46
Environmental performance	0.62	0.95	0.58	0.62
Operational performance	0.66	0.68	0.43	0.89
Competitive advantage	0.91	0.73	0.53	0.69

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs in a model. In the current study, discriminant validity was evaluated using the Fornell–Larcker criterion, which compares the square root of the Average Variance Extracted (AVE) for each construct with the correlations between that construct and others in the model. Based on Table 3, the square root of the AVE for each construct (as displayed on the diagonal) is greater than the corresponding inter-construct correlations (off-diagonal values). For example, the square root of the AVE for Green Innovation is 0.73, which is higher than its correlations with the Environmental Performance (0.65), Operational Performance (0.84), and Competitive Advantage (0.46). The

square root of the AVE for Environmental Performance is 0.97, which exceeds its correlations with all other constructs, such as Operational Performance (0.58) and Competitive Advantage (0.62). The pattern shown is consistent across all constructs, indicating that each construct shares more variance with its indicators than with other constructs. Thus, the results confirm that discriminant validity is established, and the constructs used in the model are empirically distinct from each other.

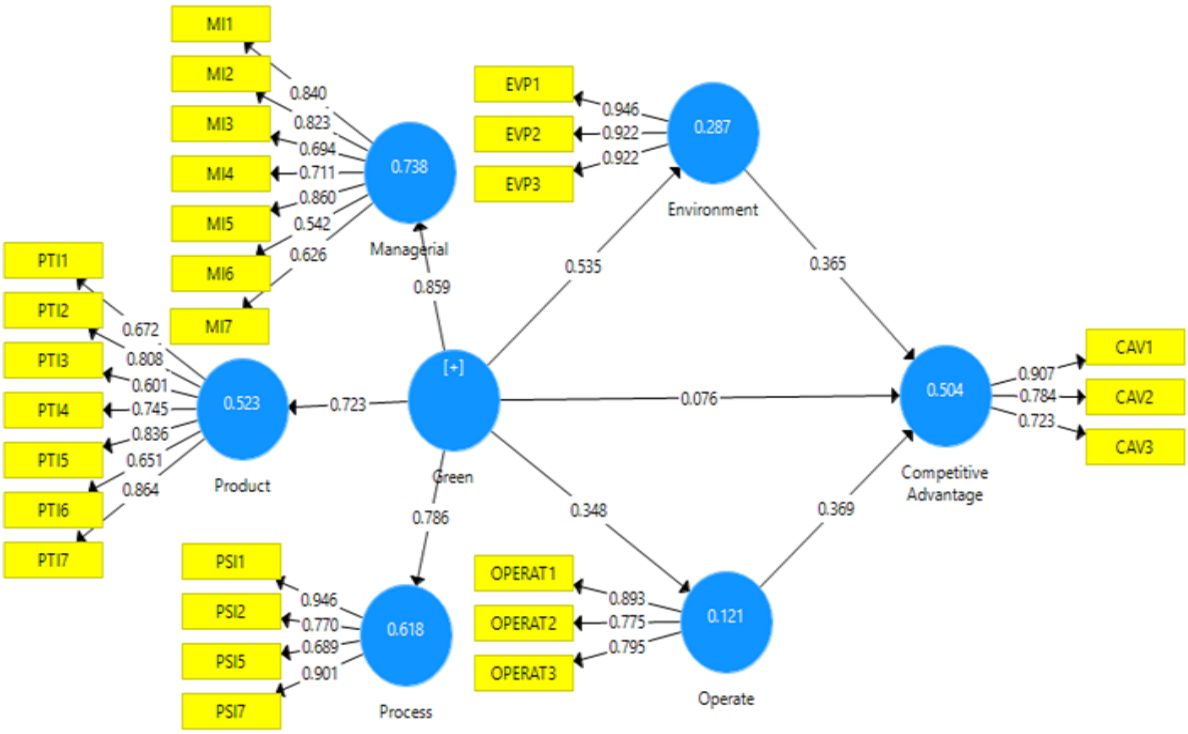
Furthermore, the structural model is examined by using collinearity, R-squared blindfolding, and path coefficient. The Cronbach's Alpha of each item is more than 0.9 and less than 1.0 (0.9 < Cronbach's Alpha < 1.0), which means that the questionnaire has high reliability and consistency. In terms of composite reliability, the values for all constructs are greater than the recommended value of 0.7. That means the measures of the constructs are highly reliable in terms of their internal consistency. In addition, the AVE values for the variables are all greater than the recommended value of, which means that those (indicator) variables in the questionnaire have been understood.

Table 4: Hypothesis testing

Hypothesis		*Beta*	*Std. Err.*	*t-value*	*Decision*
H1	Green innovation → environmental performance	0.54	0.54	10.03	0.00 (Accept)
H2	Green innovation → operational performance	0.35	0.35	5.24	0.00 (Accept)
H3	Green innovation → competitive advantage	0.08	0.08	1.59	0.11 (Reject)
H4	Environmental performance → competitive advantage	0.36	0.36	4.21	0.00 (Accept)
H5	Operational performance → competitive advantage	0.37	0.37	3.79	0.00 (Accept)

Notes: **p < 0.01; *p < 0.05

Figure 2: PLS structural results



As a conclusion, the study discussed the influence of green innovation on operational performance, environmental performance, and competitive advantage among automotive-related suppliers. The result showed that green innovation in terms of managerial, product, and process had a significant influence on operational and environmental performance. Unfortunately, green innovation did not influence the competitive advantage of the automotive-related suppliers in this study. It means, greening the suppliers did not have a significant effect on the competitive advantage of the companies. All the variables showed significant values as well as a positive relationship among constructions, as expected in the table, except for the competitive advantage.

5. Conclusion and Recommendations

As per the discussion, it is worth noting the influence of green innovation on operational performance, environmental performance, and competitive advantage among automotive-related suppliers. The findings indicate that green innovation in terms of managerial, product, and process had a significant influence on operational and environmental performance. However, green innovation did not influence the competitive advantage of the automotive-related suppliers in this study context. The relevance of the statement can be seen from the greening the suppliers did not have a significant effect on the competitive advantage of the companies. All of the variables showed significant values as well as a positive relationship among constructions, as expected in the table below, except for the competitive advantage.

The result showed “operational” significantly included in the GSCM framework, as well as supported by Azavedo et al. (2011) and Wang et al. (2014). Competitive advantage showed an incongruous implication from the previous literature by Porter & Linden (1995), where the scholars contend that stringent environmental regulation, which forces the adoption of clean technology, will yield greater innovation. A higher innovation level will contribute to higher efficiency, hence making companies compete more. It means green practices have zero impact on competitive advantage in this study. This situation is supported by several studies with conflicting evidence, revealing that the integration could only revolve around poor performance. The findings have their relevance in Malaysia due to our country's approach of not being dependent on direct investment in the automotive manufacturer industry, as it intends to promote the local suppliers’ development programs. This indicates that when there is no openness in the economy, Malaysia does not become competitive with other players in the global automotive industry. Based on the Malaysian automotive policy, which sheds more light on domestic capabilities and participation by continuously developing activities for better quality and added value among domestic players. The findings would help companies to become more productive in terms of green innovation in the automotive industry performance in Malaysia. GSCM could also become the guideline for the industry, so they could improve the air quality. For preserving the environment, the government should implement a revised version of the environmental law and regulation by having more frequent inspections, organising more programs and campaigns, and establishing a comprehensive guideline and standard. As a conclusion, this study echoes well the 11th Malaysia Plan (2018-2020), promoting green growth initiatives to achieve by protecting the environment, reducing the amount of greenhouse gases, and spearheading a low-carbon and resource-efficient economy.

The study shows that encouraging green suppliers to lead to internal green products, processes, and managerial innovation will further increase the dynamic and competitive advantages. The researcher implied, through the findings, that the companies should closely work and integrate their business process with their upstream and downstream supplier to achieve significant environmental goals. In addition, it can also relieve the pressure on the purchasers’ requirements. Moreover, by utilizing the green approach, more opportunities will be generated by local businesses compared to their competitors in the global market. Implementing an environmental management approach will involve capital outlay, which is a valuable investment for the future. Businesses should continue to invest more capital and effort in GSCM, specifically in greening the supply chain and green innovation, to be able to meet and keep up with the ever-evolving environmental regulations and maintain a sustainable presence in the global market.

GSCM research in the future should focus more on integrating digital technologies, such as blockchain and AI. The benefits of digital technologies, such as enhancing transparency and sustainability in supply chains, particularly within the automotive sector, have yet to be proven in the local context. In addition, the recent

National Automotive Policy (NAP) 2020 effectiveness needs to be evaluated; thus, future research could provide beneficial insights into the regulatory impacts on green innovation practices. Moreover, there is an increasing need to explore the circular economy models, particularly in end-of-life (ELV) management, to reduce waste and promote efficiency in resource management. As small and medium enterprises (SMEs) are the backbone of the supply chain, a study on barriers and enablers of GSCM adoption among the SMEs requires attention. Other than that, consumers play a crucial role in influencing corporate sustainability strategies. For that, the development of Malaysia-specific context performance metrics seeks to be produced, to assist and guide the development of local policy and business decision-making.

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Fostering Sustainability through Experiential Green Social Entrepreneurship: A Conceptual Approach Using Kolb's Learning Theory

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Abstract: This conceptual paper explores the intersection of sustainability education and social entrepreneurship through an experiential learning lens. While environmental challenges continue to escalate globally, there remains a significant gap in pedagogical approaches that effectively integrate hands-on sustainability education with entrepreneurial thinking, especially among younger learners. This study addresses this gap by proposing a framework grounded in Kolb's Experiential Learning Theory, focusing on how immersive, community-based environmental activities can cultivate sustainable values, social responsibility, and entrepreneurial skills among youth. The framework is modeled on a structured one-day environmental engagement program involving real-world activities aligned with four stages of Kolb's learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The program design is further mapped to relevant Sustainable Development Goals (SDGs) — particularly SDG 4 (Quality Education), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals). The paper finds that such experiential interventions have strong potential in shaping responsible, action-oriented learners and offers a replicable model for integrating green social entrepreneurship into sustainability education. The proposed framework contributes to the growing body of literature by offering a structured pedagogical model that blends environmental stewardship, community engagement, and entrepreneurial learning for youth development.

Keywords: *Experiential Learning, Kolb, Sustainability, Social Entrepreneurship, Youth, Green Education, SDG, Community Engagement.*

1. Introduction and Background

Environmental education is essential for fostering awareness and a sense of responsibility among youth regarding sustainability issues. Despite the rise of environmental education in school curricula, it remains predominantly theoretical, lacking practical and experiential components. Educational activities (Tilbury, 2011). In Malaysia, young learners possess minimal exposure to the entrepreneurial dimensions of sustainability, despite the crucial role of community engagement in tackling environmental issues (Ahmad et al., 2020). Although social entrepreneurship is extensively examined at the university level, it is hardly associated with environmental action at the school level (Hockerts, 2015). This indicates a distinct disparity in educational methodologies that incorporate practical learning, environmental stewardship and entrepreneurship.

Despite increasing acknowledgement of the importance of sustainability education, several current educational frameworks do not effectively implement environmental knowledge. Students often encounter sustainability in a passive classroom environment, lacking the opportunity to explore its entrepreneurial aspects or interact with community-based solutions. This discrepancy not only limits their comprehension but also hinders their capacity to function as proactive change agents. Moreover, there is inadequate integration of academic knowledge and practical application, especially in the conjunction of environmental literacy with business and innovation. This underscores the essential requirement for an educational system that emphasises experiential learning alongside the integration of social entrepreneurship and sustainability principles.

A one-day environmental outreach program was executed as a school-based intervention involving a substantial number of secondary school students. The program offered a comprehensive platform that integrated environmental education with entrepreneurial practice through interactive Explorace modules, Trash2Treasure idea challenges, and sustainability-focused company booths. This conceptual paper presents a scalable methodology for linking experiential sustainability education with social entrepreneurship, grounded in Kolb's Experiential Learning Theory (1984), which encompasses experience, reflective observation, abstract conceptualisation, and active experimentation. The research provides a framework for cultivating dynamic and accountable teenagers who can spearhead community-oriented environmental transformation by situating this model within Malaysia and aligning it with Sustainable Development Goals (SDGs 4, 12, 13, and 17).

2. Literature Review

Environmental education is regarded as a crucial element in cultivating pro-environmental attitudes and behaviors among youth. Nonetheless, conventional pedagogical methods remain predominantly theoretical, constraining their enduring efficacy (Tilbury, 2011; Ahmad et al., 2020). This disparity is particularly evident in school-based programs, since students often lack the opportunity to implement sustainability concepts in real-world contexts. Recent research (Arslan & Şeker, 2021; Zainudin et al., 2022) indicates that experiential learning is crucial for students to assimilate durable values and convert knowledge into significant action.

Experiential learning has surfaced as a potent instructional methodology, allowing students to immerse themselves in real-world challenges while cultivating critical thinking and leadership abilities (Kolb, 2015; Merriam & Bierema, 2018). Kolb's Experiential Learning Theory is fundamental in this domain, presenting a cyclical learning model with four stages: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. The notion has been extensively utilized in educational innovation and sustainability, where experiential learning fosters behavioral change and enhances engagement (Hedin, 2020; Ko & Chiu, 2022).

Researchers have recently highlighted the efficacy of experiential methods in sustainability teaching. Programs enabling student engagement in simulations, community initiatives, or sustainable innovation projects have shown beneficial effects on environmental knowledge, action competence, and eco-literacy (Wiek et al., 2019; Barth & Rieckmann, 2020). Green education, which combines environmental consciousness with values-based instruction, inspires learners to contemplate their responsibilities as global citizens and agents of change (Sterling, 2021). These programs transcend cognitive knowledge, emphasizing the cultivation of emotional connection, ethical reasoning, and interactive learning (Zamzuri et al., 2023).

Simultaneously, social entrepreneurship education has garnered interest for its capacity to tackle environmental and social issues through innovation and community-oriented solutions. Students involved in social entrepreneurship are urged to recognize issues, gather resources, and execute sustainable ideas, all while fostering empathy and leadership (Sassmannshausen & Volkmann, 2018; Kummitha & Majumdar, 2021). Nevertheless, the majority of programs are focused on the postsecondary level and frequently lack environmental integration. A limited number of frameworks integrate entrepreneurial education with environmental aims, particularly at the school level.

Community-based experiential learning bridges this gap by grounding educational interventions within the learners' local context. Community engagement supports social learning, civic participation, and real-time feedback, making sustainability education more relevant and impactful (Falk & Harrison, 2018; Rowe & Gentile, 2020). Studies have shown that when students work with their communities on environmental or social innovation projects, their learning outcomes improve across multiple domains: cognitive, affective, and behavioral (Sharma et al., 2021; Wahab et al., 2023).

Despite this, there remains a research gap in integrating Kolb's experiential framework with green social entrepreneurship in Malaysian secondary school settings. The literature is still sparse in examining how school-aged learners can benefit from immersive environmental entrepreneurship education that blends sustainability, social impact, and hands-on learning. Most existing studies focus on either higher education

(Hockerts, 2015; Norazah et al., 2022) or singular domains such as recycling awareness or business skills, without exploring how a combined framework can foster holistic youth development. This paper addresses that gap by proposing a model based on a one-day environmental engagement program that operationalizes Kolb's theory while aligning with the Sustainable Development Goals (SDGs 4, 12, 13, and 17).

3. Research Methodology

This conceptual study adopts a qualitative and reflective research approach aimed at addressing the existing gap in environmental education, particularly the lack of experiential and entrepreneurial integration at the school level. Guided by Kolb's Experiential Learning Theory (1984), the study seeks to explore how experiential learning can enhance environmental awareness and social entrepreneurial mindset among youth, while contributing to the development of a theoretically grounded and practically replicable educational framework.

The following research questions guide this inquiry:

- In what ways can experiential learning activities grounded in Kolb's Experiential Learning Theory enhance environmental awareness and social entrepreneurial mindset among school students?
- What are the key elements of a green social entrepreneurship programme that can be conceptually mapped to form a reproducible experiential framework for environmental education?

To address these questions, the study utilizes a conceptual synthesis method, drawing from both an extensive review of recent scholarly literature and practitioner-based reflections. The reflections are based on a one-day environmental outreach initiative involving secondary school students and university student facilitators. Although the study does not involve empirical data collection or hypothesis testing, it systematically analyses non-numerical insights to construct a theoretically informed model of experiential green social entrepreneurship education.

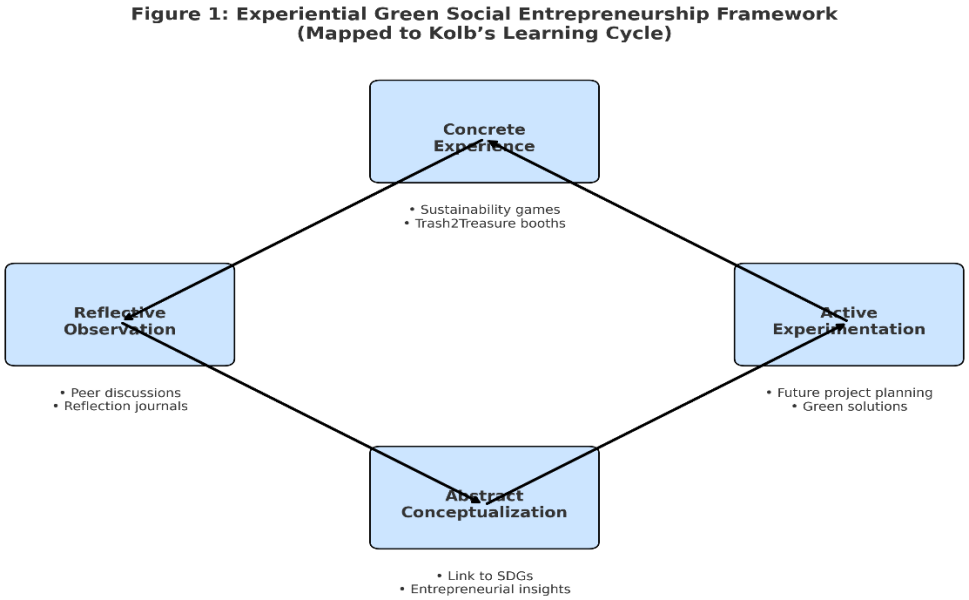
Data for this conceptual mapping were derived from the following qualitative sources:

- Programme documentation and planning reports,
- Reflective journals maintained by student facilitators,
- Field notes and observational records collected during the programme,
- Informal feedback and verbal responses from student participants and teachers.

These qualitative data were subsequently aligned with the four stages of Kolb's Experiential Learning Cycle:

- Concrete Experience – Direct involvement in sustainability activities such as eco-themed Explorace, innovation competitions, and green entrepreneurship booths.
- Reflective Observation – Personal and group reflection sessions where facilitators and participants critically examined their actions and outcomes.
- Abstract Conceptualization – The process through which students derived broader environmental and entrepreneurial principles from their experiences.
- Active Experimentation – Application of acquired insights to propose new sustainability initiatives or improvements for future programmes.

Figure 1: Conceptual Framework of Experiential Green Social Entrepreneurship Based on Kolb's Learning Cycle



The overall process is illustrated in Figure 1, which presents the conceptual framework derived from the analysis. This framework exemplifies how youth-centered, community-engaged programmes can be theoretically structured to cultivate environmental consciousness, social responsibility, and entrepreneurial competencies. The methodology employed in this study aligns with conceptual research standards, offering a practice-informed model with potential for replication in other educational settings.

4. Findings and Discussions

Reflective Discussion

This conceptual study provides reflective observations from the Hunt4Green program, which yield useful insights into how experiential learning can enhance environmental awareness and entrepreneurial skills among school-aged students. This study illustrates how structured, participatory learning experiences in genuine situations can be transformative by aligning real-world activities with Kolb's Experiential Learning Cycle (1984). These findings bolster the accumulating data about the significance of experiential pedagogies in sustainability education (Barth & Rieckmann, 2020; Sterling, 2021).

Concrete Experience

Over 700 secondary school students engaged in immersive environmental activities during the Hunt4Green event, which featured an Explorace and the Trash2Treasure green invention challenge. These activities functioned as contextual learning environments where students encountered authentic ecological issues such as recycling, waste segregation, and upcycling. The veracity of these encounters enhanced emotional involvement, cognitive stimulation, and comprehension of environmental challenges (Ko & Chiu, 2022; Zamzuri et al., 2023). Research indicates that experiential learning promotes enhanced ecological literacy and cultivates more robust pro-environmental behaviours (Balsiger et al., 2022).

Reflective Observation

Reflection after the exercise was conducted via journal writing, informal discussions, and structured debriefing sessions with both student facilitators and school participants. These reflection exercises allowed participants to express lessons learnt, assess their roles in group dynamics, and enhance self-awareness concerning environmental responsibility. This aligns with Kolb & Kolb's (2017) assertion that metacognitive reflection augments the profundity of learning and the construction of meaning. Recent research indicates that organised reflection improves environmental identity and fosters enduring eco-conscious behaviour (Barros & Pinheiro,

2021).

Abstract Conceptualization
The third stage was seen as students commenced synthesising experiential insights with theoretical concepts from the classroom. Facilitated talks allowed them to link sustainable methods with responsible consumption, social business models, and environmental ethics. This phase signified the assimilation of practical experience into conceptual knowledge, thereby connecting theoretical education with practical comprehension (Wiek et al., 2019). Furthermore, participants exhibited an increasing recognition of the use of entrepreneurial thinking as a means to tackle environmental concerns, consistent with the findings of Kummitha & Majumdar (2021).

Active Experimentation
Encouragingly, the final stage of the learning cycle was evident when both school and university participants proposed follow-up initiatives. These included starting recycling clubs, hosting green campaigns, and exploring social business models related to sustainability. Such outcomes indicate a successful transition from learning to application—a key marker of experiential learning (Kolb & Kolb, 2017). They also reflect the broader value of youth-driven innovation in promoting eco-social change (Sharma et al., 2021; Rowe & Gentile, 2020).

Broader Implications
This conceptual study highlights the transformative potential of experiential, community-engaged programs in fostering sustainability-oriented knowledge, values, and skills in kids. The Hunt4Green program operated as a dynamic "living lab," providing students with opportunities to actively experiment with environmental and entrepreneurial themes in a real-world context. This practical immersion enhanced cognitive and emotional involvement, placing learners as active agents of change rather than mere users of knowledge.

The collaborative design of the program, which integrates tertiary-level facilitators with secondary school participants, underscores the significant impact of intergenerational relationships in educational innovation. This partnership improves the learning process by establishing mutual environments of mentorship, empowerment, and peer learning. This underscores the relevance of Kolb's Experiential Learning Cycle (1984) as a comprehensive framework for executing sustainability education that is both pedagogically effective and socially significant (Kolb & Kolb, 2017; Rowe & Gentile, 2020).

5. Conclusion

This article proposed a conceptual framework for experiential environmental education and social entrepreneurship, guided by Kolb's Experiential Learning Theory (Kolb, 1984; Kolb & Kolb, 2017). Hunt4Green has shown that systematically structured experiential activities can serve as an effective teaching approach to instill environmental values and entrepreneurial abilities in young learners (Tilbury, 2011; Yuen, 2021).

The study introduces a repeatable model for use by policymakers and educators, which may be adapted for the development of school-based sustainability programs. It underscores intergenerational collaboration, community involvement, and experiential learning as pivotal components of effective environmental education (Ahmad, Abu Bakar, & Ahmad, 2020; Hockerts, 2015).

Implications for Practice
In practice, this study highlights several strategic paths for the stakeholders in the education system. Firstly, schools are encouraged to integrate more project-based learning approaches that are sensitive to both environmental and entrepreneurial objectives, thereby allowing students to implement theoretical concepts in real-life situations and build meaningful civic engagement (Yuen, 2021).

Second, universities might also serve as mentoring partners by involving their students in outreach and community work, thereby also serving as a bridge between academic higher learning and social practice. Intergenerational collaboration encourages Kolb's model of experiential learning by constructing ongoing loops of action and reflection (Kolb & Kolb, 2017).

Finally, policymakers are urged to sponsor the integration of experiential learning models into national environmental education strategies to enable systemic change that favors environmentally aware and socially entrepreneurial young people (Tilbury, 2011).

Limitations and Future Research

As a conceptual paper, this study does not empirically test the framework. Future research should employ mixed methods to evaluate the impact of such programs on participants' environmental attitudes, entrepreneurial intention, and long-term behavior change of participants (Ahmad et al., 2020). Comparative studies between different school contexts and age groups may also enrich the framework's applicability and generalizability.

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Factors of Learning Agility and Students' Attitudes on Online Learning

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Abstract: With the widespread use of digital and information technologies in education, students' learning styles and needs are always changing. This study examines the relationships among student engagement, information literacy, perceived digital proficiency and learning agility within a university student population. Research indicates that there exists a relationship among these factors; however, the specific pathways of influence remain inadequately comprehended. This study surveyed 323 students from a higher education institution to assist educators in improving students' learning agility and refining educational strategies. It used Structural Equation Modelling to look at the direct and indirect relationships between these variables. The results show that how engaged students have a big effect on their information skills, which in turn affects how competent they feel with technology and how quickly they learn, with a mediator between information skills and learning agility. The study highlights the importance of enhancing student engagement and information literacy to effectively prepare students for evolving learning environments. These findings provide significant insights for formulating innovative strategies to enhance students' learning agility and overall academic performance.

Keywords: *Learning Agility, Attitude, Competency, Communication*

1. Introduction and Background

As the use of digital and information technologies in the classroom increases, students' cognitive strategies and needs are continually evolving. Research indicates that there are complex relationships among learning agility, perceived digital competency, information skills, and student engagement. However, the specific pathways through which these variables interact remain unclear. This study aims to explore the connections between university students' learning agility, information skills, perceived digital competency, and student engagement. The goal is to assist educators in developing strategies that help students become more agile learners. Specifically, it will examine how student engagement influences information skills, how information skills impact perceived digital competence, and how information skills directly and indirectly affect learning agility both directly and through perceived digital competence. By addressing these research questions, the study seeks to provide empirical data that teachers can use to enhance their teaching methods and support students in becoming more agile learners (DeRue et al., 2012). The objectives of this study were to investigate the learning agility, information skills, perceived digital competency, and student engagement relate to one another among college students. It targets students in various academic years and majors, including undergraduates and graduates of higher education institutions.

2. Literature Review

In recent years, the relationship among student engagement, information skills, perceived digital competence, and learning agility has received attention in education. Student engagement is the assessment of a learning outcome that is measured (Astin, 2014). High calibers of engagement enhance students' academic performance and ameliorate their overall learning experience. Student engagement encompasses interest in and application of course material, participation in extracurricular activities, and proactiveness and ebullience for learning. Information skills are crucial for students in the digital age, involving the ability to identify, acquire, evaluate, and use information (Bruce, 1997). These skills are crucial in academic research, professional settings, and everyday life. Bruce's Seven Faces of Information Literacy model highlights the application of information skills across various contexts. Perceived digital competence, rooted in Self-Efficacy Theory, pertains to students' self-

assessment of their ability to use digital tools and technologies (Bandura, 1977). This self-assessment reflects students' confidence and proficiency in digital skills, including presentation software, online collaboration tools, and information retrieval techniques.

Student engagement

According to Astin's Student Involved Theory, student engagement is defined as active participation in both extracurricular and classroom activities (Astin, 2014). Higher levels of engagement are associated with improved learning outcomes and academic achievement. The level of focus, interest, curiosity, and involvement students exhibit in their learning process, both within and outside the classroom, is student engagement. According to Astin's (2014) Student Involvement Theory, engagement is the amount of mental and physical effort students put into worthwhile academic pursuits. Astin asserts that the amount and caliber of student participation directly correlate with learning and growth. In other words, students are more likely to succeed academically and grow personally if actively involved in extracurricular and academic activities.

Student engagement is more important than ever in the current educational environment of 2024–2025. Due to the trend toward hybrid and tech-enhanced learning, sustaining engagement calls for emotional, behavioral, and cognitive investment in addition to regular attendance in class. In addition to being more likely to persevere in the face of difficulties, engaged students are better equipped to adjust to new knowledge, work well in teams, and apply what they have learned in various settings. The idea of learning agility, which describes a student's capacity to apply knowledge gained from experience in novel or evolving circumstances, is closely related to this adaptability. Recent research indicates that students who are more involved tend to exhibit higher levels of learning agility. The new learning environment could help many students to actively participate in class, such as asking probing questions, working in teams, and reflecting. They continuously develop the mental flexibility and problem-solving skills necessary to succeed in new learning environments. Engagement is the behavioral engine that drives learning agility. Therefore, educational institutions must design learning experiences that go beyond passive delivery. The elements of incorporating gamification, cooperative projects, active learning strategies, and real-world problem-solving should be added to teaching and learning activities to engage students with the lesson. The variation of learning styles is significant to students' learning agility and better prepares them for continuous learning and success in an evolving world. Hence, the hypothesis developed is as follows:

Hypothesis 1: Student engagement has a significant influence on learning agility

Perceived digital skills: The Self-Efficacy Theory is the source of this self-assessment of digital implementation proficiency. According to Bandura's research, self-efficacy, which reflects confidence in using digital tools and technologies, influences motivation and demeanor. The self-assessment of digital implementation proficiency is grounded in Bandura's Self-Efficacy Theory (1977), which emphasizes how people's beliefs about their abilities have a significant impact on their motivation, behavior, and performance. In the context of digital learning, "perceived digital skills" refers to students' confidence in their ability to use digital tools, platforms, and technologies to improve their learning. According to Bandura's theory, when students feel they can master tasks—in this case, using digital tools—they are more likely to participate regularly, take proactive steps to overcome obstacles, and produce better results. In today's technologically advanced educational system, perceived digital skills are now crucial for successful learning, especially in the years following the pandemic in 2024–2025. As online and hybrid learning environments become more prevalent, students who identify as digitally competent are more adaptable, self-sufficient, and resourceful in navigating often complex learning platforms. Because of their confidence, they are able to solve problems on their own, search for new learning resources, and manage their learning processes, all of which are essential behaviors associated with learning agility.

Learning agility, or the ability to pick up, adapt, and use knowledge in new or rapidly changing situations, is directly impacted by digital competency. Students who believe they have strong digital skills are more adept at combining data from multiple sources, solving problems, and experimenting with new tools. They are also more likely to use cutting-edge technologies like virtual labs, AI-powered learning systems, and digital collaboration platforms, all of which call for flexibility and technological fluency. Our study supports the strong and significant relationship between perceived digital skills and learning agility ($\beta = 0.534$, $p < 0.001$). This outcome is in line with current studies that show how digital self-efficacy boosts engagement and autonomy

while preparing students for lifelong learning in ever-changing digital environments. In this regard, digital competency is a psychological facilitator that promotes flexibility, resilience, and proactive learning in addition to being a technical skill. Educational institutions must therefore teach students digital tools and assist them in becoming more accustomed to using them in order to promote learning agility in their students. This entails promoting environments in which students can try new things, make errors, and develop their digital skills without worrying about the consequences. Teachers can help students become agile learners who can thrive in fast-paced academic and professional environments by integrating self-efficacy-building strategies and digital skill development into the curriculum. Hence, the hypothesis developed is as follows:
Hypothesis 2: Perceived Digital Skills have a significant influence on learning agility

Information Skills
According to Bandura's theory, students' attitude and their motivation are affected by self-efficacy, which is a measure of their confidence in using digital tools and technology. This could be explained by students' beliefs about their abilities, behaviour, and motivation to apply any digital skill in relation to online learning. More explanation on Bandura's Theory, students are more inclined to participate consistently, take the initiative to overcome challenges, and achieve better outcomes when they believe they can manage the learning activities with technology tools. Students' confidence in their own digital literacy is more important than ever in today's technologically sophisticated classrooms, particularly in the years after the pandemic in 2024 and 2025.

Adaptable, self-reliant, and resourceful, students who self-identify as digitally proficient are better able to navigate the increasingly common online and hybrid learning environments. Their self-assurance allows them to do things like control their own learning processes, find new learning resources, and solve problems independently. These are all characteristics of agile learners. In today's data-rich, digitally connected world, the capacity to efficiently gather, evaluate, and utilise information, a talent sometimes referred to as information skills, has become crucial. In contrast to Marchionini and White (2007), who stress the need to identify credible digital content, Silva (2009) makes it clear that information skills encompass the ability to collect, organise, and synthesise data from diverse sources. An integral aspect of information literacy is literary competence, which includes reading comprehension, interpretation, and, more and more, digital literacy, which is the ability to use the internet and its sources effectively (van Laar et al., 2020). Employers nowadays are looking for people who can demonstrate not only subject knowledge but also the ability to learn on their own, think critically, adapt to new situations, and work independently. Acquiring agility in one's learning requires all of these things. A necessary condition for learning agility is the ability to apply previously acquired knowledge to completely new and different situations. This is backed up by information skills, which equip students to do their own research, assess the credibility and usefulness of sources, and make sense of data. To rephrase, those who are naturally gifted with knowledge are in a better position to absorb new material. Adapt rapidly to shifting learning agility indicators while solving difficult issues on the move.

This is supported by a recent study by Ismail et al. from 2024, which found a strong positive correlation between learning agility and information-related study skills. The study found that students who are good at locating and analyzing information are more likely to be agile learners, able to respond to obstacles in the classroom and outside of it with flexibility and insight. In today's educational system, teaching students how to use search engines and cite sources is just one part of building their information skills. It involves cultivating discernment, critical thinking, and the confidence to pursue knowledge on one's own. These skills, when integrated into curricula, help students acquire the independence, adaptability, and initiative that define high learning agility and are essential for success in the quickly changing global environment. Hence, the hypothesis developed is as follows:
Hypothesis 3: Information Skills have a significant influence on learning agility

3. Research Methodology

The target population for this study consists of students from higher education institutions. To ensure the representativeness of the data and the generalizability of the research findings, a random sampling method was employed, selecting samples from students of different majors and academic years. The sample size for this study is 323 students, and the selection process includes undergraduate and graduate students, encompassing different academic years and majors, to comprehensively understand student engagement,

information skills, digital competence, and learning agility across various academic backgrounds. The data collected is analyzed using the Structural Equation Model and assessed using the measurement and structural models.

4. Results

Profile of Respondents: Based on the provided SPSS output, a preliminary data analysis was conducted focusing on three variables: Gender, Age, and Exposure to Digital Skills. For the Gender variable, the sample size is 323, with 76.8% identified as male and 23.2% as female. The descriptive statistics indicate a standard deviation of 0.423 and a skewness of 1.274, suggesting a significant deviation from normality and a male-dominant sample. Regarding age, almost the entire sample (99.7%) falls into the younger age group, with only 0.3% in the older age group. The standard deviation is 0.056, and the skewness is exceptionally high at 17.972, highlighting a highly non-normal distribution due to the nearly homogeneous age representation.

Regarding Exposure to Digital Skills, most respondents (96.0%) reported exposure to digital skills. This variable shows a standard deviation of 0.197 and a skewness of 4.700, indicating that most of the sample responded similarly, with a strong consensus on exposure. Overall, the sample predominantly consists of younger males exposed to digital skills. The high skewness and kurtosis values across all variables suggest non-normal distributions. This should be considered in further statistical analyses, potentially necessitating variable transformation or non-parametric methods to address the non-normality.

Table 1: Demographic Factors

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Males	248	76.8%
Females	75	23.2%
Total	**323**	**100%**
AGE		
19-30	322	99.7%
31-40	1	0.03%
Total	**415**	**100%**
Exposure to Digital Skills		
Yes	310	96.0%
No	13	4.0 %
Total	**415**	**100%**

Descriptive Statistics: Table 2 provides descriptive statistics for four key variables: Information Skills, Learning Agility, Student Engagement, and Perceived Digital Competence. Each variable was measured using a scale from 1 to 5. For Information Skills, the sample size is 323, with a mean score of 3.9647, indicating a relatively high level of information skills among the respondents. The standard deviation is 0.67786, and the skewness is -0.407, suggesting a left-skewed distribution where most respondents rated their information skills on the higher end of the scale. Learning Agility has a mean score of 4.0390, indicating high learning agility among respondents, with a standard deviation of 0.70002 and a skewness of -0.356, showing that most respondents rated themselves highly on learning agility. For Student Engagement, the mean score is 3.9022, suggesting high engagement among the respondents. The standard deviation is 0.67564, and the skewness is -0.157, indicating a more symmetrical distribution than other variables. Perceived digital skills have a mean score of 3.9474, reflecting that respondents generally perceive themselves as competent in digital skills. The standard deviation is 0.67476, and the skewness is -0.222, showing a slight tendency towards higher self-ratings.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.
Information Skills	3.967	0.677
Learning Agility	4.039	0.700
Student Engagement	3.902	0.675
Perceived Digital Skills	3.947	0.674

Measurement Model

Based on Table 3, which provides measurement model data, we can evaluate the reliability and validity of the constructs. Firstly, factor loadings should be above 0.70 to ensure item reliability. All items have factor loadings exceeding 0.70, indicating good item reliability. Cronbach's Alpha values should be above 0.70 to indicate internal consistency. Information Skills has a value of 0.883; Learning Agility is 0.935, Perceived Digital Competence is 0.908, and Student Engagement is 0.936, all showing good internal consistency. Composite Reliability (CR) values should be above 0.70, with Information Skills at 0.915, Learning Agility at 0.951, Perceived Digital Competence at 0.936, and Student Engagement at 0.952, all demonstrating excellent reliability. AVE should be above 0.50 to indicate that the construct explains more than half of the variance of its indicators. All constructs have AVE values exceeding this standard, with Information Skills at 0.683, Learning Agility at 0.795, Perceived Digital Competence at 0.784, and Student Engagement at 0.797.

Table 3: Convergent Validity

Variables	Factor Loading	Cronbach Alpha	Composite Reliability	AVE
Information Skills		0.883	0.915	0.683
Informationskills1	0.734			
Informationskills2	0.864			
Informationskills3	0.843			
Informationskills4	0.857			
Informationskills5	0.828			
Perceived Digital Skills		0.908	0.936	0.784
PDS1	0.869			
PDS2	0.888			
PDS3	0.900			
PDS4	0.885			
Student Engagement		0.936	0.952	0.797
SE1	0.895			
SE2	0.910			
SE3	0.924			
SE4	0.865			
SE5	0.869			
Attitude		0.964	0.966	0.704
Attitude1	0.924			
Attitude2	0.933			
Attitude3	0.922			
Attitude4	0.897			
Learning Agility		0.935	0.951	0.795
Learningagility1	0.871			
Learningagility2	0.853			
Learningagility3	0.922			
Learningagility4	0.893			
Learningagility5	0.918			

Discriminant Validity

The above table presents the Heterotrait-Monotrait ratio (HTMT) matrix for discriminant validity. It shows the HTMT values between the four constructs: Information Skills, Learning Agility, Perceived Digital Competence, and Student Engagement. The values below the 0.85 to 0.9 threshold indicate good discriminant validity between the constructs. Among them, the values for Perceived Digital Competence and Learning Agility, Student Engagement and Learning Agility, and Student Engagement and Perceived Digital Competence are within the threshold range of 0.85 to 0.9, which is still acceptable.

Table 4: Heterotrait-Monotrait Ration (HTMT)

Variables	1	2	3	4
1. Information Skills				
2. Learning Agility	0.815			
3. Perceived Digital Skills	0.812	0.858		
4. Student Engagement	0.809	0.892	0.899	

Structural Model

The Adjusted R Square for learning agility was 0.687, indicating that 68.7 percent of learning agility can be explained by information skills, perceived digital skills, and student engagement. The findings from the structural model illuminate the relationships among various abilities, student attitudes, and learning agility. Three hypothesis tests related to these relationships have shown statistical support ($p < 0.05$). Specifically, students who excel in processing and applying information tend to exhibit greater flexibility and more positive learning mindsets, as demonstrated by the significant positive effects of information skills on learning agility ($\beta = 0.354$, $p < 0.05$) and perceived digital skills ($\beta = 0.534$, $p < 0.05$). Moreover, student engagement significantly predicts learning agility ($\beta = 0.736$, $p < 0.005$) and plays a vital role in this model. The results indicate that information skills, perceived digital skills, and student engagement statistically influence learning agility. This underscores the importance of interventions to enhance students' ability to manage information and foster a positive learning mindset as effective strategies for preparing them for dynamic learning environments.

Table 5: Structural Model- Direct Relationship

Relationship	Beta	STDEV	T-Value	P-Value	Results
Information skill- Learning Agility	0.354	0.061	5.780	0.00	H1: Supported
Perceived Digital Skills- Learning agility	0.534	0.062	8.597	0.00	H2: Supported
Students Engagement-Learning Agility	0.736	0.035	21.34	0.00	H3: Supported

Discussion

This study investigated the relationship between learning agility, digital competence, student engagement, information skills, and information competence among 323 college students. The results found that students' involvement influences learning agility. More interesting, perceived digital skills and the usefulness of information skills in adjusting to different learning contexts are the next most important factors. Naeem and Mushibwe (2025) mentioned that this might happen because universities encourage students to take part in academic and extracurricular activities that make their lives better and help them get better at gathering, analyzing, and using knowledge. More evidence highlights that students' perceptions of their own digital competence are positively impacted by their information abilities (Zhao, Sanchez Gomez, Llorente, & Zhao, 2021). Students can enhance their learning experiences with the help of numerous technology tools. The more kids master digital tools, the more comfortable they will feel using them, and the more they will embrace technology as a whole. A complicated interaction among these elements suggests that information skills support learning agility, but this effect is somewhat less significant. Moreover, the results demonstrate that learning agility is substantially enhanced by increased levels of perceived digital competence (Ali, Mat, Kori, Salleh, Bahry & Yunus, 2024). Hence, as students having digital confidence in their ability to adapt and apply new knowledge is key to keep up with the fast-paced learning environment of today, it is vital to master digital tools.

5. Managerial Implications and Recommendations

This study examines the interrelationships among student engagement, information skills, perceived digital competence, and learning agility, highlighting how these dimensions collectively enhance the learning performance of university students. The findings yield valuable empirical evidence for educators and policymakers. The primary contributions of this study can be delineated into several key facets:

Practical Implications

The results of the study indicate that the development of information skills, which have a major influence on perceived digital competency and learning agility, depends on student involvement. Perceived digital competency acts as a mediator between information skills and learning agility. These findings provide educators with specific recommendations that will help them improve students' learning agility by focusing on improving information skills and increasing student engagement (Gales & Gallon, 2019). These results are essential for enhancing instructional strategies, creating course materials and advancing educational methodologies.

Student Development

This study gives guidance for students' personal development by highlighting the critical role that information skills and student participation play in enhancing learning agility. Students will be better prepared to adjust to the constantly changing educational landscape while enhancing their self-efficacy and academic accomplishments by actively participating in both classroom and extracurricular activities, honing their information processing abilities, and increasing their perceived digital competence (Zhao & Gómez, 2021).

In summary, with the ultimate goal of fostering students' academic success and general development, this study not only advances theoretical discussion in the field of education but also offers educators and policymakers useful resources and guidance. This goal can be accomplished through interactive teaching methods, competitive projects, and scholarly seminars. Teachers should also concentrate on improving their students' ability to collect, analyze, and use information. Information literacy instruction, relevant coursework, and encouraging participation in research projects can all help achieve this (Henderson et al., 2011). A lecturer can also help students gain confidence in their digital skills by giving them a range of opportunities to use digital tools and technologies, like coding classes, digital content creation, and online collaboration (Labella & Pérez-Valls, 2023). For students to use their knowledge in a digital environment, digital competency and information skills must be integrated. Project-based learning and cooperative multidisciplinary efforts can help to facilitate this fusion. Lecturers must also acknowledge the significant indirect impact of student participation on perceived digital competency and learning agility through information skills (Patwardhan et al., 2022). Therefore, it is essential to support students' active participation in extracurricular and academic activities while providing the necessary tools and support.

Conclusion

This study aims to enhance students' academic success and overall development. It contributes to theoretical discourse in education while providing valuable resources and guidance for educators and policymakers. This objective can be achieved via interactive teaching methods, competitive projects, and academic seminars. Educators should focus on enhancing their students' skills in collecting, analyzing, and utilizing information. Instruction in information literacy, pertinent coursework, and the promotion of participation in research projects can all contribute to this objective (Henderson et al., 2011). Lecturers can assist students in developing confidence in their digital skills by providing various opportunities to engage with digital tools and technologies, such as coding classes, digital content creation, and online collaboration (Labella & Pérez-Valls, 2023). Students must integrate digital competency and information skills to effectively apply their knowledge in a digital environment. Project-based learning and collaborative multidisciplinary approaches can facilitate this integration. Educators should recognize the substantial indirect influence of student engagement on perceived digital competency and learning agility via information skills (Patwardhan et al., 2022). It is crucial to facilitate students' engagement in both extracurricular and academic activities by offering the requisite tools and support.

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Entrepreneurial Resilience in SMEs: A Bibliometric Perspective

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Abstract: Entrepreneurial resilience is essential to SMEs' success and long-term viability, especially when faced with competitive pressures and economic uncertainty. The resilience of their leaders and staff is critical to SMEs' capacity to weather economic downturns, adjust to shifting market conditions, and seize new opportunities. Because of the rapidly expanding and multidisciplinary nature of the research, a bibliometric analysis was carried out, as it is crucial in the field of entrepreneurial resilience. The Scopus database provided the bibliometric information used in this investigation. The results highlight the most significant writers, organizations, and geographical areas that contribute to the field, as well as trends in keyword co-occurrence and citation. The results and limitations of this study can be taken into consideration for future research.

Keywords: *Entrepreneurial Resilience, Small and Medium Enterprise (SME), Bibliometric Analysis*

1. Introduction

Small and medium-sized enterprises (SMEs) function as essential economic growth drivers and job creators throughout the world, but they struggle because of their limited resources and increased market sensitivity (Cheruiyot, 2024). The economic development of SMEs remains essential because they generate substantial GDP and improve living standards worldwide, thus helping to resolve poverty and unemployment issues (Liu et al., 2022). The limited size and restricted resources of SMEs create obstacles for them, including limited financial access and elevated failure rates, particularly in developing countries (Fatoki, 2018; Saad et al., 2021).

The ability of entrepreneurs to survive challenges and become stronger through adversity has emerged as a vital element for small and medium enterprise (SME) survival and success (Duchek, 2017). The leadership and decision-making traits of entrepreneurs play a crucial role in organizational resilience because SMEs heavily rely on these characteristics (Liu et al., 2022). Entrepreneurs who operate in uncertain environments with informal structures and direct experience of hardship tend to show high resilience, which enables their SMEs to adapt to challenges and recover from failures while maintaining a positive outlook (Branicki et al., 2018).

The concept of resilience faces challenges because it exists differently across various disciplines, research settings, and enterprise sizes, which leads to fragmented business literature understanding (Saad et al., 2021). This study is grounded in the resilience concept, which positions resilience as a dynamic capability that enables individuals and organizations to adapt, recover, and grow stronger through adversity (Duchek, 2018). According to Duchek's model, resilience is not a static trait but an evolving process involving anticipation of crises, coping during adversity, and subsequent adaptation and transformation.

The combination of personal traits like perseverance, optimism, and problem-solving abilities with organizational strengths including adaptability, innovation, and strong social networks defines entrepreneurial resilience (Saad et al., 2021; Liu et al., 2022). Entrepreneurs use cognitive, emotional, and behavioral elements to handle obstacles while extracting valuable lessons from their mistakes, which leads to enduring business success (Dewi, 2024; Pramesti & Prihastiwi, 2020).

Research shows that resilient entrepreneurs maintain better agility and flexibility during crises, which helps them create a continuous improvement culture in their firms (Hartmann et al., 2022; Sachdev, 2023). The ability to adapt and innovate becomes crucial for SME survival during disruptive events such as the COVID-19 pandemic (Liu et al., 2022). The definition and measurement ambiguity of SME resilience creates difficulties for both research and practical applications, according to Saad et al. (2021). A thorough comprehension of entrepreneurial resilience factors enables the development of successful strategies to promote SME growth and sustainability. Given that entrepreneurial resilience intersects multiple disciplines such as psychology, management, and economics, bibliometric analysis (BA) helps organize and synthesize this complex body of

literature, offering a comprehensive overview that traditional reviews may overlook. Thus, the objectives of this study are to map the production of publications on entrepreneurial resilience in SMEs and to identify common terminologies and keywords related to entrepreneurial resilience in SMEs.

2. Methodology

This study involved bibliometric analysis (BA), in which further discussion will be focused on the selection of the database, search strategy, analysis, and approach.

Selection of a database

The bibliographical data for this study were obtained from the Scopus database. It was selected because it covers a wide range of subjects, especially in social sciences and management (Sweileh, 2022). Scopus has more citation indexes than the Web of Science (WoS), with about 60% more, which makes it better for finding more relevant articles (Magadán-Díaz & Rivas-García, 2022). Scopus also provides up-to-date coverage of over 42,000 journals and useful tools like author profiles and citation tracking (Quvae, 2023). Many recent review studies have used Scopus, showing it is a trusted and popular choice for research (Pham-Duc et al., 2023; Singh & Arora, 2023; Ullah et al., 2023).

Search strategy

The search initiated on February 1, 2025. The main keyword that we use is "entrepreneurial resilience" and "small and medium enterprises". Interchangeable and synonymous terms for these two concepts were derived from the literature as presented in Table 1.

Table 1: Finalized search terms and definitions

Search concept	1	2
Main keywords (and definitions)	*entrepreneurial resilience* Entrepreneurs demonstrate their ability to adapt and recover while continuing their goals through challenging situations. Entrepreneurs use psychological and behavioral abilities to control stress while learning from failures and staying motivated in unpredictable situations (Garrett & Zettel, 2021)	*small and medium enterprises* Small and medium enterprises (SMEs) are broadly defined as businesses with limited employees and revenue, although exact definitions vary by country and study (Senderovitz, 2016).
Synonymic and interchangeable keywords	Business resilience, entrepreneur resilience, resilience in business,	SMEs, small businesses, medium enterprises, individual businesses

The initial keyword search yielded 546 articles, which were then narrowed down to those published between 2006 and 2024 to explore the development of research on entrepreneurial resilience. We selected this time frame due to the oldest published date was in 2006 and the publication cycle for the year 2024 has already been completed. 466 articles remained after we filtered by publication year. Afterward, we implemented the subsequent exclusion criteria to enhance the dataset:

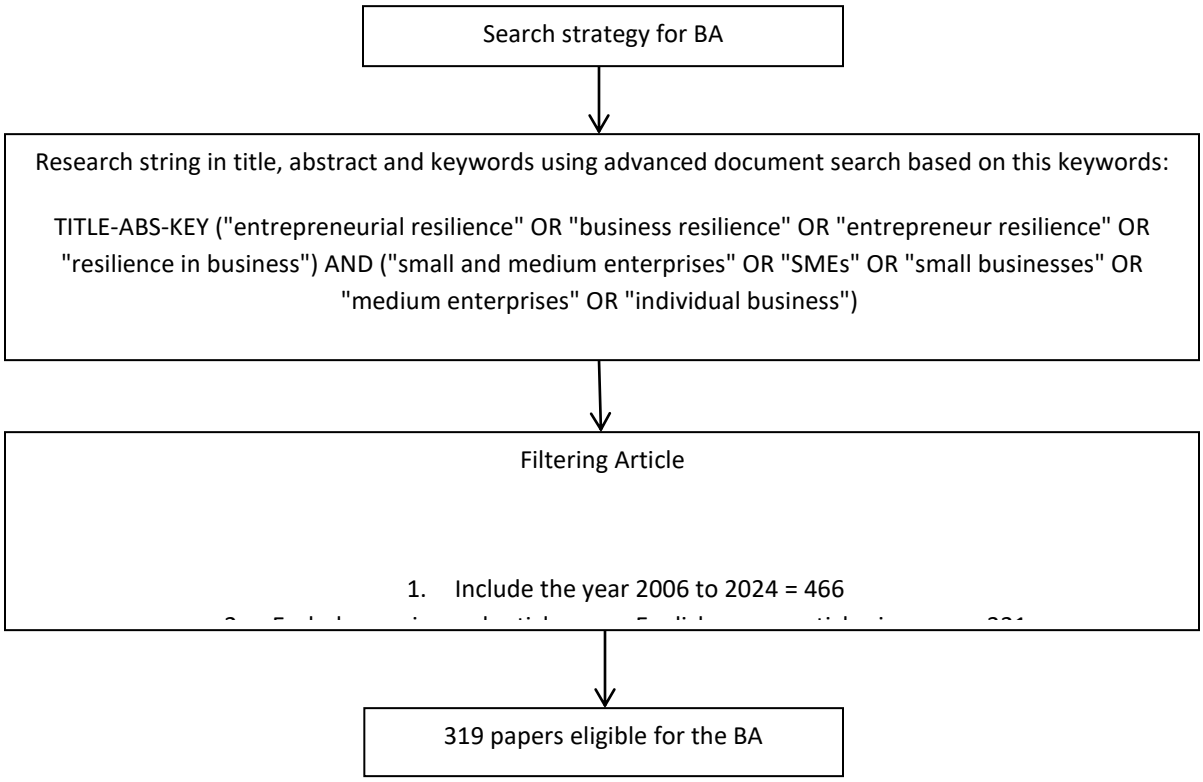
Article Type: Our concentration was solely on peer-reviewed journal publications. Non-journal sources, including conference papers, press articles, and surveys, were removed to maintain methodological consistency and emphasize properly evaluated academic literature.
Language: Only English-language publications were chosen to ensure uniformity in content assessment and facilitate worldwide comparability. Although this may create a linguistic bias, standardizing the bibliometric and content analysis process was essential.
Context: We eliminate studies that utilized students as study respondents.

After applying these filters, the dataset was reduced to 319 articles representing global research on entrepreneurial resilience. Figure 1 shows the inclusion and exclusion criteria applied in this study.

Analysis approach

A total of 319 articles were analyzed using Bibliometric Analysis (BA), following the guidelines outlined by Block and Fisch (2020). BA is a powerful technique for exploring large volumes of scientific data to identify the evolution of a discipline, key contributors, and emerging research areas (Donthu et al., 2021). Visualization maps were generated using VOSviewer (van Eck & Waltman, 2010), a tool that offers flexible data editing and distance-based visualization capabilities (Iddy & Alon, 2019). In our analysis, we examined annual publication trends, leading countries, prominent scholars, influential journals, and the most cited articles to understand overall researcher engagement in entrepreneurial resilience. Additionally, we applied bibliometric techniques such as keyword co-occurrence analysis to map thematic research trends.

Figure 1: Search strategy for bibliometric analysis for this study



We implemented the following measures to guarantee transparency and reproducibility:

Data Source: The analysis utilized data obtained from Scopus, which provides high-quality, peer-reviewed literature.

Inclusion Criteria: Only articles published in peer-reviewed journals were considered. To ensure consistency, non-journal sources such as conference papers, press articles, and surveys, as well as non-English papers, were excluded.

Time Range: The dataset encompassed articles published from 2006 to 2024 to include both foundational and contemporary research.

Software and Settings: VOSviewer was utilized for network visualization, implementing a threshold to eliminate isolated nodes with weak citation links.

Normalization and Data Cleaning: To ensure accuracy, the thesaurus function in VOSviewer was employed to merge duplicate author names and standardize keyword spellings, thereby minimizing inconsistencies in the dataset.

Co-Occurrence Analysis: Keywords were included only if they appeared at least three times, thereby ensuring that only commonly used terms contributed to thematic mapping.

3. Findings

The results for this paper will focus on BA involving 319 global-based articles. Our BA examined the annual publication trends, the most productive countries and institutions, the most prolific authors, the most cited articles, author collaboration networks, and keyword analysis.

Annual publication trend

Figure 2 depicts the annual and cumulative trends in scholarly publications focusing on entrepreneurial resilience from 2006 to 2024. The data differentiates between the number of new publications each year and the cumulative total over time, illustrating the evolution of academic interest in this field.

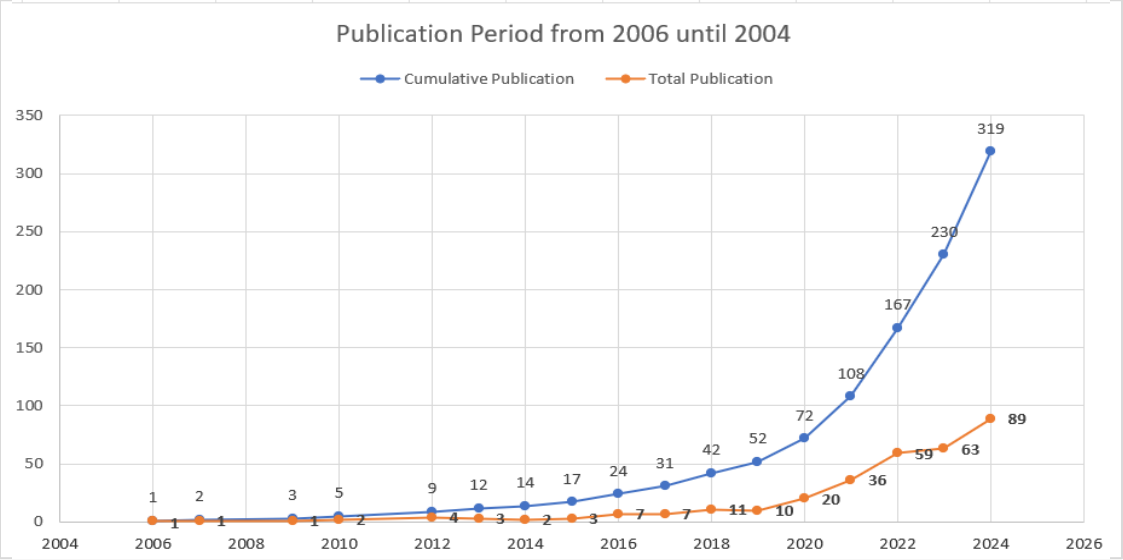
Between 2006 and 2015, research on entrepreneurial resilience was sparse, with annual publications ranging from only 1 to 4 articles. The cumulative number of publications during this period remained below 20, indicating that entrepreneurial resilience was still an emerging concept within academic discourse and had yet to attract widespread scholarly attention (Grčić Fabić et al., 2025).

Starting in 2016, there was a steady increase in publication output, with yearly articles rising from 4 in 2016 to 20 in 2020. This period reflects growing recognition of entrepreneurial resilience as a critical area of study, driven by increasing awareness of the challenges entrepreneurs face in volatile environments (Grčić Fabić et al., 2025; Hwang, 2024).

The most pronounced growth occurred from 2021 onwards, with annual publications sharply increasing to 36 in 2021, 59 in 2022, 63 in 2023, and reaching a peak of 89 in 2024. Correspondingly, the cumulative total surged from 109 publications in 2021 to 319 by 2024, marking nearly a threefold increase within just three years. This rapid expansion aligns with heightened scholarly focus on resilience in the wake of global disruptions such as the COVID-19 pandemic, which underscored the importance of resilience for entrepreneurial survival and growth (Grčić Fabić et al., 2025; Hwang, 2024; Telli, 2023).

This surge also reflects the integration of resilience theory with crisis management and entrepreneurial studies, emphasizing strategies such as innovation, digital transformation, and emotional resilience as vital components for navigating economic uncertainty (Hwang, 2024). The growing body of literature highlights entrepreneurial resilience not only as a mechanism for survival but also as a driver of long-term competitiveness in turbulent economic contexts (Hwang, 2024; de Vries & Shields, 2006).

Figure 2: Yearly trend for publication on entrepreneurial resilience (Authors' construct)



Top 10 productive countries and institutions

Table 2 highlights the leading countries and academic institutions contributing to research on entrepreneurial resilience, as measured by total publication count (TPC) and the proportion of single-country publications (SCP). The top 10 countries include the United Kingdom, Indonesia, the United States, China, Malaysia, India, Italy, Spain, Australia, and New Zealand.

The United Kingdom ranks first with 41 publications, with Aberystwyth University identified as its most productive institution, followed by Indonesia with 37 publications. The United States, China, and Malaysia also rank in the top 10 with 37, 23, and 20 publications, respectively. Among the 10 countries, we can see that India has the highest percentage of single-country publications (78.95%), indicating that it produces a large number of articles without collaborating with other countries.

Table 2: Top ten most productive countries and academic institutions for entrepreneurial resilience

Rank	Country	Total publication of a given country (TPC)	Most productive academic institutions based on TPC	Single-country publications (SCP)(%)
1	United Kingdom	41	Aberystwyth University	43.90
2	Indonesia	37	Universitas Gadjah Mada	70.27
3	United States	37	Purdue University	51.35
4	China	23	Sun Yat-Sen University	65.22
5	Malaysia	20	Universiti Teknologi MARA	70.00
6	India	19	Symbiosis International (Deemed University)	78.95
7	Italy	19	Università degli Studi di Modena e Reggio Emilia	68.42
8	Spain	19	Universidad de Málaga	73.68
9	Australia	17	Victoria University	35.29
10	New Zealand	16	University of Otago	62.50

These regional differences may reflect variations in national research funding, institutional priorities, and policy focus on SME development. For instance, countries like the UK (e.g., Davis et al., 2023) and Indonesia (e.g., Prayitno et al., 2024) may prioritize entrepreneurship resilience due to their policy responses to recent economic disruptions. The higher SCP rate in India could suggest a strong local academic network but limited global research engagement.

Figure 3: Co-occurrence map generated from VOSviewer for countries in entrepreneurial resilience

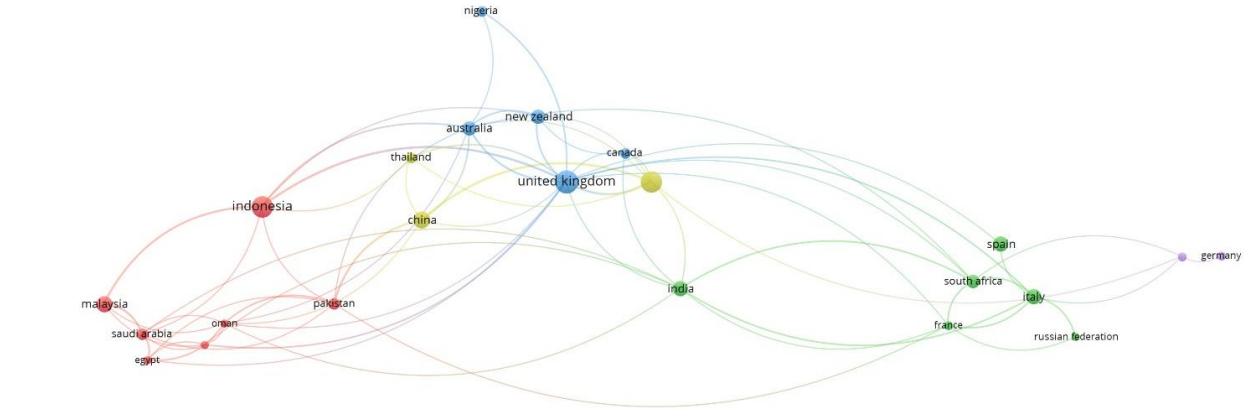


Figure 3 illustrates the co-occurrence of the leading countries, where proximity among countries signifies a stronger connection in VOSviewer (Zhou et al., 2022). The borders between nations illustrate co-citation relationships, where total link strength reflects the overall robustness of a researcher's co-authorship connections, and the link denotes the quantity of co-authorship relationships (van Eck & Waltman, 2022).

The co-occurrence map shows that 23 countries are producing articles on entrepreneurial resilience. The United Kingdom collaborates with several countries, including the United States, India, Canada, New Zealand, Australia, Thailand, and Indonesia. This collaboration is the strongest, with 16 links, 41 documents, and 29 total link strengths in co-authorship. The United States and Australia follow with 14 total link strengths, and Indonesia has 13 total link strengths in co-authorship.

Top 10 productive journals

Table 3 presents the ten most productive academic journals that have contributed to the field of entrepreneurial resilience. The analysis is based on the three key indicators, which include the Total Publications, Total Citations, and Cite Score (2024), which measure a journal's influence in this research area. Journal of Sustainability (Switzerland) ranks the most productive journal with 21 total publications, followed by Frontiers in Psychology, International Journal of Disaster Risk Reduction, and International Journal of Entrepreneurial Behavior and Research with 6 total publications.

In terms of total citations, International Journal of Entrepreneurial Behavior and Research emerged as the most cited journal, accumulating 227 citations from an article produced by Branicki et al. (2018). The high citation volume suggests that articles published in this journal are widely referenced and considered influential within the academic community, especially in studies exploring behavioral and psychological aspects of entrepreneurship.

The Journal of Hospitality and Tourism Management reported the highest CiteScore of 14.9 among the top ten journals. With only four publications on entrepreneurial resilience, the journal still achieved 119 citations, reflecting a high average impact per article. The most cited publication is "Transcending the COVID-19 crisis: Business resilience and innovation of the restaurant industry in China" by Li et al. (2021). This journal's prominence underscores the relevance of entrepreneurial resilience in service-based and tourism-oriented industries, especially in the context of crisis and recovery.

Table 3: Top ten most productive journals for entrepreneurial resilience

Journal	Total Publication	Total Citation	Cite Score (2024)	Most Cited Article in the Journal
Sustainability (Switzerland)	21	107	7.7	Toward a business resilience framework for startups (Aldianto et al., 2021)
Frontiers in Psychology	6	15	6.3	Entrepreneurial mindfulness and organizational resilience of Chinese SMEs during the COVID-19 pandemic: The role of entrepreneurial resilience (Liu et al., 2022)
International Journal of Disaster Risk Reduction	6	33	8.5	Psychological capital, social capital, and organizational resilience: A Herringbone Model perspective (Tanner et al., 2022)
International Journal of Entrepreneurial Behavior and Research	6	227	9.3	How entrepreneurial resilience generates resilient SMEs (Branicki et al., 2018)
International Entrepreneurship and Management Journal	5	164	10.7	The role of mentoring in the learning development of the novice entrepreneur (St-Jean & Audet, 2012)
Journal of Contingencies and Crisis Management	5	101	4.1	Does social capital pay off? The case of small business resilience after Hurricane Katrina (Torres et al., 2019)

Journal of Entrepreneurship in Emerging Economies	5	76	8.1	Entrepreneurial resilience during the Covid-19 pandemic: navigating survival, continuity and growth (Purnomo et al., 2021)
Cogent Business and Management	4	105	4.9	Conceptualization of SMEs' business resilience: A systematic literature review (Saad et al., 2021)
International Journal of Organizational Analysis	4	45	7.5	In the family way: an exploration of family business resilience (Beech et al., 2020)
Journal of Hospitality and Tourism Management	4	119	14.9	Transcending the COVID-19 crisis: Business resilience and innovation of the restaurant industry in China (Li et al., 2021)

Top 10 prolific authors

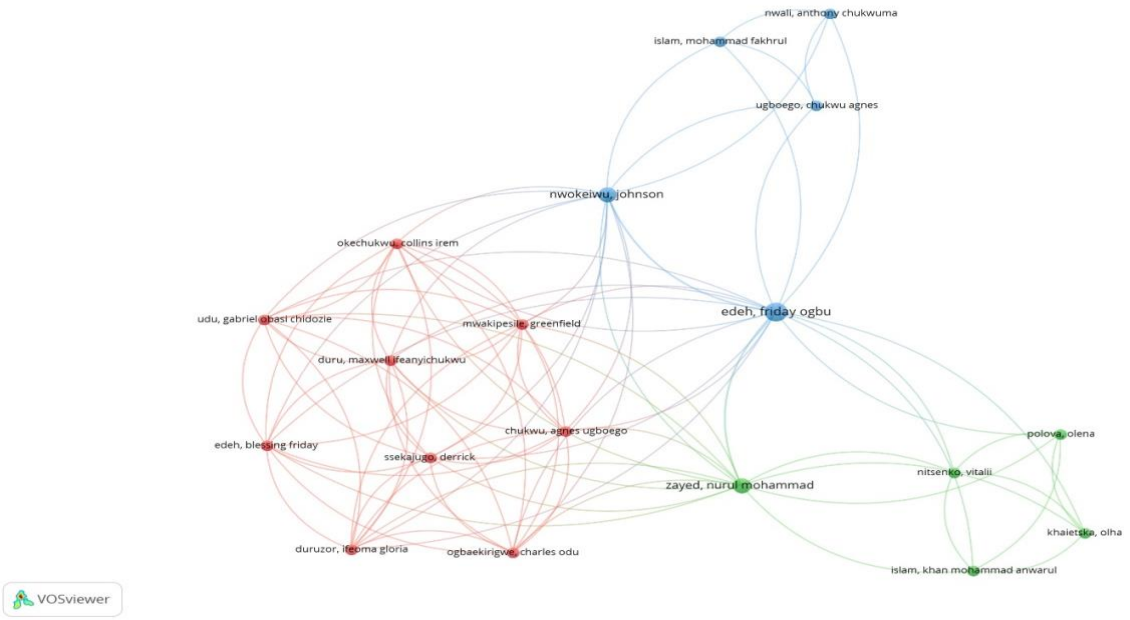
Table 4 displays a summary of the top ten authors who have published the most articles in the field of entrepreneurial resilience. The table includes each author's h-index, total number of publications, total citations, institutional affiliation, and country of origin. The analysis below highlights the most productive contributors based on three key indicators: the highest number of publications, the highest total citations, and the highest h-index. We can see from the table that most authors come from Indonesia, Italy, and the United States, with 2 authors originating from each country, and 1 author comes from India, Saudi Arabia, Uganda, and the United Kingdom.

By focusing on authors, we can identify prominent scholars who have significantly contributed to the development of literature on entrepreneurial resilience. We identified 19 influential authors who have played a pivotal role in shaping the research landscape, with their work profoundly impacting the study of entrepreneurial resilience (Figure 4).

Table 4: Top ten prolific authors in entrepreneurial resilience studies

Author	Scopus ID	h-Index	Total Publication	Total Citation	Affiliation	Country
Alshebami, Ali Saleh	57211347764	19	4	50	King Faisal University	Saudi Arabia
Anggadwita, G.	56540008500	20	4	107	Telkom University	Indonesia
Martinelli, Elisa	55337570700	12	4	129	Università di Pisa	Italy
Wang, Qingfang	56543851800	12	4	11	University of California	United States
Abdinagoro, S. B.	57193864630	10	3	4	Bina Nusantara University	Indonesia
Agarwal, Sucheta	56865149900	14	3	52	GLA University	India
Edeh, Friday Ogbu	57225150404	6	3	16	Kampala International University	Uganda
Kang, Wei	57191076284	11	3	11	University of North Texas	United States
Morris, Wyn	57194398389	10	3	66	Aberystwyth University	United Kingdom
Tagliazucchi, Giulia	57201005335	7	3	129	Università degli Studi di Modena e Reggio Emilia	Italy

Figure 4: Most contributed authors in the field of entrepreneurial resilience



Based on Table 4, Martinelli, E., and Tagliazucchi, G. are the most influential, with 129 total citations. Anggadwita, G. has also made major contributions to the discipline and received more than 100 citations. These authors have been instrumental in promoting research on entrepreneurial resilience, and their work remains highly cited in academia.

Top 10 cited articles.

Table 5 presents the 10 most cited articles from Scopus. Analysing the top 10 most cited articles from highlights the most influential and foundational research in the field. Citation counts reflect a study's impact and relevance, helping to identify key contributions and emerging trends. This analysis supports informed literature reviews, guides future research, and benchmarks scholarly quality, providing valuable insights into the core developments shaping the discipline. The highest cited article is from Dahles & Susilowati (2015) with 352 total citations. This research highlights the importance of embeddedness, livelihoods, and adaptive strategies in fostering business resilience in developing country contexts affected by sustained crises.

Table 5: Top ten most cited articles in entrepreneurial resilience research

Author	Title	Journal	Total Citation
Dahles & Susilowati (2015)	Business resilience in times of growth and crisis	Annals of Tourism Research	352
Branicki et al. (2018)	How entrepreneurial resilience generates resilient SMEs	International Journal of Entrepreneurial Behavior and Research	227
Shepherd et al. (2020)	How to circumvent adversity? Refugee-entrepreneurs' resilience in the face of substantial and persistent adversity	Journal of Business Venturing	171
St-Jean & Audet (2012)	The role of mentoring in the learning development of the novice entrepreneur	International Entrepreneurship and Management Journal	164
Corner et al. (2017)	Entrepreneurial resilience and venture failure	International Small Business Journal Researching Entrepreneurship	153

Duchek (2018)	Entrepreneurial resilience: a biographical analysis of successful entrepreneurs	International Entrepreneurship and Management Journal	151
Santoro et al. (2021)	Searching for resilience: the impact of employee-level and entrepreneur-level resilience on firm performance in small family firms	Small Business Economics	148
Orchiston (2013)	Tourism business preparedness, resilience, and disaster planning in a region of high seismic risk: The case of the Southern Alps, New Zealand	Current Issues in Tourism	135
Santoro et al. (2020)	Exploring the relationship between entrepreneurial resilience and success: The moderating role of stakeholders' engagement	Journal of Business Research	134
Martinelli (2018)	The resilient retail entrepreneur: dynamic capabilities for facing natural disasters	International Journal of Entrepreneurial Behavior and Research	129

Keyword clusters

Co-occurrence analysis was employed to identify the primary topics in the research on entrepreneurial resilience within SMEs, utilising widely recognised keywords. The keywords deemed "popular" are generally considered significant and are selected based on their frequency or through centrality-based network measurements, both of which have been shown to yield highly comparable keyword selections (Choi et al., 2011). Eight analogous keywords are grouped according to their co-occurrence frequency in scientific literature. This process creates a mapping of research domains and subgroups, illustrating the connections between various document groups and scientific publications (Zupic & Cater, 2015; Vorgel, 2012).

Figure 5 displays co-occurrence relationships among key research keywords in the analyzed literature dataset. Each node (circle) represents a keyword, and links (lines) between nodes represent the frequency with which two keywords appear together in the same publication. Node size and link thickness indicate the frequency and strength of these relationships, respectively. Different colors represent clusters of related keywords, suggesting thematic groupings within the research field.

The term “resiliency” is prominently featured at the center of the map, appearing in 222 articles and being linked to most of the keywords on the cluster map with a total link strength of 259. This demonstrates its substantial correlation with entrepreneurship, COVID-19, crisis, and sustainability. The term "entrepreneur" ranks as the second most frequently occurring term, as denoted by the blue colour on the cluster map. It demonstrates a strong correlation with most terms, exhibiting a total link strength comparable to that of COVID-19. The link strength of 77 between "resilience" and "entrepreneur" indicates significant interaction between these variables. This has significantly impacted research on entrepreneurial issues.

Table 6: Keywords clusters in entrepreneurial resilience

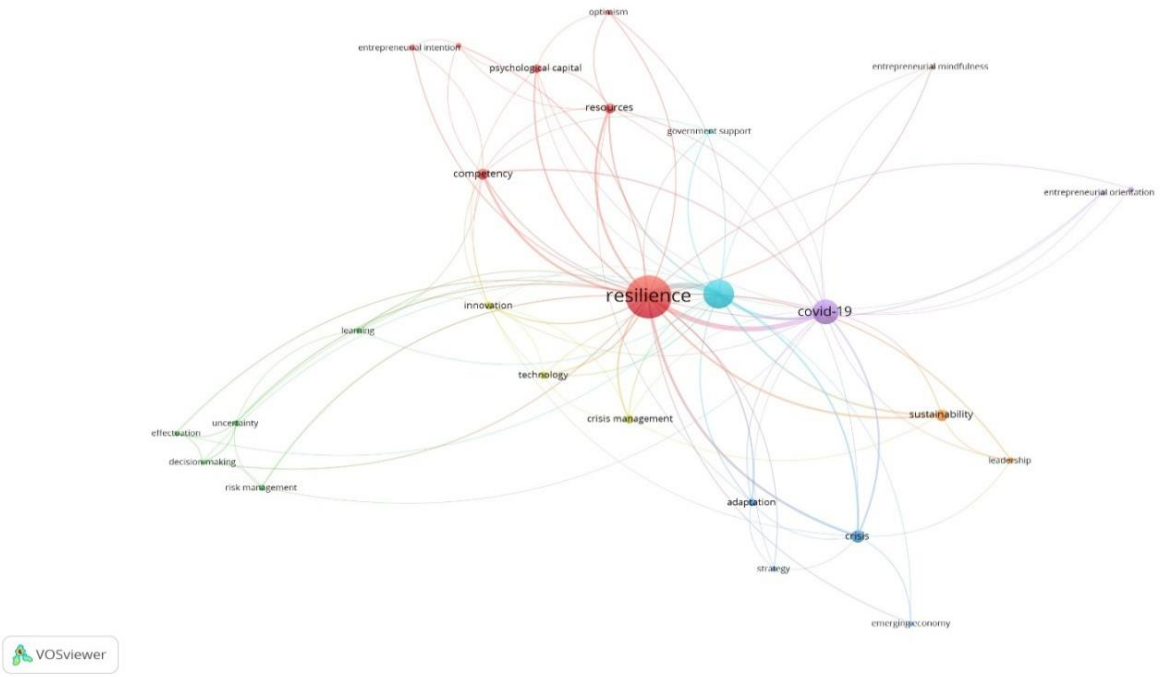
Cluster	Keywords	Overarching Themes	Significance
Cluster 1	Competency, entrepreneurial intention, entrepreneurial passion, optimism, psychological capital, resilience, resources	*Multidimensional construct:* This cluster integrates the individual (psychological capital), social (networks), and organizational (strategic adaptability) dimensions, reflecting how resilience is not a single trait or action but a dynamic, context-driven process influenced by personal, relational, and structural factors, especially under crisis or uncertainty	*Policy interventions and entrepreneurial development*. Development of policy and investment in entrepreneurial development, especially in psychological and leadership skills, will help maintain business continuity and competitiveness during crises.
Cluster 2	Decision-making, effectuation, learning, risk management,	*Decision making and uncertainty*: this cluster particularly focuses on how entrepreneur and their enterprises	*Creating a supportive ecosystem.* Targeted interventions such as financial education, resilience

	uncertainty	respond to crises, disasters, and uncertain environments. The focus includes psychological traits, adaptive behaviors, strategic decision making, and organizational capabilities to help businesses survive, recover, and grow amid crises and uncertainty.	training programs, and policies that facilitate access to resources and networks can be created (Seraj et al., 2022). To add, promoting entrepreneurial learning and digital adoption can help SMEs better navigate crises and seize emerging opportunities (Abbas et al., 2024).
Cluster 3	Adaptation, crisis, emerging economy, strategy	*Crises response and adaptation*: This cluster focuses on how businesses adapt, innovate, and sustain operations during and after disruptive events. It focuses on how businesses across industries build and leverage resilience to survive, adapt, and recover from crises, emphasizing the interplay of innovation, leadership, ecosystem support, and adaptive strategies.	*Enhancing adaptability and innovation.* Benefit from embracing digital technologies and creative pivots will help sustain operations and seize new opportunities during crises (Santos et al., 2023). It is also crucial for entrepreneurs to have entrepreneurial mindfulness, which will help them maintain focus, manage stress, and foster resilience, which in turn improves crisis response.
Cluster 4	Crisis management, innovation, technology	*Organizational change and future readiness.* Response to external shocks such as disasters, crises, and COVID-19. Various integrated approaches will enable businesses to withstand external disruptions like pandemics, economic shocks, or environmental challenges, ensuring their survival and growth.	Resilience is not only about surviving disruptions but also about proactively adapting, innovating, and growing. For entrepreneurs and organizations, resilience translates into operational continuity, competitive strength, and sustainable success. For governments and policymakers, fostering resilience supports economic stability, social welfare, and sustainable development in the face of ongoing global uncertainties.
Cluster 5	COVID-19, entrepreneurial orientation, recovery	*Resilience-building mechanisms.* This cluster emphasizes the importance of psychological, social, and entrepreneurial capital, sustainability integration, and robust research methodologies to understand and support business recovery and long-term sustainability.	As for an entrepreneur, emotional intelligence, leadership skills, as well as long-term financial stability are crucial to maintain team cohesion during crises and improve the business's sustainability and attractiveness.
Cluster 6	Entrepreneurs, government support	*SMEs enabler*: This cluster focuses on government support as an SMEs enabler that acts as a key catalyst in strengthening SME resilience. Supports in terms of facilitating adaptability, promoting technology adaptation, and enhancing financial literacy will enable SMEs to better withstand shocks and facilitate sustainable recovery and growth.	*Government support* is fundamental to building SME resilience and driving economic growth by providing financial relief, fostering digital adoption, enhancing workforce capabilities, and promoting innovation. These measures enable SMEs to sustain operations and compete globally, thereby underpinning broader economic stability and transformation.
Cluster 7	Leadership, sustainability	*Sustainability*: This cluster focuses on how effective leadership, sustainability-oriented strategies (including CSR and ESG), resilience-building, and knowledge management contribute to the long-term sustainability, growth, and competitive advantage of SMEs and small businesses across diverse contexts	*Improve the entrepreneur's capacity to survive.* Entrepreneurs who cultivate adaptability, embrace technology, and develop financial and leadership competencies—supported by targeted government initiatives—are better equipped to build resilient, sustainable

		and sectors.	businesses capable of thriving amid uncertainty and change.
Cluster 8	Entrepreneurial mindfulness	*Entrepreneurial mindfulness.* This cluster focuses on entrepreneurial mindfulness and leadership in enhancing resilience and performance in startups and SMEs. Being aware, present, and reflective helps entrepreneurs improve mental clarity, emotional regulation, and adaptability.	*Designing Mental Health and Leadership Development Initiatives.* Policies can promote mindfulness training and leadership development as part of entrepreneurship support services to enhance decision-making, stress management, and adaptive capacity.

Altogether, the eight keyword clusters reflect a multidimensional research field that spans the individual, organizational, and institutional levels of entrepreneurial resilience. For instance, the integration of psychological capital, decision-making processes, innovation strategies, government support, and sustainability reveals that resilience is no longer viewed as a single trait but as a dynamic capability shaped by internal capacities and external systems. The prominence of COVID-19 across clusters also signals how global disruptions have accelerated scholarly focus on crisis response and adaptability. This thematic diversity highlights a shift toward more holistic understandings of resilience, capturing not only how entrepreneurs survive disruptions but also how they evolve, transform, and sustain long-term growth across varying contexts.

Figure 5: Keywords co-occurrence map generated from VOSviewer in the field of entrepreneurial resilience



The third most common keyword is "COVID-19," as it was used in 76 documents with 121 total link strength. This keyword's frequency and connectedness in contemporary studies emphasize its centrality in debates regarding entrepreneurial resilience. The link strength of 63 between "resilience" and "COVID-19" shows that these topics are frequently discussed together in the literature on the area of entrepreneurial resilience in SMEs.

This map demonstrates that resilience and entrepreneurship are deeply interconnected themes in the current research landscape, particularly in the context of crises like COVID-19. The centrality of these keywords and their strong associations with concepts such as innovation, crisis management, and competency reflect a scholarly emphasis on understanding how entrepreneurs and entrepreneurial ventures navigate, adapt to, and thrive amid adversity.

4. Conclusion and Recommendations

The research objective was to identify the intellectual structure together with emerging trends in entrepreneurial resilience studies of SMEs. The research shows that resilience' and 'entrepreneur' are the most frequently used keywords in the field of entrepreneurial resilience. The study identified eight different clusters, which represent groups of keywords that appear together frequently. The United Kingdom, Indonesia, and the United States emerged as leading contributors, while journals such as Sustainability (New Zealand) dominated the publication landscape.

The analysis shows that crisis management and entrepreneurial adaptation are fundamental topics, while digital transformation and external environment issues in entrepreneurship during crisis times are emerging areas that provide a detailed understanding of current research priorities. The research indicates a growing interest in startup company resilience and the hospitality and retail industries. By examining prolific authors, influential journals, and country-level contributions, the study sheds light on the geographic and institutional landscape of entrepreneurial resilience research, noting that collaboration remains limited and suggesting the need for more interdisciplinary partnerships.

While this study offers a descriptive mapping of the entrepreneurial resilience literature, interpreting the findings through a theoretical lens can enhance their significance. For instance, Duchek's (2018) model of resilience, as a dynamic capability comprising anticipation, coping, and adaptation, provides a useful framework for understanding the progression of topics identified in the clusters. The emergence of themes like crisis management, digital transformation, and adaptation aligns with these stages, indicating how entrepreneurial resilience evolves in response to environmental challenges. Integrating such models in future bibliometric or empirical research could deepen understanding of resilience development among SMEs.

The research contains specific boundaries that need attention. Our research depended exclusively on Scopus database information. Although this database includes numerous high-impact journals yet it fails to include all relevant sources. The exclusion of Web of Science and Google Scholar databases from our analysis might have led to missing important studies that appear in regional or emerging journals that Scopus does not index. Future research should use multiple databases to collect publications because this approach will enhance both the quantity and quality of research findings.

In addition, this study adopts a general bibliometric scope, capturing cross-sectoral insights into government support, psychological capital, and crisis management. While this provides a broad overview of the field, future studies may benefit from an industry-specific focus to derive more tailored practical implications. For practitioners, the findings suggest that resilience-building initiatives should prioritize leadership development and digital innovation, particularly in crisis-sensitive sectors such as tourism, hospitality, and retail, which were among the most impacted during the COVID-19 pandemic.

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Leveraging Artificial Intelligence to Enhance Financial Education in Corporate Finance and Calculation-Intensive Subjects

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Abstract: The study of finance, especially corporate finance, poses significant obstacles owing to its dependence on calculations and the complexity of its theoretical constructs. Students frequently need to comprehend complex concepts such as Net Present Value (NPV), Internal Rate of Return (IRR), cost of capital, and financial modelling, all of which necessitate accuracy, logical reasoning, and multi-step problem-solving abilities. Even trivial computational errors might result in substantial misinterpretations of financial results, hindering effective learning. The swift progression of Artificial Intelligence (AI) in the education industry presents an increasing possibility to include AI-driven technologies into finance education, enhancing both understanding and implementation of complex ideas. The present study explores the potential of AI that can be effectively utilized as a teaching assistant for finance students, focusing specifically on quantitative analysis, decision-making under uncertainty, and corporate financial management. AI applications such as intelligent tutoring systems, automated calculation engines, and adaptive learning platforms can assist students by simplifying complex tasks, offering personalized learning trajectories, and providing real-time feedback. Moreover, scenario-based simulations powered by AI allow learners to engage more deeply with financial decision-making processes, bridging the gap between theory and practice. By leveraging these capabilities, AI not only enhances accuracy but also improves student engagement, motivation, and critical thinking skills. The study concludes with a discussion on the long-term implications of AI integration in finance education, highlighting its potential to reshape traditional pedagogy and prepare students for a technologically driven financial landscape.

Keywords: *Artificial Intelligence, Finance Education, Corporate Finance, Quantitative Problem-Solving, Financial Modeling.*

1. Introduction and Background

Teaching corporate finance subjects and other finance-related disciplines requiring intricate calculations poses difficulties for educators and learners. Corporate finance, an essential topic in business and finance education, necessitates several computations, such as discounted cash flow (DCF), capital budgeting, cost of capital, financial forecasting, mergers and acquisitions, and valuation (Brigham & Ehrhardt, 2017). Traditional educational materials, such as textbooks, calculators, and spreadsheets, are helpful but often do not help students fully understand these complex substances and ideas. In mitigating these issues, Artificial Intelligence (AI) is emerging as a revolutionary educational tool that can perform complex calculations, evaluate massive databases, and provide personalized feedback (Luckin et al., 2016). In addition, Zakaria et al. (2023) argue that AI is increasingly transforming financial management research and reshaping the tools and methodologies used to teach complex economic concepts. This study examines key challenges in financial education and discusses how AI can address them by providing personalized learning experiences, automating calculations, and supporting real-time problem-solving.

Corporate finance education is inherently demanding due to its reliance on quantitative methods and data analysis (Parrino et al., 2025). To fully understand the concept, students must not only understand theoretical principles but also apply them through complex calculations. The complexity of financial calculations is among the challenges faced by students. Students must perform calculations such as Net Present Value (NPV), Internal

Rate of Return (IRR), and capital cost estimations, all of which involve multiple steps and procedures. These tasks demand precision and accuracy, as minor errors in calculations can lead to incorrect results and interpretations (Ross et al., 2019). Students must not only grasp calculations but also comprehend how these figures impact business and corporate decisions. Students frequently struggle to grasp where they went wrong in their calculations and how to improve their skills and comprehension (Abylkassymova et al., 2020). Therefore, the AI positions will be of great help to students, particularly in their comprehension of the concept of corporate finance, which will facilitate the process of conducting calculations.

2. Literature Review

AI as a Solution in Finance Education

AI can be a powerful solution in finance education, particularly in calculation-intensive courses that students sometimes find terrifying. One of the key ways AI overcomes these issues is through personalized learning, which AI-powered platforms can be tailored to specific students' needs, providing real-time feedback, personalized practice problems, and interactive lectures based on performance (Popenici & Kerr, 2017). This enables students to learn at their own pace, tackling hard computations step by step, thus reducing the anxiety of falling behind in class. Moreover, AI can assist with breaking down complex financial models and equations into more digestible parts, offering visual aids and simulations that clarify abstract concepts in corporate finance (Siau & Yang, 2017). Additionally, AI tools can automate tedious and repetitive calculations, allowing students to focus on higher-order thinking (HOT), involving critical thinking skills and evaluation, such as strategy formulation and decision-making. For example, AI can streamline financial modelling by automatically producing templates and forecasting economic consequences based on previous data, so alleviating cognitive burden and enhancing confidence in addressing more complex financial issues (McKinsey, 2021). By integrating AI into finance education, educators can create a more engaging and less anxiety-inducing learning environment, making it easier for students to grasp and apply complex financial concepts.

Moreover, AI is positioned to tackle numerous issues encountered in the instruction of corporate finance. The incorporation of AI enables students to dynamically engage with finance subjects and obtain immediate aid in comprehending intricate computations and concepts. According to He & Xu (2020), AI tools can automate time-consuming and error-prone financial calculations, enabling students to focus more on understanding the underlying concepts. For instance, AI-powered platforms can perform discounted cash flow analyses, calculate bond yields, or optimize capital structures automatically, allowing students to explore multiple financial scenarios with ease. Tools like AI-enhanced spreadsheet plugins or standalone financial analysis platforms can perform calculations such as NPV and IRR instantly, offering students step-by-step explanations and interactive feedback (Popenici & Kerr, 2017). Furthermore, Zakaria et al. (2023) emphasize that AI's computational capabilities are reshaping how students engage with complex financial models and decision-making processes.

Furthermore, AI-based educational platforms allow students to solve finance problems in real time, providing immediate feedback on their inputs. For example, students can input assumptions about growth rates or interest rates, and AI systems can generate updated financial models that show the impacts of these variables (Baker, Smith & Anissa, 2019). Moreover, AI-powered tools adapt to each student's pace, offering personalized learning paths based on their performance. This allows students who struggle with specific concepts to receive additional practice tailored to their needs and provides details for understanding (Luckin et al., 2016). For students who struggle with complex subjects like corporate finance, AI offers personalized learning paths that adapt to their pace and understanding levels. AI-driven platforms provide interactive lessons, step-by-step tutorials, and continuous feedback, helping break down complex topics into manageable sections. These systems can identify areas where students are struggling and offer targeted exercises to improve their weaknesses, building a strong foundation in critical concepts (Luckin et al., 2016). This personalized help is especially beneficial in areas with restricted access to competent educators and quality learning resources, allowing students to obtain customised aid that conventional educational systems may fail to offer. Furthermore, AI-driven educational systems can overcome geographical limitations, providing students in underdeveloped nations access to worldwide information and resources. Cloud-based AI technologies facilitate access to virtual classrooms, instructional films, and simulations that render abstract financial ideas more concrete. For instance, students can engage in constructing financial models or examining real-world case studies utilising AI-assisted tools without the necessity for costly software or local infrastructure (UNESCO,

2020). By democratizing access to these advanced learning tools, AI enables weaker students, even in resource-constrained environments, to develop the skills and confidence needed to master complex finance subjects.

However, one common argument against the use of AI in education is that it could potentially lead students to become overly reliant on AI tools, thus undermining their ability to engage in deep learning and critical thinking. Critics argue that if students use AI to solve complex problems without fully understanding the underlying principles, they may miss out on developing essential skills such as problem-solving, analytical thinking, and creative reasoning (Selwyn, 2019). This overreliance may also result in a lack of personal accountability and effort, as students may rely on AI to complete tasks that they should be completing independently. Additionally, the apprehension is that students may regard AI tools as a shortcut, thereby evading the rigorous learning process and the challenge of tackling challenging subjects. In industries such as corporate finance, where comprehending concepts such as financial modelling or valuation necessitates intricate reasoning, relying exclusively on AI-generated responses may lead to inadequate comprehension. In order to guarantee that students continue to actively participate in the learning process, improve their critical thinking skills, and implement their problem-solving strategies, educators must strike a balance by incorporating AI as a supportive tool rather than a crutch (Holmes et al., 2021). This involves encouraging students to use AI for reinforcement and personalized learning, while still requiring them to demonstrate their understanding independently.

In short, while AI presents numerous benefits in enhancing financial education, especially for weaker students in less developed countries, there are valid concerns regarding over-reliance on these tools. The key lies in striking a balance where AI serves as a complementary resource that enhances personalized learning and reduces fear of complex subjects while still requiring students to engage deeply with the material. By encouraging independent problem-solving alongside AI support, educators can help students harness the advantages of technology without sacrificing the development of critical thinking and foundational skills.

Simplifying Key Corporate Finance Concepts Through AI

AI tools not only perform calculations but also enhance students' understanding of key corporate finance concepts by simplifying the analytical process.

Valuation Techniques

Valuation techniques can play a vital role in helping students acquire core skills in corporate finance and other computationally intensive courses. Using techniques such as discounted cash flow (DCF), comparative company analysis (CCA), and precedent trading requires students to apply basic financial concepts such as the time value of money, risk pricing, and the cost of capital (Damodaran, 2012). By learning how to perform estimations, students practice important calculations and develop a deeper understanding of how financial theory applies to real-world decisions. For example, when students use the DCF model, they must forecast future cash flows, estimate discount rates, and analyze market assumptions. This enhances their financial modeling, analysis, and problem-solving skills (Pinto, Henry, Robinson, & Stowe, 2015). Through practical application of these abilities, students acquire the ability to assess the financial health of a company, test hypotheses, and analyse data. This hands-on approach, in conjunction with the incorporation of courses such as financial statement analysis and risk management, allows students to develop a thorough comprehension of corporate finance and develop the confidence necessary to solve intricate financial issues (Grimm & Blazovich, 2016).

While valuation techniques like Comparable Company Analysis and Discounted Cash Flow (DCF) are commonly taught through textbooks and physical materials, AI provides significant advantages in mastering these concepts more effectively and efficiently. Traditional methods offer static, one-size-fits-all content, whereas AI-powered tools personalize the learning experience based on each student's pace and abilities, perhaps following students' level of understanding. AI systems can deliver real-time feedback, adjusting lessons based on students' requests through specific prompts and requests, as well as problem sets to focus on areas where students struggle the most. This personalized and adaptive approach ensures that students build a stronger foundation in complex topics, such as corporate finance, by guiding them through step-by-step learning processes tailored to their specific needs (Holmes et al., 2021). Moreover, AI automates tedious calculations that are essential in valuation but often overwhelm students, such as forecasting free cash flows or discounting

future values. By managing these repetitive chores, AI enables students to concentrate on higher-order thinking (HOT), including interpreting results, evaluating assumptions, and making strategic decisions, provided that students diligently engage with the process and strive to comprehend the flow and discourse. The integration of real-time financial data and interactive simulations also enriches the learning experience, offering students a dynamic, hands-on understanding of economic models. This practical exposure enhances their ability to apply theoretical knowledge in real-world scenarios, giving them an edge in mastering valuation techniques (Luckin et al., 2016).

Additionally, AI tools enable continuous assessment and progress tracking, allowing both students and educators to monitor growth over time. Unlike traditional quizzes or textbook exercises, AI platforms provide instant feedback and personalized recommendations for improvement. In regions where access to high-quality educational resources is limited, AI can offer scalable and affordable learning opportunities. By breaking down barriers to financial education, AI democratizes access to tools and techniques that would otherwise require advanced software or specialized instruction, making it a powerful solution for students across different regions and skill levels (UNESCO, 2020).

Financial Forecasting and Risk Management

Forecasting financial performance and managing risk are critical components of corporate finance. AI tools can assist students by running Monte Carlo simulations and stress tests, helping them visualize the impact of different risk factors on financial outcomes (Brigham & Ehrhardt, 2017). AI also improves financial forecasting by dynamically adjusting forecasts based on real-time data, thereby providing students with more precise financial models (He & Xu, 2020). AI can greatly assist students in mastering financial forecasting and risk management by providing tools and techniques that enhance learning through automation, personalized insights, and practical simulations. Financial forecasting, which involves predicting future financial outcomes such as revenues, expenses, and cash flows, typically requires analyzing large datasets and recognizing patterns. AI algorithms, particularly machine learning models, can help students process vast amounts of data and identify trends more accurately than manual methods. This allows students to focus on interpreting the forecast results and understanding the underlying factors that influence financial performance, rather than getting bogged down in the complexity of data manipulation (Brynjolfsson & McAfee, 2017).

In understanding financial risk management, AI can play a transformative role by enabling students to model and analyze different risk scenarios with greater precision. AI-based systems can simulate various risk factors, such as interest rate changes, currency fluctuations, or market volatility, and their potential impacts on financial outcomes. This hands-on interaction helps students grasp complex risk management frameworks like Value at Risk (VaR), Monte Carlo simulations, scenario analysis, and stress testing. AI-powered platforms also provide real-time risk assessments, enabling students to dynamically adjust variables and immediately see the potential risks to a portfolio or business, particularly when dealing with investment decision-making. This instant feedback mechanism enhances their understanding of risk mitigation strategies and sharpens their decision-making skills under uncertainty (Siau & Yang, 2017). Moreover, AI provides a tailored educational experience in financial forecasting and risk management. Adaptive learning systems provide students with tailored feedback and problem sets that address their individual limitations, facilitating more effective skill development. AI can furnish case studies or simulations utilising real-time market data, enabling students to implement theoretical principles in authentic business contexts. This integration of customized education and practical application guarantees that students not only acquire the technical competencies in forecasting and risk management but also cultivate the critical thinking and problem-solving skills essential for manoeuvring through intricate financial landscapes (McKinsey, 2021).

Enhancing Financial Modeling Through AI

Financial modeling is essential in corporate finance, and AI can make the process more accessible by automating repetitive tasks and enabling real-time scenario analysis.

Data-Driven Financial Models

With AI, students can integrate real-time data into their financial models, allowing them to adjust based on current market conditions. For instance, AI-driven financial platforms can gather and process large datasets, enabling students to create more sophisticated and accurate models in areas such as mergers and acquisitions,

capital raising, and financial forecasting (Baker et al., 2019; Hasan & Shreevamshi, 2025). One real-world case of a data-driven financial model effectively solving a corporate finance issue involves Uber during its initial expansion phases. Uber faced significant challenges in valuing the company accurately, as it was rapidly growing, but with complex and uncertain revenue streams due to its disruptive business model. Traditional valuation techniques, such as the discounted cash flow (DCF), would have struggled to capture the dynamics of its business. Instead, Uber turned to data-driven financial modeling to address key corporate finance issues, particularly around forecasting future revenues, risk assessment, and investment planning.

In the case of Uber's data-driven financial model, Uber used massive amounts of real-time data collected from its ride-sharing platform to develop dynamic financial models. The company leveraged machine learning algorithms to process and analyze this data, helping it forecast growth patterns in various cities based on factors like user demand, population density, and economic activity (Chen et al., 2015). By tracking millions of rides, pricing fluctuations, and customer preferences, Uber built more accurate forecasting models that could predict future revenues with much higher precision than traditional methods (Hall, Kendrick, & Nosko, 2015). These models were instrumental in helping Uber assess which cities were most profitable, where to invest in driver incentives, and how to scale operations (Isaac, 2014). This approach also extended to risk management. Uber's data-driven models allowed it to run simulations under different scenarios, such as regulatory changes, shifts in consumer behavior, or competitor actions, by providing insights into how those factors might affect its bottom line (Zervas, Proserpio, & Byers, 2021). As a result, Uber could allocate its capital more efficiently and manage operational risks by identifying which markets posed greater financial threats and where it should concentrate its expansion efforts.

This scenario is particularly pertinent for Corporate Finance students studying financial forecasting and risk management. Uber's implementation of data-driven models illustrates the capacity of advanced data analytics and AI to enhance decision-making in capital budgeting, investment strategies, and risk assessment. It underscores the significance of integrating real-time data and machine learning methodologies to enhance the precision of financial models and adjust to fluctuating market conditions (Malik, 2024). Additionally, it demonstrates how AI and data-driven financial models can solve the problem of valuation for companies with unconventional or rapidly evolving business models, which often confound traditional financial techniques. For students, understanding Uber's approach offers valuable insights into the importance of integrating big data and AI-driven analysis into financial planning and corporate strategy.

Scenario Analysis and Stress Testing

AI can significantly help students master Scenario Analysis and Stress Testing in corporate finance by automating complex simulations and improving the accuracy of financial models. These techniques involve evaluating a company's performance under various hypothetical conditions and extreme events, respectively. AI-powered tools can automate the repetitive task of adjusting financial variables, such as interest rates or market growth, and running numerous scenarios. For instance, using Monte Carlo simulations, AI can generate thousands of possible outcomes, allowing students to focus on analyzing the results rather than spending time on manual calculations (Siau & Yang, 2017). Moreover, AI can integrate real-time financial data into scenario analysis and stress testing models, making forecasting more accurate and robust. By quickly processing big data and analyzing trends, AI enables students to model real-world factors like market volatility or regulatory changes. Holmes et al. (2021) believe that this scenario helps them understand how these variables might impact a company's financial stability. Using real data also allows students to practice making informed decisions based on current business conditions and improve their risk assessment skills.

Finally, AI improves education by providing tailored feedback and engaging simulations. Students might replicate actual financial crises, such as the 2008 recession, to comprehend how corporations may navigate significant market upheavals. AI systems deliver tailored exercises according to individual student performance, facilitating a more profound comprehension of essential risk management frameworks. This practical experience, coupled with adaptive learning, guarantees that students cultivate the technical and analytical skills essential for proficient scenario analysis and stress testing (Luckin et al., 2016).

3. The Future of AI in Finance Education

The future of corporate finance and other calculation-intensive subjects is set to be transformed by the integration of Artificial Intelligence (AI), offering more dynamic, personalized, and efficient learning experiences. AI's capability to automate complex calculations, such as financial modeling, forecasting, and risk analysis, will allow students to focus on higher-order thinking and strategic decision-making. Additionally, AI enhances forecasting accuracy and risk management, optimising resource allocation and facilitating organisational growth (Rane et al., 2024). In corporate finance, AI can manage labour-intensive activities such as discounted cash flow (DCF) analysis or scenario modelling, allowing students to investigate the strategic ramifications of financial data (Siau & Yang, 2017). This transition alleviates cognitive burden and facilitates pupils in cultivating a more profound comprehension of financial principles instead of becoming bogged down by tedious calculations. In addition, AI brings personalized learning pathways to calculation-heavy subjects, enabling adaptive learning experiences that cater to individual student needs. AI-powered platforms can assess each student's strengths and weaknesses and tailor lessons, problem sets, and feedback in real time. This makes learning more effective and targeted, helping students grasp difficult concepts at their own pace. For students who struggle with the mathematical aspects of subjects like corporate finance, AI's interactive and personalized approach will provide the guidance they need to improve. In fields like accounting, engineering, and economics, AI can similarly automate repetitive tasks while offering personalized instruction, enhancing learning outcomes across various calculation-intensive disciplines (Holmes et al., 2021). Moreover, AI is likely to revolutionize the practical application of these subjects by incorporating real-time data, simulations, and predictive models. Students in finance, economics, or engineering will have the opportunity to work with live datasets and test various hypotheses using AI-driven predictive analytics. This real-world integration will help students bridge the gap between theory and practice, ensuring they are prepared to tackle real-world challenges.

As AI continues to evolve, the future of corporate finance and other calculative subjects will be more data-driven, dynamic, and closely aligned with the technological advancements shaping modern industries (Luckin et al., 2016). Furthermore, Tegmark (2018) asserts that AI's capacity to automate intricate jobs and execute computations is swiftly enhancing both efficiency and precision in fields such as corporate finance, economics, and engineering. AI tools enable pupils to comprehend intricate financial models and calculations, such as net present value (NPV) and internal rate of return (IRR), as the system can promptly compute these values based on input data. This enables students to swiftly explore many scenarios and attain a more profound comprehension of financial decision-making without the hindrance of laborious computations. Identical ideas may be utilised in other computationally demanding disciplines, such as physics and econometrics, where AI can manage extensive data sets, allowing students to concentrate on result analysis, interpretation, and strategic planning. Mayer-Schönberger and Cukier (2014) also argue that AI's ability to integrate big data into the learning process enables students to engage with real-time financial information and economic trends, making subjects like corporate finance more relevant and applied. AI's data-driven approach helps students understand market dynamics and develop problem-solving skills by working on practical, real-world cases. This contrasts with traditional methods that often rely on static textbook examples, making the subject more engaging and applicable to real-world financial issues. On the contrary, Regan and Jesse (2019) highlight their significant concern, which refers to the ethical implications of using big data in educational contexts. Critics argue that the collection and analysis of personal data to tailor learning experiences may infringe on student privacy. As data-driven learning systems require extensive data collection to function effectively, there is a risk of misuse or unauthorized access to sensitive information (Regan & Jesse, 2019). This raises important questions about consent, data ownership, and the potential for surveillance, which could detract from the educational experience rather than enhance it. These arguments are valid and increasingly relevant in today's data-driven world. Concerns about data privacy and ethics are well-documented, particularly in educational settings where sensitive student information is collected and analyzed. The potential for misuse of personal data, lack of transparency, and issues related to consent are critical issues that need addressing. Organizations and educational institutions must implement strong data protection measures to ensure the ethical use of AI technologies, which is often a complex challenge (Regan & Jesse, 2019). Therefore, as we look toward the future of corporate finance and other calculation-heavy subjects, the integration of AI holds immense promise for enhancing educational outcomes.

In short, AI technologies enable automating complex calculations, personalizing learning experiences, and providing real-time data insights, enabling students to focus on strategic decision-making and problem-solving. This shift is expected to make learning more engaging and applicable to real-world scenarios, preparing students to navigate the complexities of modern financial landscapes. However, critical challenges must also be addressed to ensure equitable and ethical implementation. Concerns regarding data privacy, over-reliance on technology, and disparities in access highlight the need for a cautious and inclusive approach. Educational institutions and policymakers must prioritize transparency, develop robust data protection measures, and ensure that AI resources are accessible to all students, regardless of their socioeconomic background. By striking a balance between innovation and responsibility, we can harness the power of AI to foster a more effective and equitable learning environment for future finance professionals and students in calculation-intensive disciplines.

4. Conclusion

In conclusion, the integration of AI in finance education represents not merely an enhancement but a transformative shift that is poised to redefine student engagement with calculation-intensive disciplines like corporate finance. As we near the commencement of this educational revolution, financial educators must wholeheartedly use AI-driven solutions. Consequently, they may equip students with the competencies required to manoeuvre through an increasingly intricate financial landscape, culminating in a workforce that is not only adept in financial analysis but also proficient in using technology for strategic benefit. This integration necessitates a vigilant consideration of ethical ramifications, encompassing data privacy and the potential for technological dependency.

Educators must balance leveraging AI's potential with fostering critical thinking skills to ensure kids are both consumers of knowledge and creators and innovators. In conclusion, the future of finance education, driven by AI, presents unparalleled potential. This transformative technology has the capacity to revolutionise education, rendering it more individualised, efficient, and pertinent. By embracing these developments, financial educators and institutions will enrich the educational experience and equip students to lead and innovate in a dynamic financial landscape. The moment for action is now. Integrating AI into financial education is a complex decision. It is essential to cultivate the forthcoming generation of financial leaders.

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Appraising the Determinants of ESG towards Maqasid Shariah in Enhancing Financial Inclusion

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Abstract: The purpose of this study is to evaluate the key determinants of Environmental, Social, and Governance (ESG) factors about the principles of Maqasid Shariah and their role in advancing financial inclusion. Most Islamic banks and Shariah-compliant firms have started promoting sustainability through their financing and initiatives many years ago, which puts them ahead in terms of ESG. There are still many obstacles that need to be overcome to get the best results from the integration of ESG and Islamic Finance, as well as offering insights into Islamic finance models such as ESG investment from an Islamic perspective, especially about the concepts of Maqasid Shariah, so that ESG and Maqasid Sharia can be applied in all institutions, especially Islamic banking and also Sharia-compliant firms. The integration of ESG principles within Islamic finance offers a holistic framework that aligns ethical and sustainable practices with the objectives of Shariah, particularly in promoting economic justice, social welfare, and financial accessibility. By appraising the synergies between ESG dimensions and the five pillars of Maqasid Shariah—protection of religion, life, intellect, progeny, and wealth. This study explores how these determinants contribute to inclusive financial systems. Using a conceptual framework analysis methods approach that includes qualitative analysis and evaluation, the study provides insights into how ESG-aligned strategies can be instrumental in reducing financial disparities, fostering trust, and promoting responsible investments in accordance with Islamic values. This study contributed to the literature by expected to offer policy recommendations and practical frameworks for stakeholders seeking to leverage ESG criteria to enhance financial inclusion in Shariah-compliant economies.

Keywords: *ESG, Maqasid Shariah, Financial Inclusion*

1. Introduction and Background

Recently, Environmental, Social, and Governance (ESG) criteria have emerged as pivotal considerations in sustainable finance. In Islamic finance, Maqasid al-Shariah provides a framework for assessing socio-economic justice as well as ethical conduct and the distribution of wealth. This paper analyzes the factors of ESG in light of Maqasid al-Shariah to explore how these criteria, in particular, advance financial inclusion among marginalized populations. The combination of ESG factors and Maqasid Shariah offers a specific prospect to advance financial inclusion in areas that lack adequate access to ethical and Shariah-aligned financial services.

Maqasid Shariah, which refers to the higher objectives of Islamic law, seeks to preserve and promote five essential values: religion (din), life (nafs), intellect (‘aql), progeny (nasl), and wealth (mal). These objectives closely align with the ESG pillars, which advocate for responsible environmental stewardship, social equity, and sound governance. By integrating ESG factors within the Islamic finance framework, institutions can not only adhere to Shariah compliance but also foster greater financial accessibility, trust, and resilience. Despite the apparent compatibility between ESG and Maqasid Shariah, there remains a gap in understanding how specific ESG determinants influence the achievement of Shariah objectives and, in turn, enhance financial inclusion. In recent years, Malaysia has emerged as a global leader in integrating Islamic finance with sustainable development, positioning itself at the forefront of ethical and inclusive financial practices. Central to this integration is the alignment of Environmental, Social, and Governance (ESG) principles with the objectives of Maqasid Shariah—the higher intents of Islamic law aimed at promoting justice, equity, and societal welfare. This alignment is particularly pertinent in the Malaysian context, where Islamic finance plays a significant role in the capital market, accounting for approximately 64% or RM2.4 trillion of the market as of August 2023.

The Securities Commission Malaysia (SC) has been instrumental in fostering this synergy. In November 2023, the SC introduced the Maqasid Al-Shariah Guidance for the Islamic Capital Market, aiming to enhance the industry's authenticity, resilience, and global competitiveness. This guidance aligns global sustainability goals with Islamic finance principles, supporting Malaysia's vision of an inclusive and sustainable financial system. Despite these advancements, challenges persist in fully realizing the potential of ESG-Maqasid Shariah integration, particularly concerning financial inclusion. While initiatives like the Islamic Social Exchange and the ESG-i Framework for micro, small, and medium enterprises (MSMEs) have been introduced to strengthen ESG programs, there remains a need for a comprehensive appraisal of how ESG determinants influence the achievement of Maqasid Shariah and, consequently, enhance financial inclusion.

Many investors are attracted to ESG funds and Islamic funds primarily because of the recent scandals in the ethics literature, and with much focus, because of the financial crisis and subsequent negative impact on conventional funds. In light of this trend, Muslim investors are left with the choice of investing in Islamic mutual funds. Islamic investment is showing considerable strength and resilience in the face of the global financial crisis, thus adding to the popularity of this type of Islamic fund (Asim & Ullas, 2022). The importance of ESG issues in satiating investors' concerns about sustainability becomes apparent. Financial institutions are seeing an increase in the practice of responsible investing, which emphasises the incorporation of ESG considerations into the investment process (Paltrinieri et. al, 2020).

ESG variables comprise a range of factors that are typically overlooked in financial analysis but may have an impact on the financial results. These factors include how businesses respond to climate change, how well water is managed, how well health and safety policies prevent accidents, how supply chains are managed, how employees are treated, and how well a company adopts a trust- and innovation-fostering culture. One element that links Shari'ah principles to ESG and sustainability in general is the *Maqasid Shari'ah*. The emphasis on stakeholder benefit is where Haq and Wahab (2019) claim that the similarities between *Maqasid Shari'ah* and the sustainability paradigm lie.

However, the regulatory landscape governing ESG in relation to *Maqasid al-Shariah* requires further examination to assess its adequacy, identify potential barriers, and explore opportunities for improvement. This study identifies the ESG determinants that need to be aligned with *Maqasid al-Shariah* to ensure the sustainability of financial inclusion. The findings may demonstrate the significant potential for the *Maqasid al-Shariah* component to be in harmony with ESG dimensions, leading to the development of a comprehensive investment tool that improves Islamic financial inclusion. The purpose of this study is to examine whether the elements of the ESG framework, each with distinct advantages, when integrated with the *Maqasid al-Shariah* mechanism, produce a novel, all-encompassing instrument for enhancing financial inclusion. The insights gained from this research will inform policymakers, regulators, and industry stakeholders by proposing strategies and regulatory improvements to foster a conducive environment for the sustainable growth of financial inclusion in Malaysia. This will support financial innovation within the bounds of Shariah principles while also aligning with the Sustainable Development Goals (SDGs), particularly SDG 10 (Reduced Inequalities) and SDG 11 (Sustainable Cities and Communities), and will contribute to the objectives of *Anjakan Ekonomi MADANI*.

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2. Literature Review

Financial inclusion refers to providing access to financial services and products such as banking, savings accounts, and insurance for individuals and businesses who do not have access to these services due to their financial status or location. Environmental, social, and governance (ESG) factors are increasingly being considered by investors when making investment decisions. In Malaysia, there is a growing emphasis on financial inclusion and the adaptation of ESG considerations in the financial sector. This is being driven by government initiatives and the increasing demand from investors for more sustainable investment options. There are various financial inclusion programs and ESG-focused investment funds available in Malaysia, with the aim of promoting financial inclusion and sustainable development.

Various instruments have been developed to align with the sustainability agenda, including Social Responsible Instrument (SRI), Value-based Intermediation (VBI), and environmental, social, and governance (ESG). ESG has

emerged as a critical investment screening tool in fulfilling the sustainability interests of the investors. This also applies to Islamic finance, where the demand for Shari'ah-compliant investment keeps increasing. For example, the governments of Malaysia and Indonesia have continued issuing ESG-linked Sukuk throughout 2020 and 2021, while Saudi Arabia has raised green Sukuk to fund the Saudi Electricity Co. and Abu Dhabi with their Etihad Airways has issued the first-ever transition Sukuk that was designed to manage the airline's shift towards a decarbonized economy (Asim & Ullas, 2022). ESG (Environment, Social, and Governance) is a set of standards that investors use to assess a company's impact on society and the environment. In Islamic finance, ESG considerations are closely aligned with the principles of *Maqasid Shariah*, which aim to promote human well-being and social justice. Many Islamic financial institutions have ESG criteria that they use to screen potential investments, and they also disclose how they are integrating ESG factors into their portfolios. It is worth noting, however, that there is no universally accepted definition of ESG in Islamic finance, and different institutions may use different criteria or weightings when evaluating ESG risks and opportunities.

Meanwhile, the Sustainable Development Goals (SDGs) facilitate a notable shift in ESG principles, allowing Islamic non-financial corporations to effectively incorporate Islamic aspirations (*Maqasid al-Shariah*) into their operational framework (Nasir & Seman, 2022; Khan, 2019; Stafford-Smithe et al., 2016; Siswanti et al., 2017; Kasbani, 2018). According to Sairally (2015), the ESG is regarded as a fundamental component of *Maqasid al-Shariah* within the framework of *Maqasid Shariah*. This reflects the fact that *Maqasid al-Shariah* elements and principles of ESG are compatible with one another and share similar concepts of duty, accountability, and stewardship in the service of delivering environmental and humanity-wide protection and benefits through their separate pathways.

Environment, social and governance (ESG)

The UN Global Compact published a seminal report titled Who Cares Wins in 2005, which is credited with popularising the term ESG. ESG investments fall under the category of sustainable investments, which is a catch-all word for investment portfolios that assess and take into account the long-term effects of corporate operations on society, the environment, and business performance alone, in addition to looking for positive profits. ESG investment is defined by the Schroders Environmental, Social and Governance Policy as a broad category of investment activities that acknowledge the connections that exist between businesses, the communities and environments in which they operate, and the shareholders who have the power to direct those businesses (Miskam & Abdullah, 2021).

When considering emerging markets, it is discovered that adding ESG to Malaysian listed companies increases their value. They came to the conclusion that there was a clear correlation between ESG ratings and a company's value, since the market performed better by over 30% and its cost of capital decreased by 1.2%. They went on to say that because the ESG or SRI agenda boosts a company's profitability, it benefits stakeholders. Eliwa et al. (2019) found that organisations with good ESG policies typically have reduced costs of financing. This finding is also true in the European market. They claim that stakeholders looking to make changes in corporate decisions appropriately evaluate ESG practices. According to this research, robust ESG practices can act as a benchmark for an organization's overall management calibre, which leads to improved financial outcomes (Abdul Qoyum, 2020). According to Kumar's research from 2022, there are seven primary areas of study in sustainable finance: impact investing, carbon finance, socially conscious investing, climate finance, energy financing, and the governance of sustainable investment and financing.

Maqasid Shariah

Maqasid al-Shariah offers a thorough framework that guarantees the upholding and advancement of these vital elements, which are primarily observed in the protection of religious freedom and the practice of Islam. It supports the idea of protecting and advancing the fundamental components of faith, including the conviction that Muhammad is a prophet, that God is one, and that Abu Ishaq Al-Shatibi's list of the tenets of Islam is accurate (Moosa, 2016). This goal guarantees people the freedom to practise their faith without interference or pressure (Moosa, 2016; Monzur-E-Elahi, 2010). Islam's core beliefs, values, and goals are inextricably linked to the Shari`ah, which is described as a system of ethics and values encompassing all facets of life (personal, social, political, economic, and intellectual), with its unwavering bearings and primary means of adapting to change. Put another way, it represents the all-encompassing perspective of Islam, which is a comprehensive and cohesive way of living that covers every aspect of life, individual and societal, in both this world and the next.

The ideals of compassion and guidance are at the core of the Shari`ah. This encourages collaboration and mutual assistance within the family and society at large in an effort to achieve justice, eradicate prejudice, and lessen hardship. Realising the public interest, which Islamic scholars have typically seen as the Shari`ah's all-pervasive value and objective—which is, for all intents and purposes, equivalent to compassion—manifies both of these conceptions. Scholars have used the terms maqasid and maslahah virtually interchangeably, with the former occasionally having the same meaning (Dusuki et al., 2005).

This interpretation of Shari'ah has consequences for the strategy to be used in creating and directing Islamic finance. It broadens the definition of Shari'ah compliance beyond only meeting the formalities and procedural requirements of the law for financial goods to include adhering to the principles and objectives set forth by the Islamic way of life. Furthermore, understanding the basic goals of Shari'ah offers a theoretical framework through which specific texts and technical methods are comprehended when generating legal rulings. To ensure that the ijtihad process produces accurate results, it is crucial to comprehend maqasid before establishing guidelines or working procedures (Al-Qaradawi, 2007, p. 137).

Financial Inclusion

Financial inclusion is defined as the availability and accessibility of affordable financial services to all individuals and businesses (Chukwuma-Eke, Ogunsola & Isibor, 2025). It is thought that financial inclusion promotes economic growth, which lowers inequality and poverty. Financial penetration is a phenomenon that reflects the element of financial inclusion. Communities facilitate business and work by offering financial services, loans, and communication among communities. Moreover, growth features of a number of metrics reflecting economic structure, including GDP, unemployment, inflation, investment, infrastructure, population, and labour, are taken into account (Erlando et al. 2020). The assertion was that as financial inclusion promotes economic growth, poverty and inequality would decline. Second, there are measures of economic expansion, such as infrastructure, which will increase when the current infrastructure is maintained. Inversely correlated with financial inclusion. Financial Inclusion entails that people and firms have access to formal financial products and services, offered by financial institutions, to meet their needs on affordable and competitive terms. (Malik, et al.,2022)

Theoretically, by outlawing riba (interest), speculation, and gambling, the Islamic financial system contributes significantly to the welfare of society (Chapra, 1992). It emphasises the social, moral, ethical, and religious aspects equally in order to promote justice and equality for the benefit of society as a whole. When considering the application of social and economic justice, income distribution, work ethic, and the role of the state, the Islamic financial system is thought to be more welfare and equivalent. In this sense, it is possible to argue that a financial system based on Islamic principles would theoretically be more effective in advancing financial inclusion.

3. Research Methodology

This study adopts a conceptual framework approach rooted in the integration of ESG principles and Maqasid Shariah with the aim of promoting sustainable financial inclusion. The framework proposes that ESG elements, particularly the social and governance dimensions, can be ethically strengthened and operationally aligned with Maqasid al-shariah to enhance the performance, inclusiveness, and legitimacy of Islamic finance. This alignment is theorised to contribute to broader socio-economic objectives, particularly SDG 10 (reduced inequalities) and SDG 11 (sustainable cities and communities), and national frameworks such as Anjakan Ekonomi MADANI. In essence, conceptual analysis is best used for identifying relationships between variables and determinants in the scope of literature on ESG, Maqasid Shariah, and Financial Inclusion. In the context of Islamic Finance, aligning ESG with Maqasid al-Shariah to enhance financial inclusion directly contributes to reducing inequalities and to support inclusive economic activities, clean energy, and foster sustainable communities, especially for urban and semi-urban areas, such as the poor, women, or rural populations.

This article forms part of a major study regarding value creation through the conceptual analysis to study the changing trends based on theoretical content and methodological approaches by analyzing the conceptual framework and discussion of previous studies about discipline knowledge regarding the ESG, Maqasid Shariah, and financial inclusion. The method used is based on a conceptual discussion that focused on the descriptive

explanation of the relationship between ESG, Maqasid Shariah, and Financial Inclusion. Furthermore, the discussion is continued by making a conceptual framework that explains how the role of Maqasid Shariah in encouraging the achievement of the ESG towards financial inclusion. This study covers the issues that hinder conducive sustainable practices in fostering financial inclusion through ESG initiatives in Malaysia by formulating targeted policy recommendation and strategies that ensures its productivity and sustainability aligned with Maqasid Shariah. Thus, this study will specifically look into challenges that could impede the building of conducive and sustainable ESG based on Maqasid Shariah for increasing financial inclusion in Malaysia.

The qualitative approach is also appropriate for analysing the challenges and issues of ESG and exploring how ESG and Maqasid Shariah can provide the necessary support and assistance. This study uses a conceptual framework approach, which is particularly effective in elucidating the principles and application of ESG and maqasid Shariah. This method allows for thorough exploration of the concept, highlighting its tools and their societal benefits based on financial inclusion. Furthermore, the analysis method facilitates the study in linking maqasid shariah mechanisms as an alternative solution for addressing the implementation of ESG towards financial inclusion. It is important to note that financial inclusion encompasses a range of indicators, including financial literacy, zakat, waqf, social microfinance, and other practices. These tools collectively play a vital role in providing socio-economic solutions and fostering community resilience. This paper highlights these concepts and provides detailed information to propose a framework. Recognising the significant potential of ESG and maqasid Shariah in providing a good environment in the communities. For instance, zakat can provide unconditional cash to affected families, and shariah-compliant governance can support infrastructure development. This paper asserts that this discussion would benefit the economic condition. This study's hypothesis is expected to demonstrate the significant potential for harmonising Maqasid Shariah objectives. Furthermore, the study will positively influence sustainable financial inclusion within Islamic Finance.

4. Discussion

The conceptual framework of ESG determinants does relate to financial inclusion, especially through Social and Governance channels, because it is believed that the main hurdle in financial inclusion is the social underdevelopment of society (Ali, 2019; Cicchiello, 2021; Park and Mercado, 2018). Meanwhile, environmental factors support inclusion by addressing climate-related financial risks and creating new markets for sustainable finance. When aligned with Maqasid Shariah, this relationship becomes even stronger because both ESG and Maqasid emphasize justice, welfare, equity, and sustainability, which are foundational to inclusive finance. The issues arise when many institutions use ESG as a compliance tool but not a value-driven initiative. Maqasid shariah, which focuses on human welfare and justice, is often sidelined. Missed opportunities to design finance that truly empowers vulnerable groups (e.g., zakat-based microfinance, waqf projects).

Table 1: Integrated framework between ESG, Maqasid Shariah and Financial Inclusion

ESG	Maqasid Shariah	Financial Inclusion
Environmental - Sustainable energy - Climate-resilient infra - Waste management	Preservation of Life (Hifz al-Nafs) Wealth (Hifz al-Mal) Support sustainable livelihoods	Green microfinance Climate risk insurance Eco-loans for farmers Rural energy access
Social - Gender inclusion - Community engagement - Customer fairness	Preservation of Dignity, Intellect & Intellect (Hifz al-Aql) & Lineage (Hifz al-Nasl) Support social justice & well-being	Women & minority access Financial literacy Ethical banking services Social microfinance Zakat & waqf integration
Governance	Preservation of Wealth (Hifz al-Mal) & Intellect (Hifz al-Aql)	Consumer protection Trust in institutions

- Transparency - Accountability - Anti-corruption - Inclusive decision-making	Ensure ethical, fair finance Promote transparency & equity	Regulatory inclusion Shariah-compliant governance Financial system stability

Table 1 above presents an integrated framework that aligns Environmental, Social, and Governance (ESG) principles with the maqasid al-Shariah and financial inclusion goals. In the environmental domain, initiatives like sustainable energy, climate-resilient infrastructure, and waste management support the preservation of life (Hifz al-Nafs) and wealth (Hifz al-Mal). This basic protection is tied to financial inclusion through tools such as green microfinance, eco-loans for farmers, and rural energy access, all of which aim to support sustainable livelihoods and protect vulnerable communities from climate risks. Developing a strategic framework for financial inclusion in energy access involves integrating multiple components that align technological innovation with inclusive economic and policy systems (Apeh et al., 2024; Omowole et al., 2024; Sam Bulya et al., 2024). As energy poverty continues to affect millions in underserved communities, particularly in rural and low-income regions, the ability to access and sustain clean, reliable energy services depends significantly on the availability of appropriate financial tools and supportive institutional frameworks (Daramola et al., 2025). ESG efforts often prioritize environmental or corporate governance metrics, but neglect access to finance for the poor, especially in Islamic societies. Financial exclusion continues in rural, underserved Muslim populations, especially women and micro-entrepreneurs. Many Islamic financial products are Shariah-compliant legally, but don't fulfill the spirit of Maqasid, such as justice, equitable wealth distribution.

The social aspects, such as gender inclusion, community engagement, and customer fairness, correspond to the preservation of intellect (Hifz al-Aql), dignity, and lineage (Hifz al-Nasl). Social financial inclusion is advanced through access to financial services for women and minorities, financial literacy programs, ethical banking, and integration of Islamic social finance instruments like zakat and waqf. These mechanisms not only promote justice and well-being but also reinforce communal solidarity and equitable access to resources. As of implementation, now there's a lack of Islamic-specific metrics to assess ESG outcomes through the Maqasid lens, for example, how to quantify preservation of intellect or dignity. Difficult to track progress on goals like ethical wealth redistribution, poverty alleviation, or environmental stewardship from an Islamic perspective. Many regulators in Muslim-majority countries lack policies or incentives to integrate ESG and Maqasid into financial inclusion strategies. Financial institutions have no clear roadmap or support to adopt inclusive, value-based finance. Tools like zakat, waqf, and qard hasan are underutilized in linking ESG with financial inclusion. Missed potential to create impact-driven Islamic finance models that support the poor and the environment (e.g., green waqf funds, zakat-linked ESG microloans). Social and cultural norms in some Muslim societies can hinder women's access to finance or decision-making, despite Maqasid's emphasis on human dignity and equity. ESG social inclusion goals remain unfulfilled unless tailored approaches are adopted.

Meanwhile, in terms of governance elements, the focus on transparency, accountability, anti-corruption, and inclusive decision-making aligns with the preservation of wealth and intellect. Ethical governance is essential for ensuring fairness in financial dealings and trust in institutions. From a financial inclusion standpoint, this is operationalized through consumer protection, regulatory frameworks that include underserved populations, and the promotion of Shariah-compliant governance structures that ensure ethical conduct and stability in the financial system. Overall, this integrated framework demonstrates how Islamic ethical principles can complement ESG values to foster a more inclusive, equitable, and sustainable financial system that serves both people and the planet.

5. Managerial Implications and Recommendations

To conclude, this paper will provide a significant output of policies and strategies that can contribute towards the enhancement of the latest study. It would contribute to helping the regulator and stakeholders understand better how organisations manage the risks and opportunities around sustainability issues. Investors also keep seeking more information on Islamic industrial firms with a good application of ESG. They are now considered

socially conscious investors to identify the investment opportunities in a particular company as part of decision-making.

Conclusion

The objective of this paper was to establish whether or not the elements of the ESG framework, each with a distinct set of advantages when paired with the Maqasid al-Shariah mechanism, might provide a novel result in the shape of an all-inclusive instrument for improving financial inclusion. To sum up, aligning ESG principles with the Maqasid al-Shariah and financial inclusion offers a powerful, values-driven framework to address the unique needs of underserved Muslim communities. While environmental initiatives like clean energy access support life and wealth preservation, and social efforts promote dignity, intellect, and justice. Real impact requires financial tools and governance systems that embody both Islamic ethics and sustainability. However, the current landscape reveals significant gaps; many Islamic financial products remain legally compliant but fail to fulfill the true spirit of Maqasid, and critical tools like zakat, waqf, and qard hasan remained underutilized. Without context-specific metrics, supportive regulatory frameworks, and inclusive cultural practices, the full potential of Islamic finance to advance ESG and financial inclusion remains unrealized. Therefore, a more deliberate and strategic integration of Islamic principles, ESG goals, and inclusive finance tailored to the lived realities of Muslim societies is essential to create a just, resilient, and ethically grounded financial ecosystem.

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Performance of the MSMEs Manufacturing Sector in Malaysia: An Overview

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Abstract: Micro, Small, and Medium Enterprises (MSMEs) form the backbone of Malaysia's economy, accounting for nearly 97% of business establishments and contributing 39.1% to the GDP in 2023 (SME Corp Malaysia, 2024). This study provides a comprehensive review of the performance of the Malaysian MSME sector. This study synthesizes recent statistical data and empirical studies to explore MSMEs' contributing factors, MSMEs establishment by size and sector, state, value of MSMES GDP and overall GDP, number and annual percentage change of employment, MSMEs' employment by type of economic activity, value and annual percentage change of labor productivity, and ongoing challenges faced by MSMEs. In addition, this study discusses government policy and support, as well as the impact of technological adoption among MSMEs in Malaysia. Furthermore, this study highlights the overall performance of MSMEs in the manufacturing sector and their determinants. The key determinants include technological capability, managerial competence, financial access, supply chain integration, and government support. In conclusion, to enhance MSME performance, policymakers must streamline access to government support and incentivize digital transformation. These strategies will help manufacturing MSMEs become more resilient and competitive.

Keywords: *MSMEs, GDP contribution, MSMEs performance, Manufacturing sector, Malaysia*

1. Overview of Micro, Small and Medium Enterprises (MSMEs) in Malaysia

MSMEs are regarded as the economic backbone of a country, particularly in developing countries. Performance is the primary objective of any MSME to sustain competitiveness in the business world (Efrat et al. 2018). Performance is defined as the ability of a unit, organization, group, or individual to achieve a specific goal through a set of activities (Kumar, 2021; Laitinen, 2002). Performance is also conceived as the effectiveness of an organization in achieving its goals of behavior in work and task accomplishment (Gómez-Mejía, Berrone, & Franco-Santos, 2014). The performance of businesses can be gauged financially and non-financially. According to Chen et al. (2015), financial performance measures are a better indicator of competitive advantage than other measures. Since Malaysian MSMEs are a substantial force in the national business environment, investigating their performance is very important.

MSMEs are defined differently depending on the industry. Generally, it is based on two (2) criteria: sales turnover and number of full-time employees. In the manufacturing sector, MSMEs are defined as companies with a turnover of no more than RM 50 million or fewer than 200 full-time employees. MSMEs in the service and other sectors are defined as businesses with a maximum turnover of RM 20 million or several full-time employees 75. The contribution of MSMEs to the gross domestic product (GDP) decreased to 39.1% in 2023, with a value-added of RM613.1 billion. GDP indicates that this industry is significant for the development of the Malaysian economy.

This study aims to provide a comprehensive overview of the performance of the Malaysian MSME manufacturing sector. The paper is structured as follows: It begins with an introduction outlining the importance of MSMEs in Malaysia's economy. The next sections analyze key statistics on MSME contributions, establishments by size and sector, geographical distribution, GDP contribution, employment, and labor productivity. The study then discusses major challenges faced by MSMEs, government policies and support initiatives, and the impact of technological adoption. A focused section examines the manufacturing MSME sector, including its distribution, subsectors, and GDP growth. The study concludes by synthesizing the key determinants of MSME performance in manufacturing, including technological capability, managerial competence, financial access, supply chain integration, and government support.

2. Contributions of MSMEs

Micro, Small, and Medium Enterprises (MSMEs) play a vital role in Malaysia's socioeconomic development, contributing significantly to GDP, employment, export activity, and industrial innovation. As SME Corp Malaysia (2023) reported, MSMEs accounted for 38.4% of the country's GDP and 48.2% of the total employment in 2022. The manufacturing subset of MSMEs is particularly influential in driving industrial output, supplying intermediate goods, and supporting large firms through subcontracting and supply chain integration (Ramachandran, Chandramohan, & Taibangnganbi, 2024). While traditionally focused on domestic markets, many MSMEs have expanded their reach by participating in global value chains, contributing approximately 11.6% to Malaysia's total exports, particularly in secondary processing, textiles, and electronics (Loo, Ramachandran, & Raja Yusof, 2023). In addition to their economic footprints, MSMEs promote inclusive and balanced regional development by generating employment and entrepreneurial opportunities in both urban and rural areas. They also empower marginalized groups, including women, youth, and Bumiputera entrepreneurs (Yahaya & Nadarajah, 2023). Notably, MSMEs have demonstrated remarkable adaptability during crises, such as the COVID-19 pandemic, by adopting digital technologies and pivoting towards e-commerce and remote business models (Lim et al., 2024). Furthermore, the strategic role of MSMEs is closely aligned with Malaysia's long-term policy goals, including the Shared Prosperity Vision 2030 and the National Policy on Industry 4.0 (Industry4WRD), both of which emphasize technological upgrading, innovation, and sustainable growth (Veeraya, Raman, Gopinathan & Singh, 2024). Collectively, these contributions underscore the indispensable role of MSMEs in shaping Malaysia's economic resilience, competitiveness, and inclusive development.

MSMEs Establishment by Size and Sectors

There are 1,173,601 MSMEs in Malaysia, which predominantly represent the establishments (National SME Development Council, 2022). This number is an important driver of the national economic growth. Among them, 84.7 per cent of the establishments were in the service sector, 5.6 per cent in the manufacturing sector, and 7.9 per cent in the construction sector, as shown in Table 1. The remaining sectors were agriculture (1.4 percent) and mining and quarrying (0.4%).

Table 1: Distribution of MSMEs Establishment by Size and Sectors

Sector	No. of SME Establishments					
	Services	**Manufacturing**	**Construction**	**Agriculture**	**Mining & Quarrying**	**Total**
Micro	806,947	38,926	64,029	10,574	3,191	923,667
Small	177,435	24,200	24,154	4,946	811	231,546
Medium	9,968	2,531	4,741	921	227	18,388
Total SMEs	994,350	65,657	92,924	16,441	4,229	1,173,601
Share of SMEs (%)	84.7	5.6	7.9	1.4	0.4	100.0
No. of Large Firms	25,867	2,440	1,400	1,527	152	31,386
Overall Establishments	1,020,217	68,097	94,324	17,968	4,381	1,204,987

Source: Economic Census 2022: Profile of Small and Medium Enterprises (2022), Department of Statistics, Malaysia

MSME Establishments by State

In terms of SME establishments by state, the majority of MSMEs are from Selangor (23.2%), WP Kuala Lumpur (14.3%), Johor (10.9%), and Pulau Pinang (7.2%) states. The details are presented in Table 2.

Table 2: Distribution of MSMEs Establishments by State

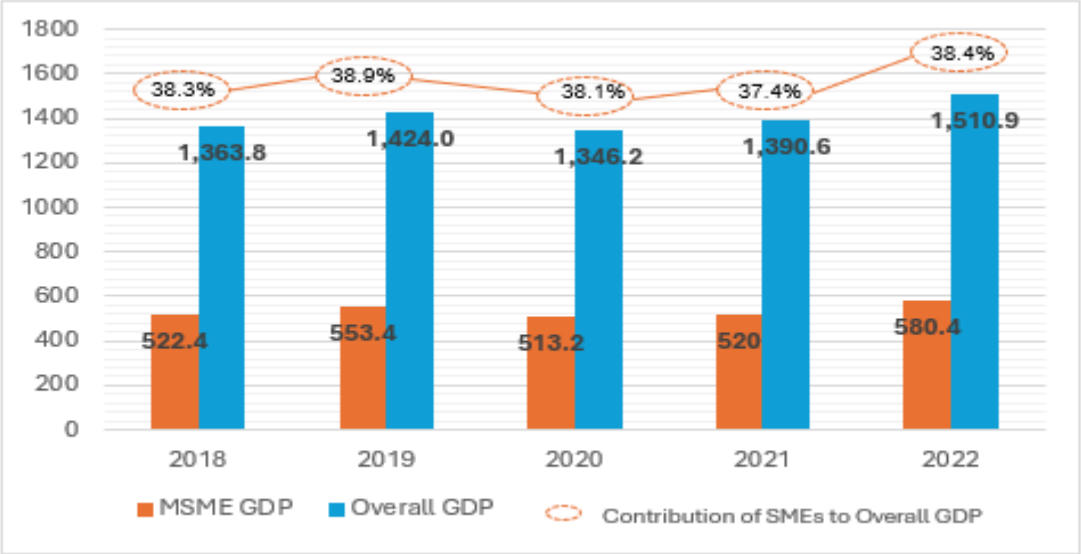
State	Total SMEs	Percentage (%)
Selangor	272,262	23.2
WP Kuala Lumpur	168,176	14.3
Johor	127,747	10.9
Perak	79,244	6.8
Pulau Pinang	84,355	7.2
Sarawak	83,708	7.1
Sabah	80,547	6.9
Kedah	54,063	4.6
Kelantan	50,502	4.3
Pahang	47,638	4.1
Negeri Sembilan	41,089	3.5
Melaka	34,905	3.0
Terengganu	37,671	3.2
Perlis	7,559	0.6
WP Labuan	2,778	0.2
WP Putrajaya	1,357	0.1
Total SMEs	1,173,601	100

Source: Economic Census 2022: Profile of Small and Medium Enterprises, Department of Statistics, Malaysia

Value of MSMES GDP and Overall GDP

MSMEs contributed RM580.4 billion to the economy in 2022 compared to RM520 billion in 2021, as illustrated in Figure 1. The figure also shows that the contribution of MSMEs to the overall GDP continued to grow to 38.3% (2018), 38.9% (2019), 38.1% (2020), 37.4% (2021), and 38.4% (2022).

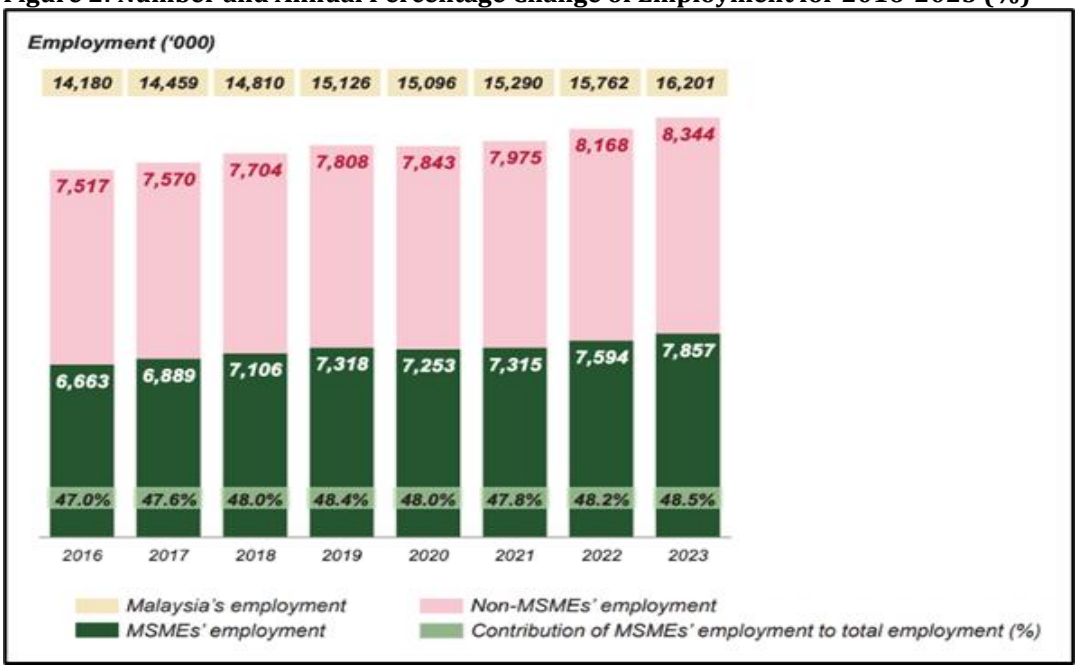
Figure 1: Value of MSMES GDP and Overall GDP



Number and Annual Percentage Change of Employment for 2016-2023 (%)

The number and annual percentage change in employment from 2016 to 2023 are shown in Figure 2. MSME employment share also increased from 48 percent in 2018 to 48.4 percent in 2019, 48.2 percent in 2022, and 48.5 percent in 2023, resulting from the GDP growth of MSMEs.

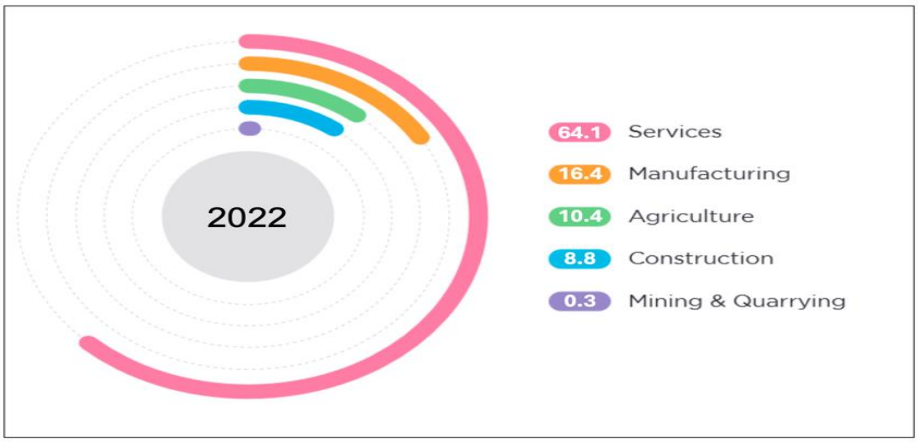
Figure 2: Number and Annual Percentage Change of Employment for 2016-2023 (%)



MSMEs' employment by economic activity

In the context of MSMEs' employment by type of economic activity for 2022, the service sector accounted for the most significant contribution (64.1%), followed by the manufacturing sector (16.4%), agriculture (10.4%), construction (8.8%), and mining and quarrying (0.3%). The details are shown in Figure 3.

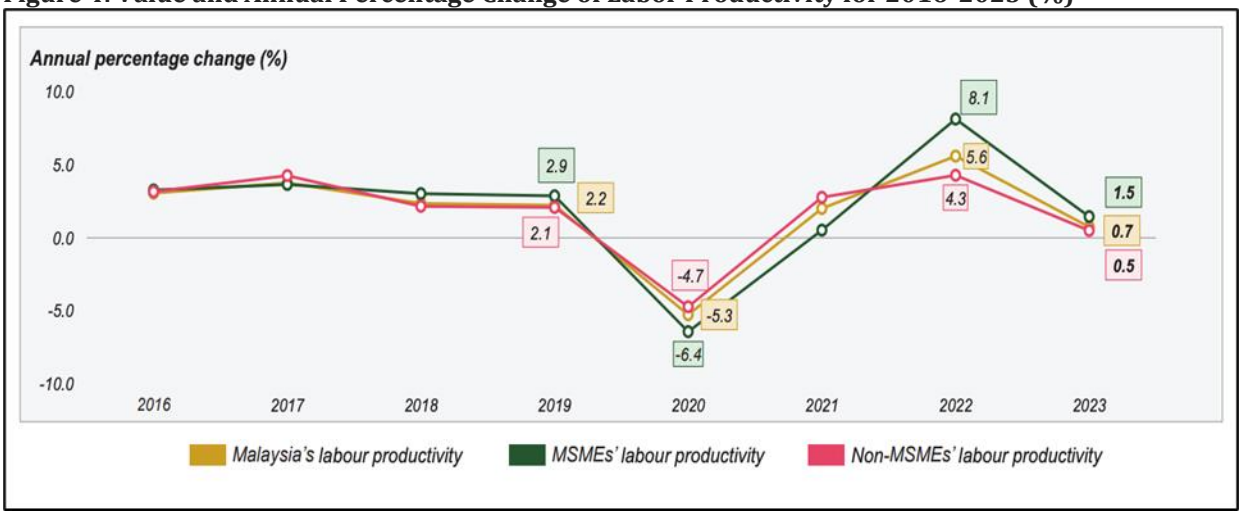
Figure 3: Components of MSME Employment by Sector (%)



Value and Annual Percentage Change of Labor Productivity

In terms of value and annual percentage change in labor productivity, Figure 1.4 indicates that MSMEs employed more labor in 2022, accounting for 8.1 per cent of the total labor in Malaysia, compared to -6.4 per cent in 2020.

Figure 4: Value and Annual Percentage Change of Labor Productivity for 2016-2023 (%)



Challenges Faced by MSMEs in Malaysia

Despite playing a crucial role in the economic development of Malaysia, MSMSs continue to face various issues that limit their growth, competitiveness, and sustainability. One of the foremost issues is the inadequate access to finance. Most MSMEs are unable to access credit due to strict collateral requirements, absence of credit history, and low financial literacy – inhibiting their capacity to invest in innovation, grow businesses, or recover from shocks (AlQershi, et.al, 2023).

In addition, Lim et al. (2024 stated that technology adoption and digital transformation remain significant hurdles. Although digital tools are essential for enhancing productivity and market reach, many MSMEs lack the infrastructure, technical know-how, and strategic awareness to implement Industry 4.0 technologies effectively.

Furthermore, managerial and human capital limitations constrain the ability to compete in dynamic business environments. Many business owners lack formal training in business management, strategic planning, and innovation, resulting in poor decision-making and operational inefficiencies (Kumar, 2021). Another major obstacle mentioned by Sahu and Mani (2025) is market accessibility and competition issues. MSMEs often face difficulties penetrating new markets due to brand limitations, high marketing costs, and barriers to participating in global value chains.

At last, policy gaps and bureaucratic inefficiencies compromise the success of government-supported projects. Although Malaysia has launched several initiatives to help MSMEs, including financing programs, digital grants, and capacity-building activities, many companies are unaware of these supports or find the application processes unduly difficult and time-consuming (Lim et al., 2024). Collectively, Loo et. al. (2023) highlighted these difficulties underlining the need for a more integrated support ecosystem combining financial inclusion, digital enablement, human capital development, and regulatory reform to empower Malaysian MSMEs for sustainable growth in a competitive, worldwide economy.

3. Government Policy and Support for MSMEs in Malaysia

The importance of MSMEs in promoting innovation, inclusive economic growth, and job creation has long been acknowledged by the Malaysian government. To improve MSME competitiveness and sustainability, numerous policies, initiatives, and institutional frameworks have been put in place, especially through organizations like SME Corp. Malaysia, MATRADE, and MIDA. One of the cornerstone initiatives is the National Entrepreneurship Policy 2030 (Dasar Keusahawanan Nasional 2030), which aims to create a holistic and conducive ecosystem that empowers MSMEs through access to finance, technology, human capital, and international markets (SME Corp. Malaysia 2023).

Policies like the Digital Economy Blueprint (MyDIGITAL) and the National Policy on Industry 4.0 (Industry4WRD) have been put into place to encourage MSMEs to adopt digital technology in line with Malaysia's goals for the digital economy. These incentives include monetary rewards, educational opportunities, and financial assistance for digital projects that encourage MSME participants to embrace automation, cloud computing, and big data. For instance, the SME Digitalization Grant provides matching grants of up to RM5,000 for digital resolutions (SME Corp. Malaysia 2023). In addition to digitalization, the government has introduced several financial assistance programs, including the Micro Credit Scheme, Soft Loan Scheme for the Services Sector (SLSSS), and TEKUN Nasional financing. These schemes seek to solve the ongoing problem of credit tightness in MSMEs through lending that is easy to obtain and has low rates of interest. Yet challenges remain in policy coordination, outreach, and impact measurement. Some MSMEs are simply not aware of the existing programs, others are discouraged by red-tapism, or are not compliant with the eligibility conditions (Lim et al., 2024). In addition, AlQershi et.al (2023) argue that enhancing transparency, reducing red tape, and strengthening inter-agency collaboration are essential to improve policy effectiveness.

Impact of Technological Adoption

Supply chain technology has played a significant role in the supply chain in this decade. It connects people, processes, data, and objects smartly. Supply chain technology offers more benefits. These include giving businesses new ways to profit by better and more efficiently organizing physical, information, financial, and human resources (Lee et al., 2016). Therefore, the adoption and utilization of appropriate technology tools are continuously expanding to gain a competitive edge in today's fast-paced marketplaces. Supply chain technology may assist firms in reducing lead times, shortening product life cycles, increasing efficiency, and ultimately increasing customer satisfaction (Khan et al., 2013).

Technological adoption is a key determinant of firm performance, competitiveness, and resilience in a rapidly evolving global economy. For Micro, Small, and Medium Enterprises (MSMEs) in Malaysia, integrating digital technologies, such as automation, cloud computing, big data analytics, and e-commerce platforms, is increasingly essential to remain viable and competitive, especially in the manufacturing sector. However, the adoption rate among Malaysian MSMEs remains moderate because of the confluence of financial, infrastructural, and human capital limitations (Hanaysha & Alzoubi,2022).

According to SME Corp Malaysia (2023), although awareness of digitalization has improved in recent years, mainly due to the impact of the COVID-19 pandemic, many MSMEs continue to face significant challenges in adopting new technology. These include limited digital readiness, a lack of skilled personnel, resistance to change, and concerns about return on investment. Consequently, technology adoption often remains superficial or fragmented rather than strategic and integrated into core business operations (Seow, Choong, & Ramayah, 2021).

Despite these challenges, empirical studies have consistently demonstrated the positive impact of technology adoption on MSME performance. According to Lim et al. (2024), Malaysian MSMEs that adopted Industry 4.0 technologies—such as sensors, the Internet of Things, and data analytics—reported increased customer responsiveness, productivity, and process efficiency. In a similar vein, Hanaysha and Alzoubi (2022) noted that businesses that use automation and cloud-based platforms see improvements in inventory control, quicker decision-making, and lower operating expenses.

The Malaysian government has launched a number of programs to promote the adoption of technology in response to these findings. For MSMEs starting a digital transformation, these include the Industry4WRD Readiness Assessment, Smart Automation Grant (SAG), and SME Digitalization Grant, which provide financial incentives and technical assistance (Loo et al., 2023). However, the effectiveness of outreach, implementation, and ongoing capacity building at the grassroots level is critical to the success of these programs. In conclusion, it is widely acknowledged that MSMEs in Malaysia have the potential to adopt technology; however, achieving this potential calls for a concerted effort that includes proactive management, private sector investment, and government support. To unlock productivity gains and position MSMEs for long-term growth in the digital economy, it is imperative to bridge the digital divide and improve technological capabilities.

4. Manufacturing MSMEs in Malaysia

According to the 2022 statistics of the Department of Statistics Malaysia (DOSM), there were 1,173,601 MSMEs in Malaysia. From the figure, 18,388 (1.6%) firms are medium-sized, 231,546 (19.7%) firms are small, and 923,667 (78.7%) firms are micro-sized. Additionally, there were 994,350 firms in the service sector, which comprised the majority (84.7 %). The construction sector is the second largest contributor to total MSMEs in Malaysia, with 92,924 establishments, forming a 7.9% share of total MSMEs, followed by 5.6% in the manufacturing sector (65,657), 1.4% in the agriculture sector (16,441), and 0.4% in the mining and quarrying sector (4,229). Although most economies are composed of service industries, they depend on manufactured goods for their operations and the development of R&D for technological progress (Lavinsaa et al., 2020). The manufacturing sector has emerged as a key driver of employment in the Malaysian economy, reflecting its significant impact on infrastructure development, job creation, and its contribution to the nation's Gross Domestic Product (GDP).

Distribution of MSMEs in the Manufacturing Sector by State

The Malaysian manufacturing sector comprises 54,505 Malaysian SMEs, accounting for 39.1% of the total manufacturing establishments in the country, as shown in Table 3. More than half of the total MSME establishments are small, accounting for 15,534 (28.5 per cent) establishments, while micro-sized establishments represent 37,990 (69.7 per cent) establishments, followed by medium-sized establishments, representing 981 establishments (1.8 per cent). Most manufacturing companies are located in Selangor, followed by Johor and WP Kuala Lumpur, which is the centre of industrialized and port facilities in Malaysia. The details are presented in Table 3.

Table 3: Distribution of MSMEs in the Manufacturing Sector by State

State	Total SMEs
Selangor	16,808
WP Kuala Lumpur	1,632
Johor	9,244
Perak	4,160
Pulau Pinang	5,678
Sarawak	2,589
Sabah	1,667
Kedah	2,988
Kelantan	1,550
Pahang	1,720
Negeri Sembilan	2,408
Melaka	1,715
Terengganu	1,870
Perlis	311
WP Labuan	134
WP Putrajaya	31
Total SMEs	54,505

Source: Department of Statistics Malaysia (DOSM), (2023).

Distribution of MSMEs in the Manufacturing Sector by Sub-sector and Size

Based on the distribution of MSMEs in the Manufacturing Sector by Sub-sector and Size, it was shown that MSMEs are mainly in Non-metallic Mineral Products, Basic Metal & Fabricated Metal Products (10,360), followed by Wood Products, Furniture, Paper Products & Printing (9,705), and Food Products (9,169), as illustrated in Table 4.

Table 4: Distribution of SMEs in Manufacturing Sector by Sub-sector and Size

Sub Sector	Micro	Small	Medium	Total MSMEs
Textile & Wearing Apparel, Leather & Related Products	4,408	1,802	114	6,324
Beverages Products & Tobacco Products	307	125	8	440
Wood Products, Furniture, Paper Products & Printing	6,764	2,766	175	9,705
Petroleum, Chemical, Rubber & Plastics	4,292	1,755	111	6,158
Non-metallic Mineral Products, Basic Metal & Fabricated Metal Products	7,221	2,593	186	10,360
Electrical, Electronic & optical Products	3,426	1,401	88	4,915
Transport Equipment, Other Manufacturing & Repair	5,181	2,119	134	7,434
Food Products	6,391	2,613	165	9,169
Total	37,990	15,534	981	54,505

Source: SME Census 2023 by the Department of Statistics Malaysia (DOSM), (2023).

MSME GDP and Overall GDP Growth by Sector

MSMEs' value-added MSMEs for the manufacturing sector recorded significant growth of 8.1 percent in 2022 from 6.0 percent in the previous year, as illustrated in Table 5.

Table 5: MSME GDP and Overall GDP Growth by Sector

	2021 SME GDP	2022 SME GDP	2022 Overall GDP
Agriculture	2.0	-0.6	0.1
Mining & Quarrying	-3.6	8.0	2.6
Manufacturing	8.4	6.0	8.1
Construction	-4.4	4.9	5.0
Services	-0.6	16.4	10.9
Total	1.3	11.6	8.7

Source: Department of Statistics Malaysia (DOSM), (2023).

Key Determinants of MSME Performance

Various internal and external factors affect the performance of MSMEs in the manufacturing sector. This section critically reviews the recent literature on the key determinants of MSME performance in Malaysia, including technological capability, managerial competence, financial access, supply chain integration, and government support.

i) Technological Capability

Technology adoption is a crucial driver of MSME manufacturing performance. According to Hanaysha and Alzoubi (2022), implementing automation, cloud computing, and innovative manufacturing tools can enhance productivity and cost efficiency in the manufacturing sector. In addition, Kumar (2021) finds that digitally enabled firms exhibit higher customer responsiveness and faster innovation cycles than non-digitally enabled firms. However, Yahaya and Nadarajah (2023) mentioned that digital readiness remains low among Malaysian MSMEs because of inadequate infrastructure and technical expertise.

ii) Managerial Competence

Business owners' and managers ' competencies significantly affect organizational performance. Loo et. al. (2023) emphasized the role of strategic thinking and leadership in navigating market uncertainties. Similarly, Hanaysha and Alzoubi (2022) found a positive correlation between managerial training and operational efficiency. Nonetheless, many MSMEs lack access to structured capacity-building programs.

iii) Financial Access

Access to finance continues to be a significant barrier for MSMEs in India (Kumar, 2021). highlighted that limited credit facilities constrain expansion and technological upgrading. Although financial assistance is available through government agencies such as Bank Negara Malaysia and SME Corp., bureaucratic processes often hinder timely access to these funds (Sahu & Mani,2025).

iv) Supply Chain Integration

Effective supply chain relationships enhance resilience and performance. Firms that collaborate with suppliers and customers achieve better product quality and delivery. Digital supply chain systems further improve inventory control and lead time reduction (Lim et al., 2024).

v) Government Support

Government policies and support play vital roles in shaping MSME performance. According to SME Corp Malaysia (2023), numerous schemes exist to support MSMEs, including tax incentives, digital grants, and export promotion programs. However, awareness and uptake of these technologies remain low. Furthermore, Seow et. al. (2021) recommend improving outreach and reducing administrative burdens to increase policy effectiveness.

5. Conclusion

This study presents a comprehensive analysis of the performance of Malaysia's micro, small, and medium enterprises (MSMEs), with particular attention to the manufacturing sector. MSMEs are the foundation of the economy and make major contributions to GDP, employment, and productivity. Despite their vital role, many firms face persistent challenges, including limited access to finance, slow technological adoption, inadequate managerial capacity, bureaucratic inefficiencies, and policy shortcomings. Their growth, creativity, and ability to compete globally are all being hindered by these obstacles. Developments in supporting MSMEs have been made possible by government initiatives like training, financial support, and digitalization policies. But the efficacy of these measures is uneven among regions and business types. There is a variation in the degree to which the adoption of digital technology has been a driver for improved MSME performance. This study identifies five core determinants of MSME success: technological capability, managerial competence, access to finance, supply chain integration, and government support. Strengthening these areas is crucial for enhancing the resilience and competitiveness of the industry. In summary, boosting MSME performance, particularly in manufacturing, requires coordinated efforts from policymakers, industry players, and enterprise leaders. By strengthening its supply chain networks, investing in talent and technology, and improving institutional frameworks, Malaysia can realize the full potential of its MSME sector.

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The Impact of Work–Family Conflict on Children in Dual-Earner Families: A Qualitative Thematic Analysis

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Abstract: Although work–family conflict has been extensively studied over the years, research in this area continues to focus predominantly on its consequences. Incompatibility between work and family roles often leads to conflict, resulting in negative outcomes both in the workplace and within the home environment. This study examines the effects of work-family conflict on children from dual-earner households. The primary objective of this study is to comprehend the impact of work-family conflict on the offspring of dual-earners. A qualitative study design was utilised, employing thematic analysis of data gathered from ten dual-earners via semi-structured face-to-face interviews. The result identified multiple causes and effects of work-family conflict that directly affect children. These findings underscore the importance of comprehending how dual-earner interactions affect child well-being. The knowledge acquired from this study is significant and beneficial for subsequent research and practice. To properly tackle this issue, it is imperative to implement complete coping mechanisms. This study shows that researchers and policymakers should pay more attention to how work-family conflict affects children in unique ways.

Keywords: *Work–family conflict, dual-earner families, children's well-being, thematic analysis, family stress, parental availability*

1. Introduction and Background

Work-family is the most important segment of a dual-earner's life. The dilemma of balancing work and family creates conflicts among dual-earners (Tammelin et al., 2015). Working parents consistently have to cope with the problems of combining work and family responsibilities in their daily lives. The length of working time is crucial for parents, as it influences the amount of time they spend away from family commitments and responsibilities. Parental employment impacts the family environment; it is critical to recognise the potential effects of parents' jobs on children. The ecological model of human development is a popular framework for comprehending how friction between work and family affects children's health and well-being. The ecological model of human development is a popular framework for comprehending how friction between work and family affects children's health and well-being. Recent studies have shown that these conflicts are linked to parental burnout and reduced fertility intentions, particularly when organizational support and extended family assistance are lacking (Wang et al., 2024; Wu et al., 2025).

As per Yucel and Latshaw (2021), the ecological model of human development is a widely utilised framework for understanding the impact of work-family conflict on children's health and well-being. The core assertion of this paradigm posits that interactions among four systems (the microsystem, mesosystem, exosystem, and macrosystem) influence child development (Bronfenbrenner, 1986). Work-family conflict is a type of inter-role conflict characterised by the incompatibility of role demands from both work and family (Zhang et al., 2013; Yucel and Latshaw, 2020a,b). It transpires when certain job and familial obligations are conflicting or obstruct one another (Greenhaus & Beutell, 1985; Mathieu & Mathieu, 2011).

There are two types of conflict: work-family conflict and family-work conflict. Work-family conflict occurs when work responsibilities obstruct family responsibilities; it is about individuals giving more time to work, which results in conflict with family demands. Family-work conflict arises when family activities interfere with work performance, meaning an individual gives more time to the family during working hours. In most cases, individuals working and being parents might face conflict due to the domain's clashes, which will increase the stress on them and the people around them (Edwards & Rothbards, 2000; Greenhaus & Beutell, 1985).

Most research on work-family conflict, dual-earner couples, and parent-child issues has focused on families with young children and in developed countries (Le et al., 2020; Chai & Schieman, 2022). In Southern Europe,

technostress and blurred work–family boundaries during the COVID-19 pandemic were found to exacerbate parental burnout, especially in families with older children (Gambin et al., 2023). It is important to look into work-family issues and their effects on children's development. Work-family conflict also originates from long working hours. Spending less time at home and having an inflexible working schedule will lead to fatigue, poor performance, feeling less competent at work, marriage dissatisfaction, and life dissatisfaction. Long working hours often include an enormous volume of work demand and, in most cases, less flexibility (Dilworth, 2004).

According to Bianchi and Milkie (2010), work pressures such as work overload increase work-family conflict. Each individual is involved in work and family, and faces work-family stress. (Mesmer-Magnus & Viswesvaran, 2009). In some studies, family-work conflict can cause conflicts between the individual and the family due to a lack of support from a spouse, a high number of responsibilities at home, the presence of a baby at home, and many children's problems at work. Those dual earners who are married and working can face clashes in their roles. Several studies have examined the impact of nonstandard work on employees and their families and found associations with reduced parental well-being (Liu et al., 2011). This nonstandard work arrangement also increased relationship conflict (Maume & Sebastian, 2012). Parents with high levels of stress and mental health difficulties are associated with lower quality parent-child interactions, less warmth, more irritability, and less consistency (Conger et al., 2002). Low-quality jobs that expose parents to work overload and intensity, low autonomy, long hours, and inflexible schedules have been linked to more punitive and harsh parenting behaviors (Crouter & Bumpus, 2001; Perry-Jenkins et al., 2007; Dinh & Racionero, 2017).

2. Literature Review

Work-family conflict (WFC) has substantial and varied long-term effects on the emotional and psychological health of children of multiple earners. According to research, children who have higher WFC may experience negative consequences such as psychological distress and emotional dysregulation. These impacts are explained in more detail in the sections that follow. Poor-quality job conditions are linked to adolescent mental health (Johnson et al., 2018). Some researchers also identified work-family imbalances as causing harsh parenting behaviors that reduced emotional availability (Johnson et al., 2018); lower quality in a family relationship with children (Cooklin et al., 2015); and less time together with family. A study found that psychological distress in parents directly correlates with lower emotional regulation in children, indicating a spillover effect from parental stress to child behavior (Matias et al., 2017). This describes how work-family conflict affects children. Emotional availability is an exploration-based, logically determined method for understanding the nature of correspondence and association between a parent (or guardian) and child.

According to Johnson et al. (2018), it is significant to be there for your kids; it involves substantially more than helping them with their homework, lifting them from school, putting supper on the table, and taking an initiative to spend "quality time" with them. Children are more likely to have emotional problems when their parents ignore them and are busy with work. Kelly (2014) mentioned that frequent and intense conflict or arguments between parents also negatively impact children, affecting their sense of security and safety. Children's situations at home will influence their behavior towards their parents and the people around them. Children who experience parental anger or hostility, frequent rejection, or low warmth are less able to self-regulate. They are more likely to have an aggression problem and emotional symptoms such as withdrawal and anxiety (Cooklin et al., 2015).

Likewise, children raised in high marital conflict environments show more fearfulness, withdrawal, and emotional insecurity in adolescence (Brock and Kochanska, 2016). The Harvard Business Review (2023) found that parents with higher workplace autonomy and supportive bosses showed greater warmth and engagement with their newborns, impacting their developmental trajectory. This nurturing care enhances attachment, emotional regulation, social competence, and academic success. Offspring with favourable employment experiences showed superior reading and math proficiency; enhanced social aptitude; and reduced behavioral issues.

The occupational experiences of parents directly impact their offspring's developmental trajectory during infancy and early childhood. A survey in Indonesia found that children with working mothers in the formal sector exhibit greater cognitive development than those in the informal sector. The employment of mothers

can enhance maternal education, potentially increasing children's cognitive abilities. Multiple children in a family can negatively impact cognitive development, while birth order can positively influence children's cognitive abilities (Iriani et al., 2023).

Low-wage hourly workers often have unpredictable work schedules. For example, 13.3% of parents had to change their schedule without warning in the last 30 days. 87% had at least one unanticipated adjustment, which had bad effects on working parents' health, such as making them feel worse and making them think they were sleeping less (Elizabeth & Anna, 2020).

The analysis conducted by the moderator on the multisource data indicates that self-regulatory resources have an impact on child health, but only in situations when job demands are high or job autonomy is low. This finding suggests that there may be opportunities for intervention and policy implementation to address this issue (Ohu, 2019). Research highlights that fathers' psychological distress has a pronounced effect on children's emotional outcomes, suggesting that gender dynamics in parental roles may influence children's psychological well-being (Schnettler et al., 2024, Yucel & Fan, 2019).

The research conducted in Indonesia indicates that a mother's employment level significantly and negatively affects her children's health. The educational level of mothers and their urban residency demonstrate a significant and positive correlation with the health status of children. This research indicates that the enhancement of education is essential for fostering favourable improvements in child health outcomes (Dwinanda et al, 2021).

Research indicated that parents with shift-based work schedules experience greater conflict between work and familial obligations (Moreira et al., 2019). Flexible work schedules enhance self-regulation and foster acceptance of parenting responsibilities. Nonetheless, work-family conflict adversely affects mindful parenting, resulting in heightened worry and stress. A study conducted in Hong Kong identified a substantial negative link between paternal nonstandard work hours and child development, especially in households with small children.

The association was most pronounced among those with lower income levels. Conversely, no correlation was identified between maternal nonstandard work hours and child developmental outcomes. The findings of this study underscore the importance of offering assistance to parents, particularly low-income fathers, to adeptly manage the challenges associated with their unconventional work hours (Minseop, K., 2021).

Perry (2021), found that working-class mothers' and fathers' job autonomy during the first year of parenthood was directly correlated with children's behavior problems and adaptive skills in the first grade. Higher job autonomy levels led to lower parenting over reactivity, improving child outcomes. The involvement of parents played a crucial role in mediating the relationship between occupational autonomy and the adaptive abilities of children, but it did not have a major impact on their behavior.

The relationship between work-family conflict and its impact on children is a multifaceted problem that has received much focus in recent studies. Research shows that parents' experiences with WFC can have negative effects on their children's conduct and mental health, mostly through the effects of parental well-being and parenting methods. The subsequent sections delineate essential results pertaining to these effects. Research indicates that both work interference with family (WIF) and family interference with work (FIW) adversely impact parental well-being, therefore affecting the quality of parenting (Eynde et al., 2020). Specifically, FIW has a direct adverse spillover effect on parental performance, resulting in behavioral difficulties in children (Eynde et al., 2020).

A study in Chile revealed that family-to-work conflict among parents of adolescents not only affects individual satisfaction levels but also spills over between partners, ultimately influencing the family system as a whole (Morales et al., 2022). These findings point to a growing recognition of the need for broader, more inclusive perspectives in WFC research. Conversely, evidence from multiple contemporary studies indicates that dual-earner households can provide enhanced financial stability and exemplify strong work ethics, which may serve as protective factors against certain adverse mental health outcomes in children (Miftahul & Sa'diyah, 2025;

Chai & Schieman, 2022). Maintaining a supportive and balanced work–family dynamic remains essential to foster a healthy emotional environment for children.

3. Research Methodology

The current study was explored with basic interpretive qualitative research by Merriam (2015). The data were collected through semi-structured interviews (Cresswell, 2012). This basic interpretive qualitative study was supposed to investigate the effect of work-family conflict on the dual-earner's children. The motivation behind qualitative explorative research studies is to help researchers comprehend individuals and the social setting in which they live (Huberman & Miles, 2002).

To achieve the objective, ten respondents were interviewed. In this study, the researcher used a purposive sampling method to identify the respondents. Dual-earners with children were chosen to answer the interview questions. Semi-structured interviews were carried out; each interview was recorded using a voice recorder. The average interview time for each participant was 30 minutes. The interview took place in a private setting with the participants. The researcher determined the sample size by conducting interviews until no new themes emerged, which indicated that the saturation point had been reached (Kerr et al., 2010).

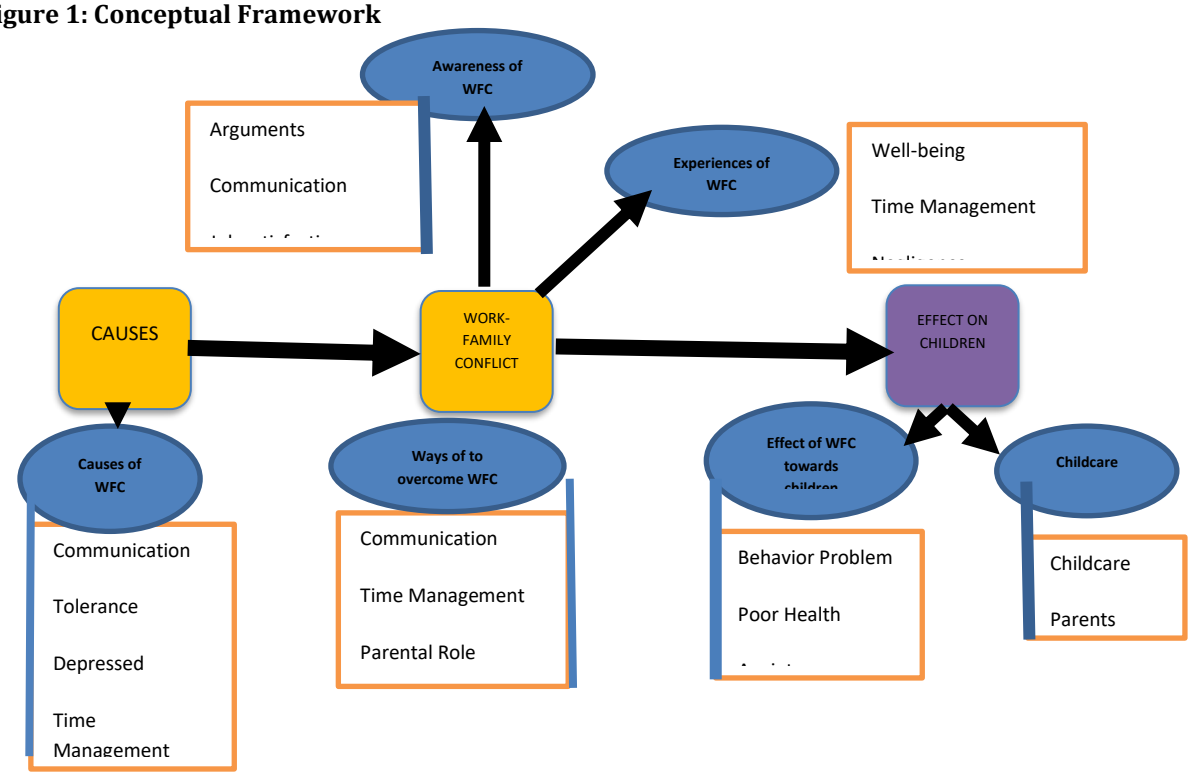
A thematic analysis was selected for this study. Attard and Coulson (2012) identified thematic analysis as a useful method for identifying, analysing, and reporting patterns in interviews. The transcript from the interviews was analysed using thematic analysis based on Braun and Clarke (2006). To produce a thematic analysis, Braun and Clarke outlined six steps that researchers should follow. First, the researcher familiarizes themselves with the data by reading it several times. The next step is to create preliminary codes to methodically record important data aspects. During the third stage, which involves theme search, the researcher groups codes into possible themes. To make sure these themes are coherent and in line with the coded data and the entire dataset, the fourth phase, examining themes, entails honing them. A thorough articulation of each theme's essence is therefore necessary for theme definition and labelling. Lastly, creating the report means combining the analytical story with visually striking data excerpts to create an engaging report on the results.

To maintain qualitative rigour, the researcher seeks assistance from a language expert proficient in both Malay and English to transcribe the interview data. This step is taken to make sure the researcher's biases do not influence the transcript process. These steps strengthened the issue of reliability and validity in this study. Reliability and validity are essential concerns in qualitative research. Researchers identified standard procedures in creating reliability and validity in qualitative research (Lincoln & Guba, 1985; Merriam, 1998). Qualitative researchers commonly apply member checking, triangulation, thick description, peer reviews, or external audits in their studies (Cresswell & Miller, 2000). A qualitative researcher's strategy to gather unbiased results is not to overestimate or underestimate (Yin, 2009). As in this study, reliability and validity were the focus when the researcher worked as a research team and hired a third person to rewrite transcripts and themes. The reflection and discussion process between co-authors was used to explore information and reduce biases, increasing the credibility.

Based on the thematic analysis performed in this study, the researchers have identified the level of work-family conflict awareness among dual earners. Researchers also identified the main focus of the survey as the effect of work-family conflict on dual-earner children. In this study, the researcher identified coping strategies for dual learners. The thematic map explains this finding in Figure 1.1. NVivo software (Version 12) was used to aid in organising and coding the data. Emerging patterns and themes were collaboratively reviewed by the research team to ensure credibility and minimise individual biases.

To bolster the study's credibility, methodologies like member verification, peer debriefing, and triangulation were utilised (Lincoln & Guba, 1985; Creswell & Miller, 2000). A third-party reviewer was hired to check if the transcriptions and theme development were correct. Regular team meetings kept reflexivity alive by letting everyone think about the research process all the time. We improved transferability by giving a detailed account of what the participants went through.

Figure 1: Conceptual Framework



4. Results

Through thematic analysis, this study identified the awareness levels of work–family conflict among dual earners, its perceived impact on their children, and strategies employed to mitigate its negative consequences. Figure 1 presents a thematic map that illustrates the major themes and sub-themes.

Impact of Work–Family Conflict on Children

Respondents cited several adverse effects of WFC on children. Eighty per cent of participants reported that their children were affected by their work–family dynamics. Participant 8 said:

"I think my children are facing work–family conflict sometimes since my husband and I both work and have packed schedules. Sometimes we have time with them; sometimes we don't."

This statement is based on research that shows that kids of couples who both work often have emotional and relationship problems when their parents aren't around (Milkie et al., 2015). Emotional detachment and emotional neglect are prevalent outcomes. Kids in households where both parents work are especially likely to be affected by the spillover effects of work-family conflict. For example, research indicates that parental work-family conflict might elevate stress levels, induce anxiety, and diminish self-esteem in children, as they may view their parents as less accessible or helpful (Huda & Sa'diyah, 2024; Vieira et al., 2016). These impacts can last throughout the teenage years and even into adulthood; therefore, it's important to start therapies early to lessen the bad effects (Saluja et al., 2023).

Most frequently mentioned were behavior issues and emotional breakdowns. These are consistent with findings from Greenhaus and Beutell (1985) and Edwards and Rothbard (2000), who highlight that resource depletion in one domain undermines performance in the other. Additional reported effects included relationship problems, poor health, anxiety, and depression.

Some respondents, however, reported a favourable outcome, such as enhanced independence among youngsters, corroborating studies that indicate certain children may achieve autonomy when parental

availability is diminished (Grzywacz & Marks, 2000). Maume and Sebastian (2012) and Presser (2000) caution that nonstandard work hours are generally linked to diminished parental well-being, disrupted parent–child relationships, and enduring emotional repercussions. Work-family conflict can make the house a difficult place to be, which can have a direct effect on how children feel. When parents encounter elevated levels of Work-Family Conflict (WFC) or Family-Work Conflict (FWC), they may demonstrate more severe parenting behaviors, such as overreacting to their children's misconduct, potentially resulting in heightened stress levels in children (Hess & Pollmann-Schult, 2020; Schneewind et al., 2010). Furthermore, children may internalise their parents' stress, resulting in emotions of fear and insecurity (Lund, 2012). Longitudinal studies indicate that children subjected to persistent work-family conflict are at an increased risk of developing internalising disorders, including anxiety and depression, as they mature (Cao et al., 2024; Vahedi et al., 2019). These findings underscore the significance of resolving work-family conflict as a pivotal element in children's mental health.

Kids who grow up in homes where work-family conflict is common often feel anxious. The stress and strain that come with work-family conflict can make the home atmosphere unstable, which can make kids more anxious. For instance, youngsters might be concerned about their parents' accessibility or the family's overall stability (Huda & Sa'diyah, 2024; Schnettler et al., 2024). Studies have demonstrated that the quality of parent-child connections might influence anxiety levels in youngsters. When parents are preoccupied with job or family obligations, they may be less attuned to their children's emotional needs, hence intensifying feelings of worry (Vieira et al., 2016; Moreira et al., 2019). This underscores the necessity for programs aimed at enhancing parent-child connections and mitigating work-family conflict.

A comprehensive study demonstrates that WFC is more significantly linked to children's mental health issues, especially internalising behaviors, rather than externalising behaviors (Bilodeau et al., 2023). The review underscores that parental mental health and features function as critical mediators in this relationship, indicating that parents' emotional states directly affect children's mental health outcomes (Bilodeau et al., 2023).

Causes of work-family conflict

The participants said that WFC was caused by many things. Three respondents cited depression and ineffective communication as significant triggers. Some mentioned marital role conflict, financial stress, emotional exhaustion, and work-related pressure. These viewpoints correspond with Bianchi and Milkie's (2010) claim that work intensification elevates WFC. Kahn et al. (1964) defined "role conflict" as the stress arising from managing several conflicting demands.

Three people suggest that depression and communication are the main causes. However, two people agreed on marital roles, financial management, tolerance, emotional breakdown, and work pressure. Bianchi and Milkie, et al. (2010) found that work pressures increase work-family conflict.

According to Kahn et al. (1964), "role conflict" is the stress resulting from the difficulty experienced by a person to adapt to another role following adaptation to a role, or, in other words, from the pressure of assuming two or more roles at the same time. This concept relates to the marital role suggested by one of the participants. The other participant suggests argument, conflict management, and time management as the causes of work-family conflict. Children face work-family conflict. According to the figure above, 80% of the participants stated that their children are facing work-family conflict. These findings mirror broader research indicating that long hours, high demands, and a lack of support contribute significantly to WFC (Michel et al., 2011).

Participant 8 stated:

"I think my children are facing work-family conflict sometimes since my husband and I are working people and we both have a packed schedule."
"Sometimes we have time with them, and sometimes we don't."

This is because some participants learn from their past experiences; therefore, they do not want this situation to affect their children. For dual-earner couples, the likelihood of experiencing such conflict is heightened due

to the simultaneous pursuit of professional responsibilities and caregiving duties. In this study, has been highlighted the key contributing causes have been highlighted.

Parenting Behavior

Parents who are having trouble balancing work and family life may be harsher or less responsive when they are parenting, which might hurt their children's emotional health. For instance, moms with elevated levels of work-family conflict are more inclined to employ severe disciplinary measures, resulting in heightened emotional difficulties in children (Hess & Pollmann-Schult, 2020; Schneewind et al., 2012).

Parent-Child Relationship Quality

The quality of the parent-child relationship is another critical mediator. Work-family conflict can strain relationships, leading to decreased emotional support and increased conflict between parents and children. This, in turn, can contribute to higher levels of stress and anxiety and lower self-esteem in children (Vieira et al., 2016; Moreira et al., 2019).

Family Resilience

Family resilience, defined as the capacity of families to adjust to adversities, has a protective function in alleviating the adverse impacts of work-family conflict. More resilient families are better able to keep a stable and supportive environment, even when work-family problems come up (Adenika & Kaloeti, 2024; Saluja et al., 2023).

Childcare Arrangements

Participants described diverse childcare arrangements. Six participants relied on extended family, particularly grandparents, while five used formal childcare services, and a few hired domestic helpers. Participant 6 stated: "Currently, my mom volunteers to take care of my children."
Participant 5 added:

"We hired a maid to take care of my children."

While these arrangements offer practical support, they may not substitute for direct parental engagement, which is critical to child development. (Nomaguchi & Milkie, 2003). The bar chart above represents the percentage of child care, which is precisely where most parents leave their child while they are at work. Six people stated that they leave the responsibility of taking care of their children to their parents. As participants 6 and 7 stated:

"Currently, my mom volunteers to take care of my children." "While I was busy working, my mother took care of my children."

Next, five people send their child to the child care or nursery available near them. While the rest of the respondents had hired a maid to take care of their children, as stated by participant 5;

"We hired a maid to take care of my children's effects of work-family conflict toward the children."

Participants' Awareness of Work-family Conflicts

There are several definitions of work-family conflict. Most participants are defining the work-family conflict as an argument and misunderstanding of managing oneself.
As stated by Participant 4;

"*It occurs when both spouses have a problem at their workplace and their arguments about it affect their family relationship."*

As stated by Greenhaus and Beutell (1985), work-family conflict occurs when some work and family responsibilities are incompatible or interfere with each other. Most people understand work-family conflict primarily as a form of conflict management, while others define it in terms of communication and job satisfaction. The participant agreed with the work-family conflict. Based on the interview, most participants

agreed that work-family conflict is a situation faced by individuals who struggle to manage their time between work and family. Participants also stated that work-family conflict creates emotional breakdown and anger, while others expressed concerns about sleeping disorders, well-being, and neglect of family duties. Participant 10 mentions:

"In my childhood, I think I experienced work-family conflict, as both my parents were working, I didn't spend time with them, and usually I was with my grandmother, who took care of me." I think the conflict affected the children and me as a child."

Strategies for Managing Work–Family Conflict

Participants offered several strategies to mitigate WFC. The most frequently cited was time management. Participant 2 shared:

'Maybe I should find a balance between work and family time. I think I should stop working overtime so I can spend time with my kids."

Other strategies included improved communication, setting family priorities, and active conflict management. These recommendations resonate with previous studies suggesting that effective time allocation, communication, and emotional regulation can buffer the negative effects of WFC. (Allen et al., 2012; Hammer et al., 2005). Seven participants provided the same opinion on how to overcome the work-family conflict: time management. Participant 2 states that;

"For me, maybe I should find a balance between work and family time management. Therefore, I believe that if I work from 8 a.m. to 5 p.m., I am just basically going back home at 5 p.m. Maybe I should stop working overtime until late at night so that I can spend my time with them. This is how I can understand them, and they can grow up and think that they have really good parents."

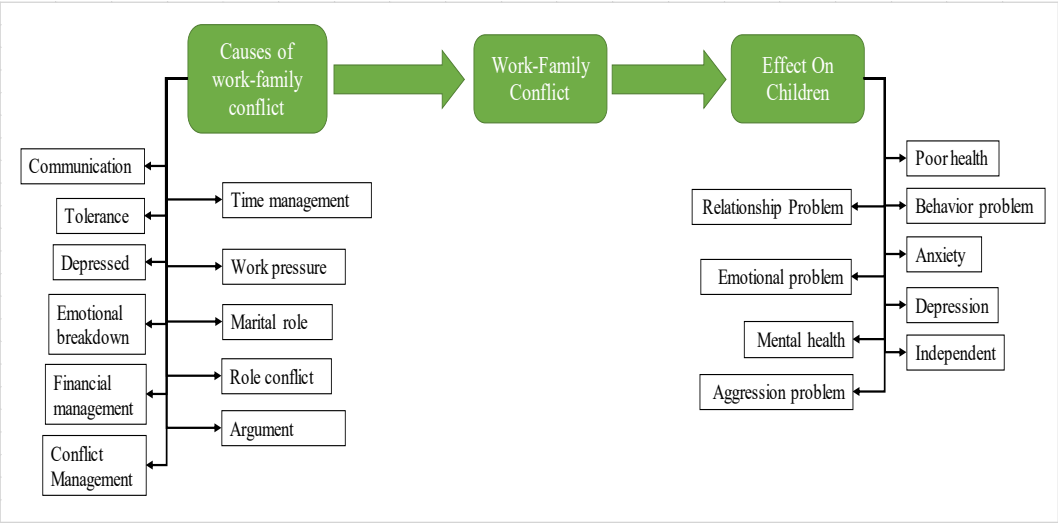
During the interview, participants shared some solutions, such as better communication, parental roles, conflict management, and relationship management.

Based on their observations of their children, six people said that behavior issues are one of the effects on the children. Other than that, four people believe that the impact on the children is an emotional breakdown. According to previous research, children are more likely to have emotional problems when their parents ignore them and are busy with work. Work-family conflict implies that one role's demands are depleting the resources that one needs to meet the demands of the other role (Edwards & Rothbards, 2000; Greenhaus & Beutell, 1985). Next, two participants suggest that a relationship problem is an effect, supported by a previous study (Maume & Sebastian, 2012; Presser, 2000). The impact of nonstandard work on employees and their families, along with reduced parental well-being, has led to increased relationship conflict, instability, and difficulties in parent-child interactions. The remaining respondent stated several effects: poor health, anxiety, depression, and one positive independent effect.

5. Conclusion

The issue of work-family conflict has emerged as a critical worry in dual-earner households, since it adversely impacts the welfare of parents and carries major consequences for their offspring. This answer examines the enduring consequences of work-family conflict on the stress, anxiety, and self-esteem of children from dual-income households, utilising findings from multiple research studies. The debate is divided into important parts, each of which talks about a different part of the problem. After that, there is a summary table that shows the main findings.

Figure 2: Research Framework



This study seeks to comprehend the causative factors and consequences of work-family conflict, particularly concerning the offspring of dual-income workers. We aimed to accomplish two distinct objectives by the conclusion of this study. The researcher aims to comprehend the origins of work-family conflict and investigate its impact on dual-earner families. Kids who live with both parents who work are most likely to be affected by work-family conflict. For instance, research has shown that when parents have problems balancing job and family, it can make their children more stressed, anxious, and less confident because they may think their parents are less available or helpful (Huda & Sa'diyah, 2024; Vieira et al., 2016). These consequences can last throughout the teenage years and even into adulthood, which shows how important it is to act quickly to lessen the detrimental impacts (Nangia, 2023).

Furthermore, work-family conflict can impair the quality of parent-child relationships, which are crucial for cultivating a sense of self-worth in children. For example, parents who are often preoccupied by stress at work may have trouble giving their kids the emotional support and validation they need to feel good about themselves (Hess & Pollmann-Schult, 2020; Moreira et al., 2019). These interruptions can have lasting effects on kids' self-esteem and mental health over time.

Based on Figure 2, the first objective was to understand the impact and causes of work-family conflict on dual earners' children. The researcher found different findings from the literature review or past research compared to the participants interviewed. Based on the literature review, the researcher identifies four causes of work-family conflict: time management, work pressure, marital role conflict, and role conflict.

The researcher identified another point on the causes of work-family conflict through the interview with the participant: arguments, conflict management, financial management, emotional breakdown, depression, tolerance, and communication. Some of the points occur in both the literature review and the interview. What are the time management skills, as stated by the participant in the interview? "For me, the causes are maybe about time management." "In my personal experience, I face overworking at the office, so I end up having a short time spent with my family." The literature review also mentioned time management; as stated by Dilworth (2004), long working hours often include an enormous volume of work demand and, in most cases, less flexibility. This usually leaves employees with less time to manage family responsibilities. The second objective of this research paper is to explore the effects of work-family conflict on the children of dual-earner couples. This objective was also already achieved; from the past study, the researcher found relationship problems, emotional problems, mental health issues, and aggression issues as the effects of work-family conflict on the children.

However, through the interviews, the researcher identifies five more effects: poor health, behavior problems, anxiety, depression, and independence. This study was aimed at exploring and understanding the cause and

effect of work-family conflict on the children of dual earners. In saying so, there are many causes and consequences of work-family conflict found throughout this research. It's proof that work-family conflict does have an impact on the children of dual earners. It is recommended that future research continue exploring this particular work-family conflict topic, especially involving children, by discovering more insight into this study. The number of journals, books, and articles about work-family conflict related to children throughout the internet is not sufficient. In the future, researchers should research work-family conflict and its impact on children's growth. This section underlines the conclusion of this investigation. The majority of the research objectives and research questions have been accomplished. The suggestion was based on the findings' viewpoint.

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Conceptualizing the Impact of Organizational and Human Factors on Drilling Safety Performance: The Role of AI as a Moderator

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Abstract: The oil and gas industry is one of the most complex and hazardous industries in the world, with operations that span across upstream, downstream, different environments, and countries. Drilling Activities are considered the most capital-intensive stage in the upstream oil and gas sector. Despite improvements in safety performance between 2018 and 2023, the International Association of Drilling Contractors (IADC) highlighted that the industry still faces challenges of incidents and their adverse financial impact. Previous studies have used incident causation methods to identify causes and various factors that lead to the accidents, a "reactive approach". However, there is a gap in research that explores the numerical relation between Safety Performance and each of Human, Organization factors, and Artificial Intelligence (AI) through a quantitative approach. The research objective was to explore underpinning theories, identify incidents and their human and organizational factors in the industry, examine the impact of Artificial Intelligence on that relation, construct a Conceptual Framework that describes that relation, and develop robust control measures considering the AI to minimize chances of accidents in the industry. The research methodology will incorporate a stratified sampling mechanism, involving the distribution of questionnaires to 425 employees across various drilling crews within drilling companies in the Middle East. Both validity and reliability will be implemented, and hypotheses will be tested. The correlation between dependent and independent variables will be analysed using the quantitative method SPSS and AMOS for data visualization, concluding in the development of a comprehensive conceptual framework, and the best robust control measures will be driven qualitatively.

Keywords: *Artificial Intelligence, Human Factors, Organizational Factors, Safety Performance, Drilling Industry, Oil and Gas Sector*

1. Introduction and Background

The Oil and Gas industry faces numerous challenges and risks, such as fluctuating market prices, geopolitical uncertainties, environmental regulations, safety concerns, and social responsibility issues (Emeka-Okoli et al., 2024). It needs to constantly improve its performance in various aspects, such as technical efficiency, operational reliability, and HSE (Izaye, 2024). It is divided into three major sectors: upstream, midstream, and downstream (Patidar et al., 2023). Drilling is considered the most capital-intensive stage in the upstream oil and gas sector (Ochulor et al., 2024). The costs depend on many factors, such as the location, depth, and complexity of the reservoir (Sujan Kumar and Deivanathan, 2021), as well as the competitiveness and sustainability of the oil and gas industry (Ponomarenko et al., 2022). A simple drilling program can be divided into four main phases: site preparation and drilling completion (Allain et al., 2018). Site preparation Phase: This phase involves selecting and preparing the location, clearing the land, leveling, building access roads, moving the drilling rig and equipment from the old to the new location, installing utilities, and setting up a drilling rig and other facilities. This phase ends with spud-in and rig acceptance ("Oil and Gas Well Drilling and Servicing - Site Preparation," 2018).

Drilling Phase involves using a drill bit attached to a drill string to create a hole in the earth's crust, reaching the target depth and location of the oil or gas reservoir. Drilling encounters challenges, such as rock hardness, pressure, temperature, stuck pipes, or fluid content (Fanchi and Christiansen, 2016).

Completion phase: This phase involves making the well ready for production by installing the final casing and cementing it to the wellbore, perforating the casing to allow the oil or gas to flow into the well, installing the production tubing, and stimulating or acidizing the rock formation (Flatem, 2021).

Problem Statement

The data is derived from the International Association of Drilling Contractors (IADC) Incident Statistics Program (ISP), as shown in Table 1, the total number of incidents reported from 2018 to 2023, along with the percentage change from the previous year, Total Recordable Injury Rate (TRIR), and Total Fatality Rate (FR).

Table 1: IADC Total Number of Incidents

Year	Incidents	% Change	TRIR	Total FR
2018	1,024	-	0.43	0.35
2019	1,132	10.5%	0.64	0.32
2020	1,264	11.7%	0.44	0.28
2021	1,321	4.5%	0.57	0.25
2022	1,356	2.6%	0.66	0.23
2023	1,389	2.4%	0.51	0.21

Source: IADC Safety performance data years 2018 and 2022 ("Safety performance indicators – 2018 data," 2019) ("Safety performance indicators - 2022 data," 2023)

The number of incidents reported in IADC increased steadily over the six years, with an average annual growth rate of 6.3% in columns 2 & 3. The highest percentage change was observed in 2020, when the number of incidents rose by 11.7% compared to 2019. This could be attributed to the impact of the COVID-19 pandemic, which disrupted the normal operations and safety protocols of the drilling industry. The lowest percentage change was observed in 2023, when the number of incidents increased by only 2.4% compared to 2022. This could indicate a stabilization of the trend or a result of improved safety measures and practices implemented by the IADC members. On the other hand, TRIR is a measure of the frequency of work-related injuries and illnesses per 200,000 working hours. Column 4 shows TRIR increased slightly over the six years, from 0.43 in 2018 to 0.51 in 2023. The Fatality rate is calculated as the number of fatalities per 100 million man-hours worked. Column 5 shows a steady decline in the rate over the years, indicating an improvement in the safety performance of the drilling industry. The rate of 2023 is projected to be half of the rate of 2018 (Carr, 2023). This suggests that despite the increase in the number of incidents reported, the severity of the incidents has been slightly increased but at a lower rate, or that the number of working hours has increased faster than the number of incidents. On average, TRIR fluctuates around 0.5.

Major Drilling and workover accidents

Several drilling-related incidents with significant consequences occurred last 10 years. A fire at a Pemex platform in April 2024 resulted in fatalities and injuries, impacting production by 200,000 bpd (barrels per day) (Čavčić, 2024). Another major platform fire at a Pemex facility in June 2023 caused deaths and affected production, with approximately 700,000 barrels impacted (Martinez, 2023). An Oklahoma drilling rig explosion in 2018, triggered by an uncontrolled gas release, led to fatalities (Wertz, 2018). The Baghjan oil well blowout and fire in 2020 in India caused casualties, environmental damage, and the displacement of more than 3000 families (Talukdar, 2021). An Argentine gas blowout in 2018 resulted in an uncontrolled release of gas and fluids due to a faulty valve, posing health and safety risks (Taillant, 2018). The Tamar gas platform fire in 2017 injured workers and damaged facilities due to a technical malfunction, disrupting gas supply and costing approximately $100 million (Carpenter and Kostianoy, 2018). The Aliso Canyon gas leak (2015-2016) released substantial methane, leading to evacuations, health impacts, and an estimated cost of $1 billion. It also had significant climate and air quality consequences (Choi et al., 2023). The biggest ever incident was the Deepwater Horizon blowout and explosion in 2010 resulted in the largest marine oil spill in history, causing extensive environmental damage and costing BP over $65 billion. The incident was triggered by engineering failures and human errors that killed 11 workers and injured 17 others (Eisenberg and Adams, 2020).

In a nutshell, although there is an increasing use of technology in the drilling industry, many companies are still facing accidents that are reflected in TRIR. In the observed lack of research that explores the numerical relation between Safety Performance and each of Human, Organization, factors, and Artificial Intelligence through a

quantitative approach. The research takes its significance at three levels: at the Drilling Industry level through Enhancing Safety Standards, improving Efficiency and Productivity, contributing to Workforce Development and Skills Gap Analysis, Benchmarking and Technology Adoption. At the Company Level, it will help identify Targeted Safety Interventions in the organization, optimize AI Implementation to complement human capabilities and optimize organizational processes for maximum benefit and return on investment (ROI) and add Competitive Advantage by leveraging the positive effects of AI on safety performance. At the Workforce Level, by enhancing Situational Awareness, reducing Cognitive Load by automating routine tasks and providing decision support, Artificial Intelligence can free up mental capacity to focus on more complex tasks, personalize training, and Support and improve Safety Culture.

Research Questions

RQ1: How do organizational Factors influence safety performance in the drilling industry
RQ2: How do Human Factors affect safety performance in the drilling industry
RQ3: To what extent does AI moderate the relationship between Organizational Factors and safety performance in the drilling industry
RQ4: To what extent does AI moderate the relationship between Human Factors and safety performance in the drilling industry

Research Aim

To develop and validate a conceptual framework that examines the influence of organizational and human factors on safety performance in the drilling industry, while analyzing the moderating effect of AI on these relationships.

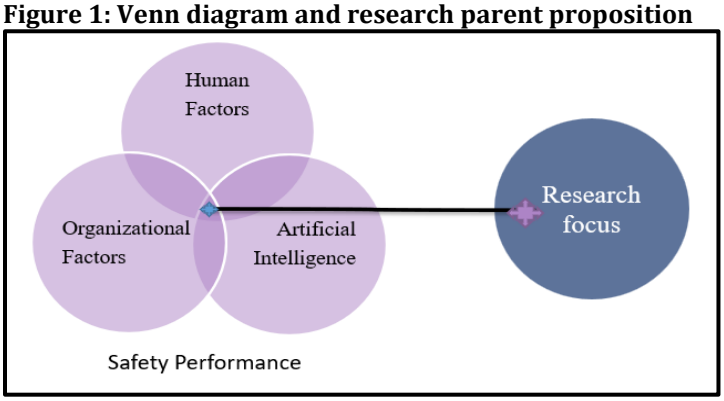
Research Objectives

RO1: To examine the effect of organizational factors on safety performance in the drilling industry.
RO2: To investigate the effect of human factors on safety performance in the drilling industry.
RO3: To analyze the moderating role of AI on the relationship between organizational factors and safety performance.
RO4: To analyze the moderating role of AI in the relationship between the human factors and safety performance.

2. Literature Review

The research process entailed collecting relevant data and statistics across multiple industries, and then the researcher focused on the oil and gas drilling sector to characterize the problem at hand. Additionally, the secondary literature review involves conducting online searches using relevant keywords to describe the parent categorical proposition in the research, as in Figure 1, according to Edwards (2004).

Figure 1: Venn diagram and research parent proposition



(Source: researcher's work)

Parent 1: Artificial Intelligence • Parent 2: Organizational Factors
Parent 3: Human Factors, • Parent 4: Safety Performance
Research Focus

The above propositions combined in different ways to target and narrow the references by several search terms one after the other at each of the subsequent databases; the whole point of literature review is to say here is what the literature says and here is what it does not say and this is how the research is going to address those gaps, look at previous literature reviews, researcher used number of research engines, he wrote topic + literature review, or SLR "Systematic Literature Review" to explore a more comprehensive literature review, also he did his best to avoid too older paper to avoid not up to date information the focus was on last 3-5 years, for the older one he explored "Cited by" to get right UpToDate with what happening now.

Among the search engines used was Google Scholar ("Google Scholar Metrics Help," 2024), OnePetro ("OnePetro," n.d.), Elsevier's ScienceDirect ("Open Access journals and books | ScienceDirect.com," n.d.), The Bureau of Labor Statistics (BLS) ("History of the U.S. Bureau of Labor Statistics," 2023), International Labor Organization (ILO) ("ILO Statistics and databases," 2023). International Association of Oil and Gas Producers ("IOGP data," n.d.), International Association of Drilling Contractors ("IADC.org," n.d.), ASCE - American Society of Civil Engineers ("Home | ASCE," 2023), EBSCOhost ("EBSCOhost Research Platform | EBSCO," n.d.), UK HSE Executive Publications ("UK HSE Executive Health and safety statistics - HSE," 2023).

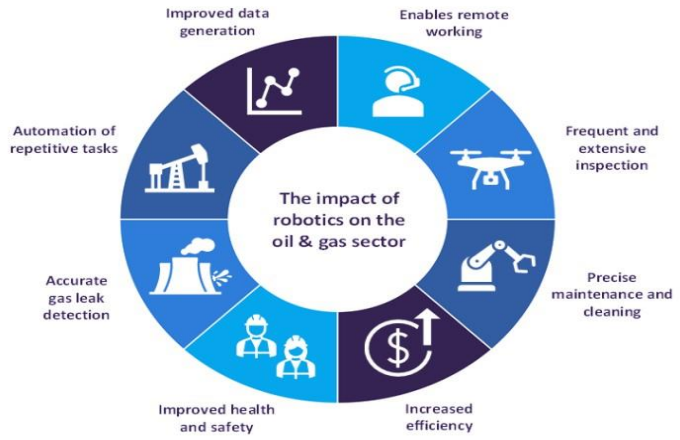
Safety Performance represents a critical component in this research (Figure 1It is necessary to investigate the constituent elements that make up safety performance, as well as derive the interactions and interdependencies among the human, organizational, and Artificial Intelligence that affect Safety performance in the drilling industry.

Artificial Intelligence (AI)

AI, according to Davi (2023) refers to the capacity of computer systems to emulate human mental functions, this encompasses abilities such as learning knowledge from data, detecting patterns, and generating predictions, where AI can perform problem-solving through analyzing complex scenarios and devising solutions, often more quickly and precisely than humans. Also, AI can utilize data and reasoning to make informed choices, even in ambiguous situations. In terms of Decision-making.

While robotics has been an integral part of the oil and gas industry for several decades, the growing integration of digital technologies, such as AI, cloud computing, and the Internet of Things, has further diversified the applications of robots within the industry. According to Fernandes (2024), a significant number of robots, including terrestrial crawlers, quadrupeds, aerial drones, autonomous underwater vehicles, and remotely operated vehicles, are now being deployed in various oil and gas operations. These robots are utilized across the industry for a wide range of tasks, including surveys and material handling.

Figure 2: Impact of Robotics on the Oil & Gas Sector



Source: Global Data Thematic Research (Fernandes, 2024) AI Technologies in Drilling

Robots equipped with advanced technologies are yielding increasingly positive results in improving safety and efficiency within oil and gas operations. They are proving invaluable for executing complex tasks at production

facilities, thereby protecting workers from hazardous environments and reducing the likelihood of costly shutdowns. Their ability to perform repetitive and mundane tasks with minimal errors is saving time and internal resources for companies (Casal, 2023).

Hussain et al. (2024) explained in their book "Application of Artificial Intelligence in the Oil and Gas Industry" how the oil and gas industry utilizes various artificial intelligence technologies to enhance drilling operations. Machine Learning, a core component of AI, is employed for predictive modeling, pattern recognition, and automated decision-making. Deep Learning, a sophisticated subset of Machine Learning, excels at analyzing complex data such as images and sensor readings. Additionally, Natural Language Processing enables AI systems to comprehend and interpret human language, facilitating the analysis of drilling reports and unstructured data. Computer Vision technology allows AI systems to perceive and interpret images and videos, which is valuable for worker safety monitoring and automated inspection purposes.

AI and Drilling Optimization

Real-Time Data Analysis: AI algorithms can analyse vast amounts of drilling data from various sensors in real-time, identifying patterns and anomalies that humans might miss (Wood, 2024).

Predictive Modelling: By learning from historical data, AI can predict potential drilling anomaly problems like stuck pipe, equipment failure, pressure instability, or sudden fluid kicks, allowing for proactive mitigation, Hao et al. (2025) demonstrated how a predictive model significantly enhances the performance of Rate of Penetration (ROP) and drilling optimization.

Automated Drilling Control: Cao et al. (2025) explained how AI-powered systems can automate certain drilling parameters, such as weight on bit or drilling fluid properties, to optimize penetration rates and reduce non-productive time.

AI for Enhanced Safety in Drilling

Predicting and Preventing Accidents: through risk assessment, AI analyzes historical data, incident analysis, and root cause prediction (Khan et al., 2024), real-time sensor readings (like vibrations or pressure), and even weather forecasts to identify potential hazards before they escalate. And it can also trigger warning systems to alert for dangerous situations, giving crews time to evacuate or take corrective action (Hallowell and Spencer, 2024).

Improving Human Performance: because it can monitor human behavior, detect fatigue of individuals, and AI can analyze video feeds to detect signs of worker fatigue, a major contributor to accidents. Javay et al. (2024) in their pilot project demonstrated how the AI algorithm can detect certain equipment or parts on the rig floor along with their motions and foresee their movement, and compare against the predefined condition to determine an unsafe condition or behavior of the workforce.

Safety Performance

Measuring Safety Performance

Measuring organizational performance serves crucial strategic purposes because it allows companies to thoroughly assess their current position, providing a comprehensive understanding of their strengths, weaknesses, and areas for improvement (Walhekar and Khatke, 2020) this, in turn, enables organizations to track their progress over time, identify meaningful trends, and set targeted, data-driven objectives (Mitrea-Curpanaru, 2021), guides more informed budgeting decisions and benchmarking against competitors (Purwoko et al., 2023).

Safety performance is evaluated through the assessment of supervisors and worker-level metrics. (Ketola et al., 2002) proficient safety management is widely acknowledged to generate substantial financial advantages by lowering accident-related costs (Caldarescu et al., 2021). Effective safety management can likewise enhance organizational productivity and financial performance (Šolc et al., 2022) and even lead to a competitive advantage (Fernández-Muñiz et al., 2009).

The discussion of safety performance became more advanced than only focusing on "lagging" indicators (Jääskeläinen et al., 2022), Organizations focus on lagging indicators measuring past events, such as accident reports, which capture the lack of safety rather than its existence. This approach is not ideal for driving improvements, as a low accident rate does not necessarily indicate that risks are effectively managed,

particularly in companies where the likelihood of accidents is low but significant hazards persist (Tremblay and Badri, 2018).

According to Podgórski (2015), safety performance can be defined as the degree to which an organization achieves its safety goals and objectives and prevents or minimizes the occurrence and consequences of adverse events. Safety performance can be measured using different indicators, such as leading or lagging indicators; both have their advantages and limitations.

Leading indicators

Leading indicators are proactive measures that reflect the inputs and processes of safety management. (Bayramova et al., 2023). Golabchi et al (2024) defined leading indicators as measurable factors that provide information about the current state of safety and health performance, and can be used to forecast future outcomes, but he did not provide an exhaustive list of leading indicators, as these can vary depending on nature of the work, location among other factors etc., he categorized leading indicators by their focus into Organizational Leading indicators represented in compliance assurance and Operational Leading indicators could be measured through number of indicators such frequency of adherence to Personal Protective Equipment (PPE).

Lagging indicators

It is reactive measures that reflect the outcomes of incidents. According to Niu et al., it can provide objective and reliable data on the safety performance, but they may not reflect the underlying or contributing factors of accidents. Therefore, a balanced and comprehensive approach is needed to measure safety performance, using a combination of leading and lagging indicators, and taking into account the different levels and dimensions of safety performance.

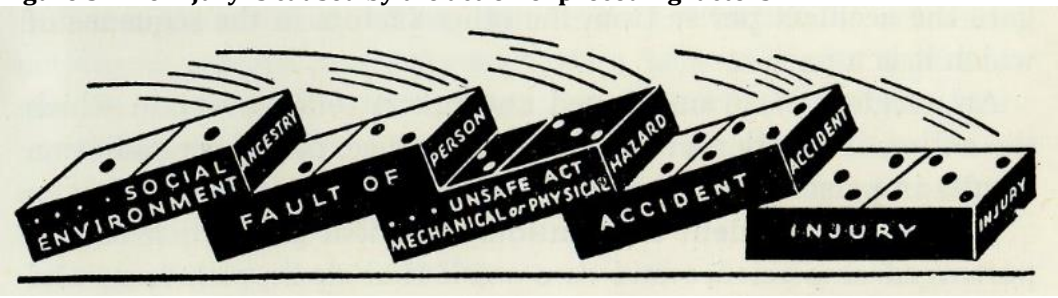
Underpinning Theories

The field of accident causation analysis and safety performance has a rich and extensive history that researchers have dedicated years to studying the different factors that contribute to accidents across diverse industries and domains (Leveson, 2004).

Domino theory

Heinrich (1931) developed the "domino theory" that shows an accident as a sequence of a causal chain of events, represented by dominoes that topple once the first block falls, as in Figure .

Figure 3: The injury is caused by the action of preceding factors



Source: The domino model of accident causation, as depicted by H. Heinrich in the 1950 edition of his book Industrial Accident Prevention: A Scientific Approach (Marsden, 2017).

However, if this sequence is disrupted by eliminating even one of the contributing factors (Figure), the injury can be prevented, as illustrated in (. Figure) below:

Figure 4: The unsafe act and mechanical hazard. the central factors in the accident sequences

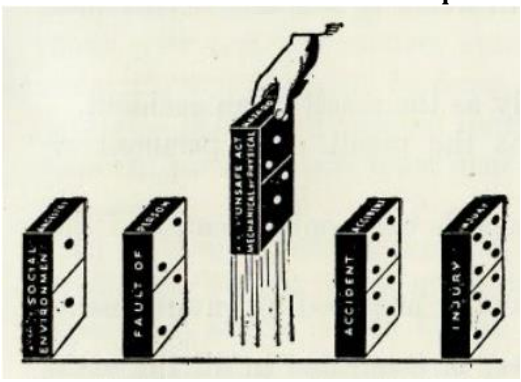
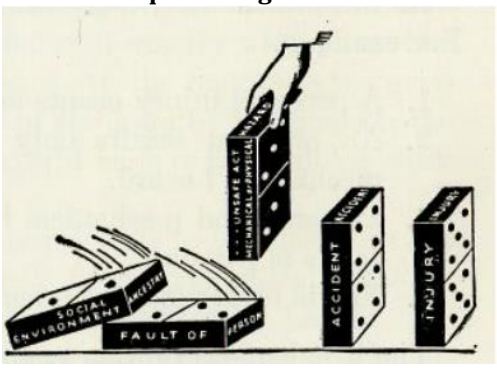


Figure 5: The removal of the central factor makes the action of preceding factors ineffective.



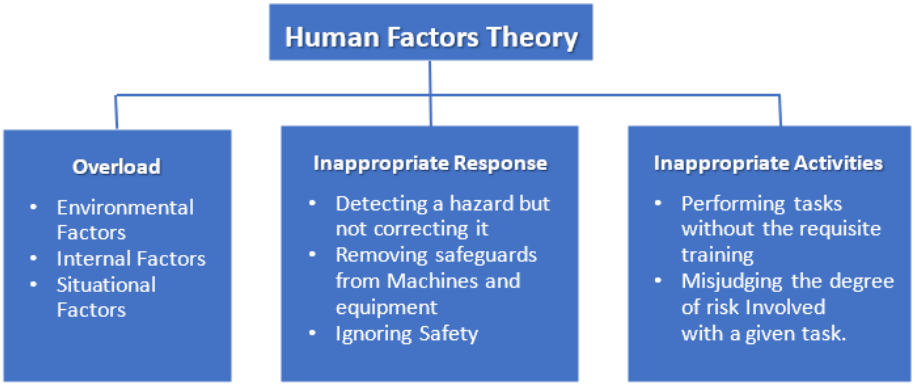
Source: (Marsden, 2017)

It was groundbreaking for its time, according to Erbayat. (2024) It has several disadvantages, such as oversimplification of causation into a linear cause-and-effect relationship and emphasis on individual capability as if it focuses on Individual Blame.

Human Factors theory

Wagenaar et al. (1990) explained Ferrell's Human Factors theory in terms of accidents often resulting from human error, and can be attributed to three key elements: overload, inappropriate response, and inappropriate activities, as per the following Figure , Radhakrishna (2015) clarified how it emphasizes the importance of a "systematic" approach to integrating human capabilities and limitations into the design of equipment, environments, and processes.

Figure 6: Human Factors Theory



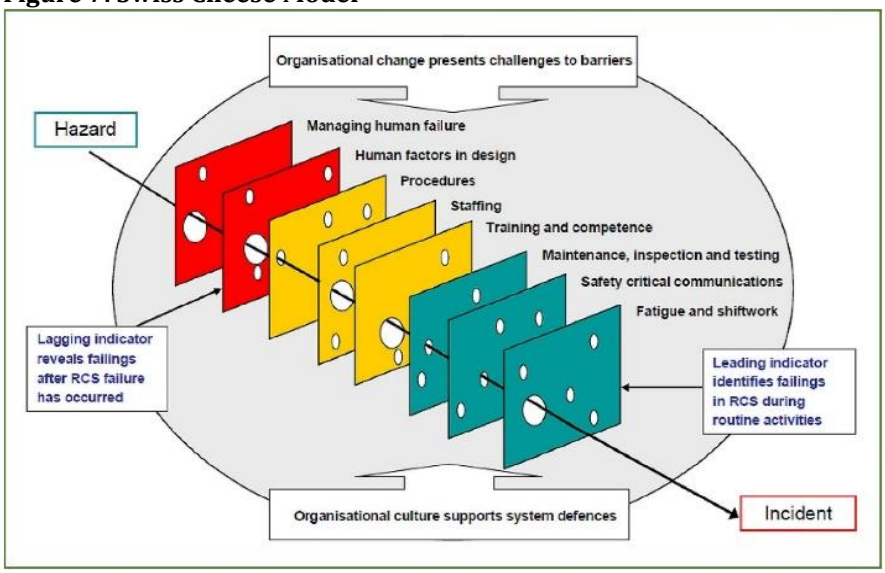
Source: (Mannan, 2014)

Limitations of HC Theory include the inability to predict rare events, Shapiro (2003) explained that over-reliance on past data only may fail to interpret novel situations or emerging technologies. HC theory is associated with Implementation Challenges in terms of cost and Time Constraints. Organizations might encounter resistance to change due to budget limitations or operational disruptions (Rouse et al., 1991).

Swiss Cheese Model

The Swiss Cheese Model was initiated by Reason (1990) and then became a widely used model for understanding how accidents occur in complex systems. Swiss cheese consists of slices lined up; each slice represents a layer of defense in a system, such as safety procedures, equipment safeguards, or human vigilance. The holes in the cheese represent weaknesses or failures in these defenses.

Figure 7: Swiss Cheese Model



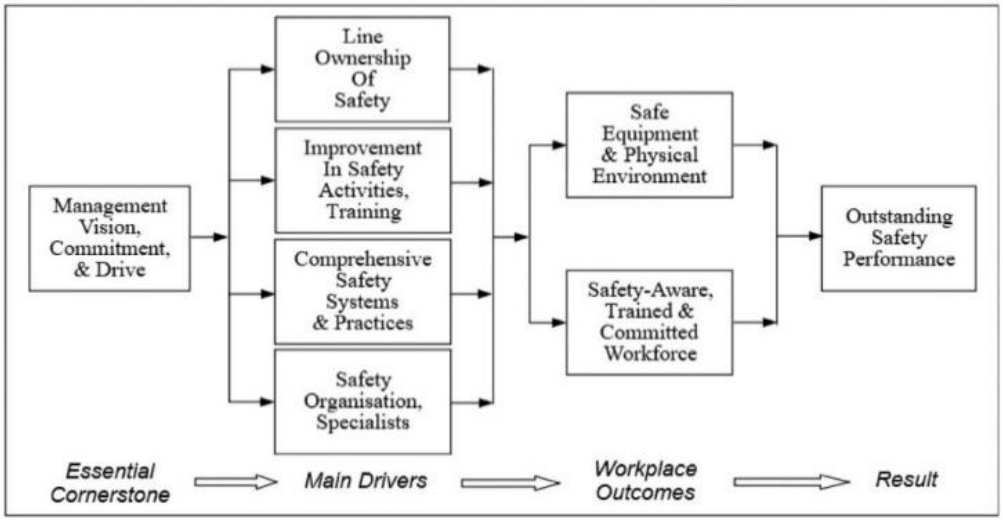
Source: (Gonyora and Ventura-Medina, 2024)

When holes align, hazards pass through and cause harm. Hollnagel (2016) argues that when these barriers are functioning effectively, the likelihood of accidents is reduced. Drawbacks when oversimplifying the complex and multifaceted nature of accident causation by portraying it as a sequential chain of failures. However, real-world accidents often involve intricate interrelationships and feedback mechanisms among various factors (Hollnagel, 2016). Leveson (2016) explained in actual scenarios, identifying all potential weaknesses, failures, and defects in every layer of defense is not static and can be challenging over time.

System theory

Stewart (2001) developed his accident model, Safety Management Model, using System Theory, in which accidents don't have singular causes but result from the complex interplay of factors within a system, showing humans as part of the system, interacting with equipment, tasks, and the work environment. According to the Figure He outlined that to achieve an outstanding safety performance, it starts with management vision, commitment, and drive. Challenges are represented in complexity, data requirements, and Organizational resistance.

Figure 8: Model of Safety Management based on Accident Causation Model



Source: (Stewart, 2001)

Variables Identification

In statistical studies, Stewart (2024) outlined that understanding variables is crucial for designing experiments, analysing data, drawing meaningful cause-and-effect relationships, formulating hypotheses, and making informed decisions based on empirical evidence.

Independent Variables

In human and safety-related research, an independent variable is the factor that is proposed to influence or bring about changes in safety-related outcomes (Sigall and Mills, 1998).

Organizational Factors (OFs), Components of IV

Haber et al. (1990) at a nuclear power plant examined the influence of organizational factors on safety performance was examined and highlighted several key organizational factors that impact safety, such as standardization of procedures, decision-making processes, supervision, Risk Assessment, management attention, and organizational culture.

Risk Assessment and Safety Performance: Risk assessment is a crucial process for improving safety performance. Pillay (2015), after reviewing twenty academic articles, suggested that in high-risk sectors, such as construction, mining, and healthcare, there are some advancements in comprehending the causation of accidents and developing effective risk assessment.

Supervision and Safety Performance: Effective supervision plays a pivotal role in cultivating a strong safety culture and improving overall safety performance within organizations, according to Chih et al. (2017) where supervisors play a critical role in delivering onsite safety training in terms of safe work practice, mentoring workers, and offering guidance while his/her subordinates are doing the task (Rabenu, 2021).

Awareness / Training / Competency: Awareness, training, and competency are fundamental pillars of a strong safety culture, and they play a vital role in enhancing safety performance. (Felix Orikpete and Raphael Ejike Ewim, 2024). According to Ferguson (2021) Workers must be aware of potential hazards linked with their tasks and the significance of following safety procedures, and effective training programs equip workers with the necessary knowledge and skills to perform their jobs safely.

Job Method / Planning: Hislop (1999) in his book "Construction Site Safety: A Guide for Managing Contractors," pointed out that well-defined job methods and thorough planning are essential for ensuring safe work practices and improving overall safety performance. Desrochers (1994) explained that incorporating principles of risk reduction into the job planning process can yield significant improvements in safety performance.

Permit to Work System: Jusoh et al. (2020) have proven that Permit to Work elements have a significant impact on occupational accidents, where hazardous activity has become the main element that affects occupational accidents; accident in hazardous activity contributes about thirty percent of the occupational accidents in the Petrochemical Plant. The Permit to Work process ensures that appropriate control measures, such as isolating energy sources, are implemented before work begins, thereby enhancing safety (Maddox et al., 1991).

Audits and Inspections: The Canadian Centre for Occupational Health and Safety has identified the importance of workplace inspections in preventing incidents, injuries, and illnesses, because through a critical examination of the workplace, inspections help to capture and record hazards, enabling corrective action, part of Health and safety committees duties is to assist in planning, conducting, reporting, and monitoring these inspections, therefore regular workplace inspections are a crucial component of the overall occupational health and safety program and management system, if present (CCOHS, 2024).

The above review clearly proves the direct relationship between organizational factors and safety performance in the drilling industry and answers the Research Objective 1 (RO1) "the effect of organizational factors on safety performance in the drilling industry".

Human Factors (HFs), Components of IV

Unsafe Position / Posture incidents and safety performance: According to the Construction statistics in Great Britain 2024 report, work-related musculoskeletal disorders (MSDs) are the primary cause of nonfatal occupational injuries in the construction industry, with an estimated 40,000 workers suffering from a work-related musculoskeletal disorder, which is 52% of all ill health in this sector, based on the average estimate over 2021/22-2023/24 (Benson, 2024). Lortie & Pelletier (1996) explained that awkward or sustained

postures, particularly when combined with repetitive motions or forceful exertions, can directly cause musculoskeletal disorders such as back injuries, sprains, and strains

Impact of Failure to Secure Safety Performance: Peatie et al. (2024) investigated falling objects incidents and found that unsecured tools, materials, or debris falling from heights can strike workers or cause damage below, representing a major cause of injuries and fatalities on construction sites. In his study of the impact of dropped objects on offshore (Floating, Production, Storage and offloading tankers - FPSO) Ozguc, (2021) found that unstable structures and failure to secure structural elements, scaffolding, or formwork can lead to collapses, posing a serious risk to workers and the asset.

Failure to follow procedure and safety performance: Instances where established safety protocols, work instructions, or standard operating procedures are not adhered to can be described as "procedure not followed", Isa et al. (2021) found that this deviation from prescribed practices can have significant detrimental impacts on safety performance. Praino and Sharit (2016) explained situations when workers do not follow procedures; they may be exposed to hazards they are unprepared for, increasing the likelihood of accidents and compromising safety systems, because procedures are often integral to the proper functioning of safety systems; therefore, deviations from established procedures can undermine the effectiveness of these systems, elevating the risk of incidents.

Perkinson (2018) highlighted that when procedures are not followed, it can be challenging to determine the root causes of accidents, hindering efforts to prevent similar incidents in the future and leading to inaccurate incident investigation. Inconsistent Outcomes were highlighted by Hale and Borys (2013) that failure to adhere to procedures can lead to variable results, making it challenging to identify and address safety issues efficiently, consequently, leading to erosion of safety culture, where procedures are not consistently followed can foster complacency, increase risk-taking behaviors and decrease both safety performance and weaken the overall safety culture.

Impact of Inadequate Communication on Safety Performance: In the article of Naji et al. (2022) the abbreviation "Inadequate communication" is normally used to refer to insufficient, unclear, or ineffective exchange of information between individuals or teams involved in a task or project. In safety-critical environments like the oil and gas industry, inadequate communication can have severe consequences. It could lead to an increased risk of accidents as Zahed (2024) highlighted in his research the risk of aviation incidents due to factors such as miscommunication between pilot and air traffic control.

Lack of Attention and Accidents: Aroke's research in (2022) has demonstrated that work experience, safety training, and personality traits like conscientiousness, agreeableness, and openness to experience are significantly linked to visual attention and improved hazard identification ability; these findings have significant implications for enhancing safety performance.

In their study Muley and Wang (2024) employed a wearable eye-tracking device to examine the influence of personality traits on construction workers' recognition of fatal near-miss scenarios under different levels of stress. Their findings revealed significant differences in workers' visual attention between stressful and non-stressful conditions, indicating that workers demonstrated decreased attentiveness under stress.

Impact of taking shot cuts on Safety Performance: Saed and Omar (2024) studied lessons learned from the aviation industry to adopt in the oil and gas sector. They found that taking shortcuts, or finding ways around deficiencies, such as when pieces of equipment or tools are missed, mechanics use inappropriate tools, or adjust equipment designed for a different purpose to maintain workflow, regardless of the procedures set by organizations. The preceding review provides clear evidence of a direct relationship between human factors and safety performance in the drilling industry, thereby addressing Research Objective 2 (RO2) “effect of human factors on safety performance in the drilling industry”.

Dependent Variables

The essence of the research is to comprehend how the independent variable impacts the dependent variables, which embody the safety-related outcomes related to previously elaborated components of the independent variable under investigation.

Safety Performance (SPs), Components of DV

Safety Performance may be used to refer to two different concepts: a) metrics for safety outcomes, such as the number of injuries per year, as explained in lagging indicators, and b) metrics for safety-related behaviours of individuals (Burke et al., 2002).

The first order factors for injuries are: 1) Fatal Accident Rate (FR) and 2) Total Recordable Injury Rate (TRIR). In contrast to safety performance behaviors, safety outcomes are tangible events or results, such as accidents, injuries, or fatalities. But the metric safety behaviors, according to Neal and Griffin (2006) in the workplace, safety entails two distinct components: safety compliance and safety participation.
Safety Compliance with procedure

Conceptualizing safety performance in terms of safety compliance can be scaled by the frequency with which employees engage in the behaviors and are distinguishable in terms of not wearing PPE as required. (Burke et al., 2002). Several conceptual models of safety performance have been developed, such as the model outlined by Burke et al. (2002) in Figure .

Figure 9: An integrative model of workplace safety

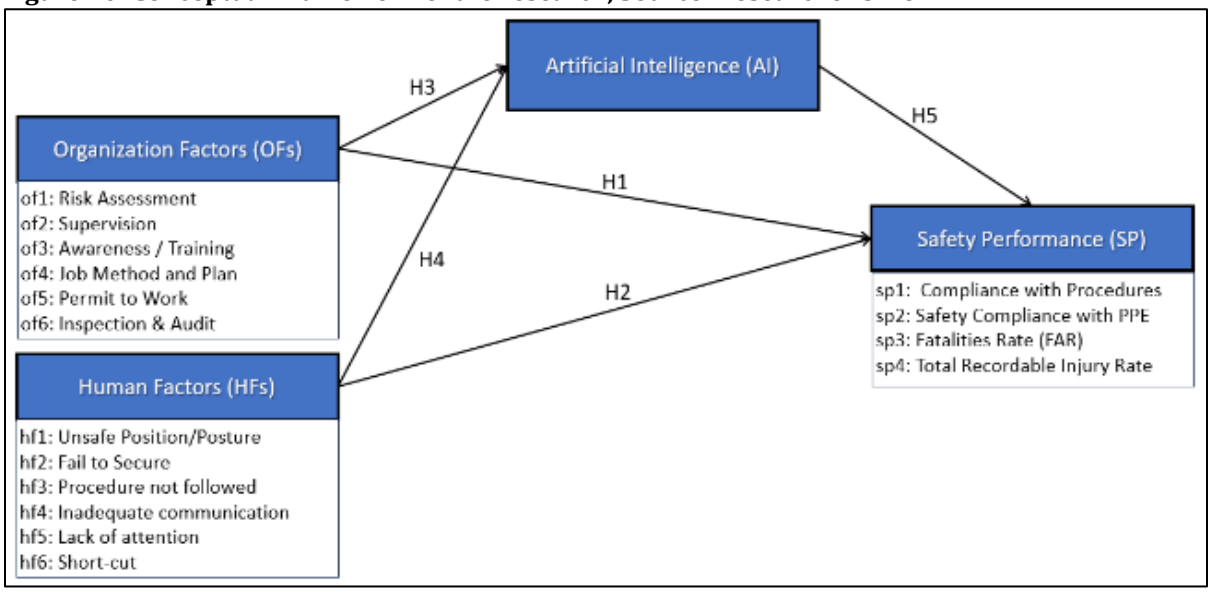


Source: (Christian et al., 2009)

Compliance with PPE
Xian et al. (2022) in recent study pointed out that the key predictors of safety performance are the presence of adequate barriers for hazards and risks, the compliance of wearing Personal Protective Equipment (PPE) on-site, and the frequency of conducting toolbox meetings.

Moderating Factors (MV):
Artificial Intelligence
Artificial Intelligence as a moderating variable, in a study conducted by Liu (2022), showed that artificial intelligence involves the creation of machines capable of performing tasks that typically require human-level intelligence. These tasks encompass learning, problem-solving, decision-making, speech recognition, and visual perception. AI systems are designed to analyze data, identify patterns, and make predictions or decisions based on the information they process. According to Solanki et al., (2022) there are various approaches to AI, including machine learning, deep learning, and rule-based systems. AI has found widespread applications across numerous industries, from healthcare and finance to transportation and manufacturing.

Figure 10: Conceptual Framework of the research, Source: Researcher's work



Conceptual Framework for the research

The literature review found that organizational and human factors significantly impact safety performance in upstream oil and gas drilling. Theories suggest a correlation between these factors and safety outcomes. The research will investigate how AI could moderate or mediate the impact of organizational factors, such as enhancing risk assessment, improving supervision, and automating permit systems. Also, will investigate how the AI could mediate or moderate the impact of human factors, such as detecting unsafe behaviours and monitoring compliance, then produce the entire Conceptual Framework of the research, as in the following figure.

Hypothesis development

The research considers three relationships: the first relation is a direct path between the IV (OFs) toward DV (SP) and IV (HFs) toward DV (SP); the second relation is an indirect path between IVs and DV, where AI penetrates the link as a mediator, as in Figure , while the third relation AI will act as a moderator between IV (OFs) toward DV (SP) and IV (HFs) toward DV (SP) to assess how the AI influences the nature, direction, or strength of the relation between IVs and DV. Consequently, the following hypothesis will be examined:

H1: Organization Factors can significantly improve the safety performance

H2: Human Factors can significantly improve the safety performance

H3: Artificial Intelligence plays a mediator role in the relationship between Organization Factors and safety performance.

H4: Artificial Intelligence plays a moderator role in the relationship between Human Factors and safety performance.

H5: Artificial Intelligence improves the safety performance

3. Research Methodology

The researcher used a mixed-method approach, and his design includes two phases to validate the conclusion that can inform more strategic decision-makers in the industry. It is essential to tell the reader that this paper discusses only the results of Phase one and Phase two will be elaborated in a separate paper.

Phase one

Focuses on analyzing primary data from incident reports, quantitatively determining the common organizational and human-related causes contributing to 80% of the incidents (Nowobilski and Hoła, 2023). This analysis helps identify the key areas that require immediate attention and prioritization; in addition, it helps validate the independent variables.

Phase two

Using survey questionnaires tailored to interview the drilling crew. Two lists of survey questionnaires were developed, the first includes closed-ended and demographic questionnaires for quantitative analysis and assessing the hypotheses and conceptual framework. The second list includes demographic and open-ended questionnaires, where the responses will be analyzed qualitatively to gain in-depth insights into the crew's perspectives and experiences. Incorporating both open and closed question types will allow the researcher to leverage the advantages of each approach (Semyonov-Tal and Lewin-Epstein, 2021).

Development of Questionnaires and Pilot Study

After collecting relevant questionnaires, the researcher will review them in one or more pilot studies to ensure they address the aim and objectives. The filtration process could remove some irrelevant questions related to working at height activities.

Population

Considering an estimated population size of approximately 8,712 employees in the company at the beginning of the research, the study requires a minimum sample size of 424 individuals who meet the inclusion criteria as explained in the 0 Sampling Size.

Sampling Method

A stratified sampling mechanism was selected because stratification requires that characteristics of the population members be known, so that the population can be stratified first before selecting the sample. (Bickman and Rog, 2008) It means that specific characteristics of individuals (e.g., different positions at the rig site) are represented as per the following:

1	Rig manager	2	Assistant Rig Manager
3	Rig Mechanic	4	Rig Electricians
5	Field safety engineer	6	Driller day/ Night shifts
7	Derrick-men	8	Barge Engineer offshore
9	Roustabouts from the day and Night shift	10	Floor-men
11	Assistant Driller	12	Labor foremen onshore or crane operators offshore

Sampling Size

Cochran's (1978), sample size formula was used to determine an appropriate and representative sample size. The following equation provides the formula for calculating sample size, considering an estimated population size of approximately 8,712 employees in the drilling company with a 95% confidence level and at least 5 percent—plus or minus—precision: The Cochran formula is:

$$n_0 = \frac{Z^2 pq}{e^2}$$

n_0 = sample size, e = e is the desired level of precision (i.e., the margin of error) = 5%
p = estimated proportion of an attribute that is present in the population, 0.5 is the maximum variability, q = 1-p, Z = abscissa of the normal curve that cuts off an area α at the tails (1-α equals the desired confidence level, i.e., 95%) = 1.96
Sample Size Calculation = $(1.96)^2(0.5)\ (0.5)/\ (0.05)^2$= 385 copies of questionnaire. A 10% allowance is provided to account for those who do not participate but subsequently drop out (non-response rate and incomplete responses). The study requires a minimum sample size of 424 individuals who meet the inclusion criteria. ("Sample Size in Statistics," 2017).

Ethical Clearance

Ethics are in accordance with the university requirements; all interviews are adults; the study will not include any misleading or incomplete information.

Reliability

Reliability (or consistency) means the stability of a measurement scale, i.e., how far the interview will give the same results on separate occasions (Bannigan and Watson, 2009). In this research, the 1st pilot interview tests were conducted, followed by fine-tuning the list of questions, then the 2nd pilot interview tests were conducted

by asking the same rig crew members the same questions twice by two different interviewers (an independent Third-party contractor and a Field Safety Engineer), where the higher the coefficient, the more stable and reliable result of the interview (Polit and Beck, 2004). Cronbach's alpha (α), a perfectly adequate index, the reliability of the research instruments will be higher when the value of Cronbach's alpha (α) is closer to 1.00 (Othman et al., 2022). Generally, values of Cronbach's alpha (α) (Nunnally, 1978):

less than 0.60 is considered to be poor,

those in the 0.70 range are considered acceptable, and

Those over 0.80 are considered to be good

Validity

Charlton (2000) highlighted the importance of a pre-test and pilot study, and it cannot be eliminated, also the resultant modifications to the questions will increase the validity, reliability and responsiveness of a questionnaire, she argued that the validity of the feedback obtained from survey questionnaires rely on the extent to which the author, who write the questions communicate their intended meaning to interviewers, who in turn convey the questions' meaning to respondents. During the interviews, the third-party contractor may be introduced to explain every question in detail in case the respondent has any doubts about the meaning. Furthermore, in this research, the researcher may do a 2nd pilot test to make sure questions are clear, and there is no confusion at any of them.

4. Results

This section presents the Pareto-Lorenz analysis method and sets of results relating to only phase 1: Quantitative Method for statistical analysis of accidents' causes. Since there are many Human Factors and Organizational Factors actually contributing to incidents, and to avoid complications, the researcher used Pareto-Lorenz (Hoła et al., 2018). To analyze and identify the most contributing factors. The Pareto-Lorenz ABC analysis, or simply ABC analysis, is a widely utilized business management technique for inventory categorization and control. It is grounded in the Pareto principle, which suggests that approximately 80% of outcomes can be attributed to 20% of the contributing factors (Robinson, 1983).

Pareto-Lorenz ABC Analysis Method

Every accident is caused by at least several causes. In the analysis method for the first phase, the causation of an accident was assumed as all deficiencies, inadequacies, and irregularities related to:

Human (H) or employees and their behavior,
Organization factors (O) at the workplace
And Technical (T), which includes materials or equipment factors, we call it technical

Therefore, the set "P" of all causes of accidents is the sum of the subset representing the technical causes "T", a subset of the organizational list of causes "O", and the subset of human causes "H". The value of "P" is defined in equation 1;

Equation 1: $P = T \cup O \cup H$

Under each T, O, H set, there are several causes listed in equation 2;

Equation 2: $T = \{ t_k \ k = 1, 2, 3, \dots, K\}$, $O = \{ O_m \ m = 1, 2, 3, \dots, M\}$, $H = \{ h_n \ n = 1, 2, 3, \dots, N\}$

In this research Pareto-Lorenz ABC method (Hoła et al., 2018) of analysis will be used, according to the ABC method (Chu et al., 2008). It is necessary to divide the causes from the set into three subgroups. It was assumed that:

The set of important causes, designated as A, forms a list of causes that account for 80% of all the causes that are attributable to a particular cause group. In the discussion, the researcher will focus on them
The set of less relevant causes, designated as B, forms a list of causes that account for 15% of all the causes that are attributable to a particular cause group, and will not be part of the discussion.
The set of irrelevant causes, designated as C, forms a list of causes that account for 5% of all the causes identified in the set.

ABC classification is proposed to identify the list of causes with the greatest importance. The calculation method is a universal calculation using Excel software; it applies to the analysis of each one in the three groups of causes of accidents involving (H, O, T). Steps of the analysis are summarized in:

Defining detailed specific causes and their cardinalities (corresponding values) in the analyzed generic group. This information is presented as a sequence of ordered pars of numbers (p_x, a_x), where p_x $(x = 1, 2, \ldots, X)$ (represents the identified details of causes and a_x indicates the number of occurrences of the examined cause in the analyzed subset H, O, or T.

Organizing sequences of pairs of numbers (p_x, a_x) That describes the analyzed causes in descending order. The position of a pair in the ordered sequence is determined by the number of occurrences of an attribute. p_x in the subset T, O, or H according to the rule in equation 3,

Equation 3: $\boldsymbol{if\ a_{x+1} \geq a_x,\quad then\quad p_{x+1} < p_x}$

Calculate the percentage share u_x of occurrences of the cause p_x In the total of all examined causes according to the following formula:

Equation 4: $\boldsymbol{u_x = \frac{a_x}{\sum_1^{x=X} a_x} .100\%}$

Calculate the percentage of the cumulated sum of subsequent causes according to the following formula, in equation 5

Equation 5: $\boldsymbol{S_x = \sum_1^x u_x \quad x = 1, 2, 3, \ldots, X.}$

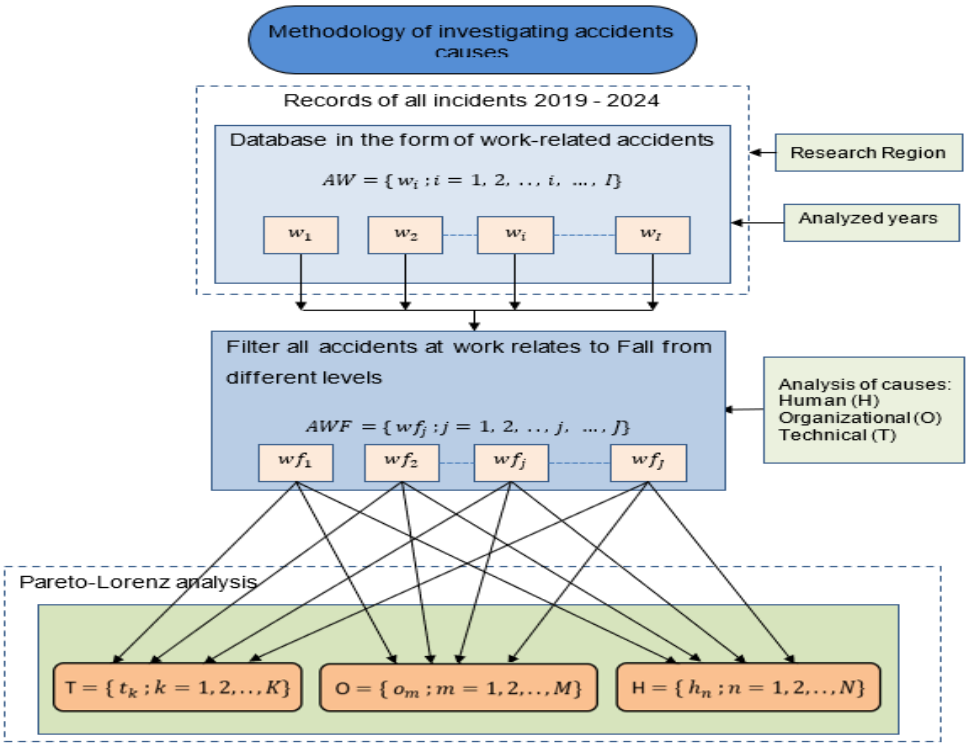
Defining the affiliation of specific causes to one of the valid classes to classify causes according to the degree of their influence on the occurrence of an accident,

The proposed methodology of classifying and evaluating the validity of causes of accidents involving personal injury is presented in the following figure. The direct source of information on the course of all types of incidents, including HIPO near-miss, was an incident management system < 3550 > events (AW) during the period (2019 – 2024), w_i - an incident event (single event) i, which occurred during five years 2019 – 2024, I = 3550, where: $AW = \{ w_i ; i = 1, 2, .., i, \ldots, I\}$

A detailed analysis of recordable accidents during the same period wf_i (LTI, MTO, RWC, FTL)

$AWF = \{ wf_j ; j = 1, 2, .., j, \ldots, J\}$; $S_x = \sum_1^x u_x \quad x = 1, 2, 3, \ldots, X.$

Figure 11: Methodology of classifying accident investigation causes

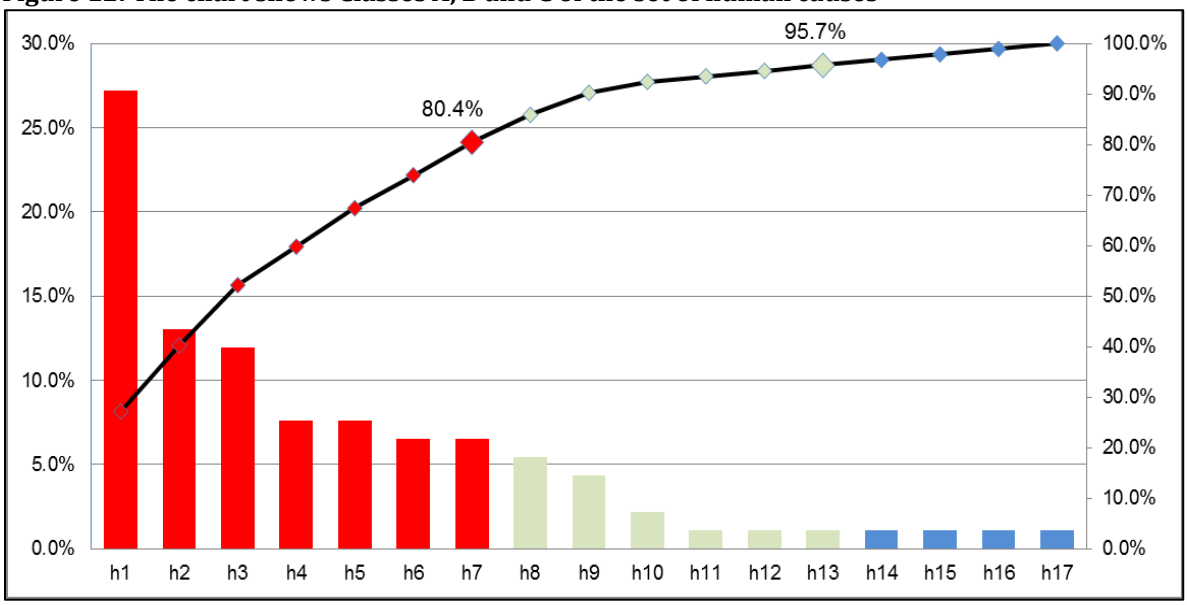


Source: (Hoła et al., 2018)

Table 2: Human (H) Subset of Causes (Source: Researcher's work)

Human Factor	Type of Human (H) Subset of Causes	The cardinality of the Occurrence of H	Share Ux (%)	Cumulative Share Sx (%)	Validity Class
hf1	Unsafe Position / Posture	25	27.2%	27.2%	A
hf2	Fail to secure	12	13.0%	40.2%	A
hf3	Procedure not followed	11	12.0%	52.2%	A
hf4	Inadequate communication	7	7.6%	59.8%	A
hf5	Lack of attention	7	7.6%	67.4%	A
hf6	Short-cut	6	6.5%	73.9%	A
hf7	Failure to use the STOP action	6	6.5%	80.4%	A
hf8	Overconfidence / Complacency	5	5.4%	85.9%	B
hf9	Inadequate judgment	4	4.3%	90.2%	B
hf10	Failure to use the right anchor point	2	2.2%	92.4%	B
hf11	Inadequate Use of Protective Methods	1	1.1%	93.5%	B
hf12	Inadequate work speed	1	1.1%	94.6%	B
hf13	Intentional violation	1	1.1%	95.7%	C
hf14	Lack of Focus / Memory Failure	1	1.1%	96.7%	C
hf15	Operating at an improper speed	1	1.1%	97.8%	C
hf16	Start Activity without PTW	1	1.1%	98.9%	C
	Sum of Cardinalities of Human Occurrence	92	100.0%		

Figure 12: The chart shows Classes A, B and C of the set of human causes

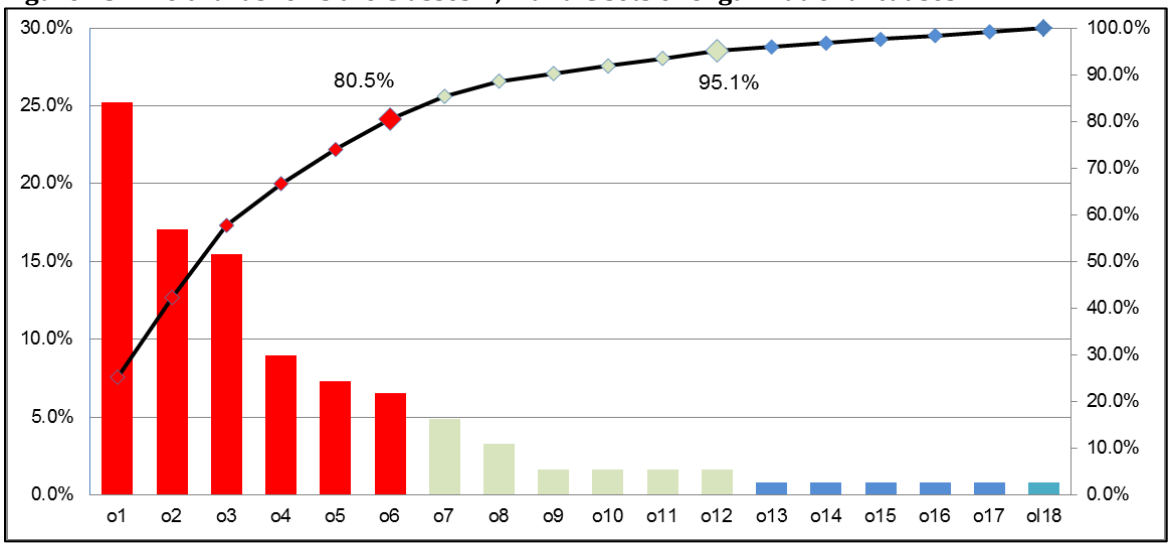


Source: Researcher's work

Table 3: Organizational (O) Subset of Causes

Org. Factor	Type of Organizational (O) Subset of Causes	cardinality of Occurrence of (O)	Share Ux (%)	Cumulative Share Sx (%)	Validity Class
of1	Inadequate Risk Assessment (JSA, TRA, Check Card)	31	25.2%	25.2%	A
of2	Inadequate Supervision	21	17.1%	42.3%	A
of3	Lack of Awareness / Training / Competency	19	15.4%	57.7%	A
of4	Inadequate job Method	11	8.9%	66.7%	A
of5	Inadequate Job Plan	9	7.3%	74.0%	A
of6	Inadequate Inspection / Audit	8	6.5%	80.5%	A
of7	Inadequate housekeeping	6	4.9%	85.4%	B
of8	Failure to warn	4	3.3%	88.6%	B
of9	Improper implementation of the PTW system	2	1.6%	90.2%	B
of10	Improper lifting practice	2	1.6%	91.9%	B
of11	Inadequate Procedure	2	1.6%	93.5%	B
of12	Stress / Tire	2	1.6%	95.1%	B
of13	Crew under time pressure	1	0.8%	95.9%	C
of14	improper handover	1	0.8%	96.7%	C
of15	Inadequate Implementation of MOC	1	0.8%	97.6%	C
of16	No toolbox talk	1	0.8%	98.4%	C
of17	Procedure does not exist	1	0.8%	99.2%	C
of18	Unclear or conflicting assignment of responsibility	1	0.8%	100.0%	C
	Sum of Cardinalities of Organizational Occurrence	123	100.00%		

Figure 13: The chart shows the Classes A, B and C sets of Organizational causes



Source: Researcher's work

Discussion

Here, the researcher shed light on the top three factors under Human and Organization factors and how Artificial Intelligence has the optional to show a reduction in accidents and better safety performance.

Organizational Factors and AI

As in Causes Factors such as "Inadequate Risk Assessment - Job Safety Analysis JSA, Task Risk Assessment TRA, Check Card" contribute the maximum, followed by "Inadequate Supervision", "Lack of Awareness / Training / Competency", then "Inadequate job Method/plan" and "Inadequate Inspection / QC /QA". The organizational factors have the most significant share of causes (123/251=49%). Risk Assessment and Safety Performance: where conducting robust risk assessments is a critical process for enhancing safety performance, both Hudson and Stephens (2000) Highlighted that effective risk assessment can yield several beneficial outcomes by proactively identifying hazards before incidents occur, better resource allocation, and, in a recent literature review on the construction industry, Kalidass et al. (2023) Highlighted that Artificial intelligence has the potential to significantly enhance risk assessment and improve safety performance in several ways.

For Risk assessment, as it is the most contributing factor in accidents, this result is in line with the recent literature review on the construction industry, Kalidass et al. (2023) explained that AI has the potential to significantly enhance risk assessment and improve safety performance in several ways; such as: i) automate certain aspects of the risk assessment process in terms of hazard identification and consequence analysis, freeing up human resources for more complex task, ii) AI algorithms can analyze large datasets of safety information, including incident reports, near misses, and sensor data, to identify patterns and trends that might not be apparent to human analysts, iii) AI can be used to develop predictive models that forecast the likelihood of future incidents based on historical data and current conditions.

Similarly, for the send most contributing organizational factor (Supervision), the experimental results of Rongrong et al.,(2020) supports the researcher where AI has the potential to complement and enhance the role of supervision in several ways: i) Real-Time Monitoring and Alerts: AI-powered systems can monitor work activities in real-time, using data from sensors, cameras, and wearable devices, and can detect unsafe behaviors or conditions, enabling timely interventions, ii) Data-Driven Insights: AI can analyze large datasets of safety information to identify trends, patterns, and high-risk areas, helping supervisors focus their attention and resources on the most critical areas. iii) Automated Reporting and Documentation: AI can automate tasks such as incident reporting, safety inspections, and training records, freeing up supervisors to concentrate on more proactive safety management activities. iv) Performance Monitoring and Evaluation: AI can track worker performance related to safety, providing supervisors with objective data to identify areas for improvement and deliver targeted feedback. Also, Hickert et al. (2023) add v) Remote Supervision and Support: AI-powered tools can facilitate remote supervision by providing real-time information and communication channels, particularly in geographically dispersed work environments.

Moving to the third most contributing organization factor (Lack of Awareness / Training / Competency), the AI has the potential to significantly enhance safety training and competency development, leading to improved safety performance in several ways: i) personalized training; AI-powered algorithms can customize training programs for individual workers based on their specific job roles, experience levels, and learning preferences, Albaladejo-González et al. (2024) Explained how a personalized approach can enhance training effectiveness and knowledge retention, they demonstrated the ability of Artificial Intelligence to forecast students' achievement in online educational settings by evaluating the breadth and calibre of trainee engagement in learning endeavors, such as discussion forums.

He preceding review elucidated the moderating influence of Artificial Intelligence on the relationship between organizational factors and safety performance in the drilling industry, thus addressing Research Objective 3 (RO3) "analyze the moderating role of AI in the relationship between the organizational factors and safety performance in the drilling industry".

Human Factors and AI

As in Table 2 Human(H) Subset of Causes after implementation of the (H, O, T) causation method revealed that total cardinalities = 251 (sum of Human, Organizational, and Technical, respectively 92, 123, and 36). The total share of human factor = 92/251 x 100% = 37% of the entire list of causes. Analysis of human factors as shown

in showed Injured Person's (IP) "Unsafe Position / Posture" was the most contributing human cause, then the "failure of IP to use/secure PPE: i.e., full body harness, "Failure to follow Procedure, "Inadequate Communication," and "Lack of attention".
Unsafe position/posture is the highest case under human factors, Mei et al. (2024) presented how artificial intelligence can automatically detect and manage guardrail climbing behavior and workers' unsafe posture in construction sites, by using existing surveillance cameras, the system can be deployed at low cost with minimal interference with workers, and the detection of their unsafe behavior, which could lead to falls from height.

Failure to secure refers to neglecting to properly fasten, stabilize, or restrain objects or equipment in the construction environment. This led to some accidents happening; oversight can have significant impacts on safety performance. Image recognition capabilities can enable artificial intelligence systems to analyze visual data from construction site cameras or drones, identifying unsecured objects or equipment and alerting workers or supervisors to potential hazards, according to the recent study by Durlik et al., (2024).

Third contributing factor, when workers not following the procedure, this case will be challenging to the artificial intelligence because it could be complicated, not straight forward considering the ideal scenario of work site which in most cases different than reality, however we need to understand that where procedures are not consistently followed can fostering complacency, increase risk-taking behaviors and decrease both safety performance and weaken the overall safety culture. This area opens the door to Artificial Intelligence use cases in the near future.

The preceding review explained how Artificial Intelligence moderates the relation between human factors and safety performance drilling industry, thereby addressing Research Objective 4 (RO4) "analyze the moderating role of AI in the relationship between the human factors and safety performance in the drilling industry".

5. Managerial Implications and Recommendations

Human Factors and AI addressing unsafe positions/postures using AI-driven video analytics offers a cost-effective solution, minimizing risks, failure to secure scenarios by identifying unsecured objects, and prompting immediate alerts. For instances of workers not following procedures, AI applications are complex due to real-world deviations from ideal scenarios, necessitating comprehensive machine learning about the details of every procedure and developing a proof of concept for each use case. Organizational Factors and AI: AI enhances risk assessment by automating hazard identification, analysing safety data for trends, and predicting incidents. AI-driven real-time monitoring, data analysis, and automated reporting augment supervision, improving safety management. AI also revolutionizes safety training through personalized programs tailored to individual needs and performance. Managerial Implications and Recommendations are expected to cover:

- Prioritize AI Implementation in High-Risk Areas: Focus on AI deployment in areas prone to falls and unsecured equipment incidents to maximize safety impact.
- Develop Adaptive AI Systems: Create AI algorithms that can adapt to the dynamic nature of different drilling rig layouts, and ensure all blind spots are covered.
- Invest in Comprehensive Safety Data Collection: Establish robust systems for collecting and analysing safety data to inform AI models and improve predictive capabilities.
- Enhance Supervisory Oversight with AI: Equip supervisors with AI-driven tools for real-time monitoring, data analysis, and automated reporting to improve safety management.
- Personalize Safety Training Programs: Utilize AI to customize training programs, addressing individual needs and performance gaps to enhance knowledge retention and safety performance.

Conclusion

The research successfully covered the main questions, identified organizational and human factors that account for the majority of accidents in the drilling industry. It outlined the most common artificial intelligence solutions that could address the primary causes of accidents and examined the underpinning theories that correlate with the research's focus area.

The first phase of the research methodology was completed, using Pareto-Lorenz, the researcher analysed accident records to identify that 20% of the causes attributed to 80% of the incidents. The research also identified independent and dependent variables and successfully constructed a Conceptual Framework for the effect of Artificial Intelligence on Safety Performance in the Drilling Industry.

However, the second phase of the research is still in progress, and it is anticipated to develop Conceptual Framework of the research, validate the hypotheses and will be published in another paper, in which the results of quantitative and qualitative surveys will be analysed through SPSS and visualized through AMOS software; then, hypotheses will be validated along with elaborated discuss for the results.

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How Economic and Financial Indicators Shape Bond Market Performance in Asia?

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Abstract: The focus of this study is to examine the effects of macroeconomic and financial indicators on bond market performance in Asia countries. This study utilizes a regression analysis to measure the relationship between inflation, interest rate, stock market performance, and gold price in six selected nations: India, Indonesia, China, Vietnam, South Korea, and Turkey, from 2014 to 2024. The validity of the data was diagnostically checked by performing a VIF procedure, autocorrelation test, and normality test on residuals, and the data were analysed via EViews software. The analysis showed mixed findings; however, two major variables that negatively affect the performance of bond markets in Asia are "inflation and stock market," which reflect global economic stability in the selected countries. An abrupt or sudden rise in the lending interest rate can trigger market volatility, leading to losses for bondholders and potentially discouraging corporate investment (Alam & Uddin, 2009). Moreover, the monetary policy stances adopted by central banks have systemically important ramifications for the valuation of both bond and equity markets on a global scale (Jang & Atukeren, 2019). For practical implications, this study suggests that policymakers pay extra attention to inflation to ensure a sustainable economic condition. To the best of the authors' knowledge, this study is the first to examine the combination of both economic and financial shocks, along with gold price, both pre- and post-COVID-19 pandemic, focusing on Asia.

Keywords: *Macroeconomic, Lending Interest Rate, Inflation, Stock Market Performance, Gold Price, Asia*

1. Introduction and Background

The intricate relationship between macroeconomic variables, financial indicators, and bond market performance has garnered significant attention, especially within the context of emerging economies (Nair & Thenmozhi, 2012). Understanding the dynamics of this interplay is crucial for investors, policymakers, and researchers alike, as bond markets play a pivotal role in capital allocation, risk management, and overall economic stability (Zhou & Cui, 2019). Bond markets in Asia, particularly in countries like India, Indonesia, China, Vietnam, South Korea, and Turkey, have experienced substantial growth and transformation in recent decades, reflecting broader trends of financial deepening and integration with the global economy. Macroeconomic and financial factors are critical determinants of a country's economic well-being. The COVID-19 outbreak in 2020 significantly disrupted these factors globally, leading to GDP declines in many countries and adversely affecting bond market performance (Gherghina, 2023). Therefore, macroeconomic indicators must be monitored closely to ensure economic well-being to prepare for any unexpected events such as the COVID-19 pandemic, which is affecting economic performance globally, including the overall performance of bonds. We aim to explore any different effects of stock market trends, gold values, interest rates, and inflation rates on the performance of bond markets in different Asia continents: South Asia (India), Southeast Asia (Indonesia, Vietnam), East Asia (China, South Korea), and West Asia (Turkey).

The absence of vibrant bond markets in East Asia significantly contributed to the 1997–98 financial crisis, highlighting their importance in financial reforms. These nations have unique economic structures, regulatory environments, and market dynamics, making them ideal candidates for a comparative analysis of the factors influencing bond market performance (Hale, 2011). The expansion of domestic debt securities markets in numerous Asia economies during the 2000s underscores the growing importance of these markets in the region's financial landscape (Das, 2014).

In India, the bond market is demonstrating improved performance, evidenced by a total market capitalization of $2.5 trillion, signalling positive market trends. Mishra and Nangru (2024) report that the Reserve Bank of India is actively fostering bond market development. Data from the National Securities Depository Ltd. reveals

a net investment of ₹121,059 crore from foreign portfolio investors in India's debt market in 2024, representing the highest inflow since 2015 (Dhutia, 2025). This indicates a robust growth trajectory driven by both government and corporate sectors (Das, 2014).

In early 2024, Indonesian government bond yields have slightly decreased, suggesting a stable lending environment where banks maintain their lending rates despite moderate inflationary pressures. This stability in the bond market often appeals to investors seeking less risky returns compared to the stock market, where growth is spurred by companies with strong earnings forecasts (Mead, 2024). Furthermore, the increase in gold prices indicates a move towards safer investments during times of global instability, which impacts investor attitudes in both the bond and stock markets. Overall, the bond market demonstrates stability but offers low yields; stock market performance and gold prices, along with well-managed inflation and consistent lending rates, collectively shape investor decisions across these various asset categories (Vanneaux & Plaque, 2025).

The current conditions in China's bond market present multiple operational challenges because of the combined forces of domestic financial indicators and international economic conditions. Market volatility has particularly affected government and corporate bond rates. To stimulate growth, the People's Bank of China has implemented accommodative monetary policies by lowering interest rates. Current challenges in China's bond market amplify the importance of policy timing. Due to decreased consumer demand and reduced industrial activities following the pandemic, market growth is showing signs of slowing down (Fu, 2024). The economic slowdown has increased yield volatility, prompting the PBoC to lower interest rates to stimulate economic growth, which affects bond market dynamics. These issues highlight the urgent need to understand how macroeconomic factors impact bond markets. The study's findings provide valuable insights for decision-makers and investors regarding China's evolving financial structure (Cui et al., 2025).

Moreover, global trends and macroeconomic policies significantly affect Vietnam's financial markets. The Ho Chi Minh Stock Index and the VN30 Equal Weight Index are two important measures of the nation's economic health. To combat inflation, which reached 4.1%, Vietnam's Central Bank has kept its real interest rate high in recent months (Can & Nguyen, 2021). This decision demonstrates the government's commitment to reducing inflation and stabilizing the gold price, especially the US gold price. However, the stock market has slowed, and business profitability has decreased because of high borrowing costs. The VN-Index and VN30 Index fluctuate because high interest rates discourage investment, showing how Vietnam must balance controlling inflation and supporting economic growth (Chowdhury et al., 2024).

According to Trading Economics data from January 2024, the South Korea 10-Year Government Bond Yield reflects the bond market's performance. It indicates South Korea's economic health and the stability of its financial market relative to inflation expectations. This yield fluctuates due to domestic and global factors, with past volatility ranging from 7.91% in April 2001 to 1.13% on August 12, 2019. These changes highlight the bond market's sensitivity to economic conditions, policy actions, and external events. The Bank of Korea influences bond market performance by setting lending interest rates, affecting the prices of lower-yielding bonds. In October 2024, the Bank of Korea lowered the key interest rate by 0.25% to 3.25%, influencing bond yields and investor strategies. South Korea's bond market is highly responsive to macroeconomic and financial variables (Min, 2025).

Turkey's main stock market index, Borsa Istanbul 100, reflects the nation's corporate and economic growth. It tracks the performance of the top 100 companies on the Istanbul Stock Exchange. The Turkish Central Bank maintained its policy rate at 50% to control the 48.58% inflation rate. This aims to stabilize the currency market and increase investor confidence. However, it raises borrowing costs for companies, reducing profitability and slowing economic growth. The BIST 100 is significantly affected by these measures, as high borrowing rates can hinder investment and cause short-term stock market fluctuations. Stabilizing Turkey's economy while promoting growth amid inflation presents a fragile balance (Ibrahimov et al., 2025). The impact of interest rate hikes on businesses in Turkey has been particularly severe; many small businesses have faced bankruptcy due to cash flow shortages and difficulties in short-term payments (Zhang et al., 2021).

Government bonds are crucial investment tools for maintaining financial stability and facilitating economic

growth. They also provide low-risk investment opportunities for individuals and institutions looking to diversify their portfolios. Analysing bond market performance against macroeconomic fluctuations and financial factors can therefore provide investors with important insights. This study aims to address existing gaps in knowledge by being the first to incorporate gold prices and stock market performance into a model that identifies specific trends in the bond market. It uses a time-series approach with data collected monthly from January 2014 to December 2024. Future investigations should consider the interaction of domestic and international factors in bond markets (Yun, 2019).

The central question is: "Which *economic and financial shocks* significantly affect *bond market performance* in selected *Asia* countries?" The fascinating aspect emerges when comparing the bond market's performance with other macroeconomic and financial components. Our primary goal is to determine how the bond indices of these six Asia countries respond to economic shocks, including fluctuations in macroeconomic indicators, gold prices, and stock market performance. Historically, bond indices have reacted to economic and financial indicators during events like the 2008 GFC and the COVID-19 pandemic, illustrating how external factors influence the bond market.

In India, for instance, heightened inflation and decreased gold prices might dampen the appeal of bonds (Kumar & Singh, 2023), whereas in Turkey, elevated interest rates diminish the attractiveness of bonds relative to alternative investments (Duran & Demirkale, 2021). Vietnam's inflationary pressures and underperforming stock market erode investor confidence in bonds (Rose, 2014), while Indonesia's struggling bond market mirrors broader economic challenges (Dwi & Nelmida, 2019). Conversely, in China and South Korea, lacklustre stock market results could steer some investors toward bonds (Shroders, 2025); however, constrained economic growth tempers their allure. Consequently, addressing these issues is crucial to bolstering investor assurance and revitalizing bond markets.

We first look at **India**, where falling gold prices and rising inflation are creating economic challenges. Additionally, a Finimize Newsroom article from November 2024 noted that rising costs of food, energy, and commodities are causing inflation, which reduces purchasing power and affects the consumer price index. Inflation also diminishes the value of bonds, making them less attractive to investors. Higher interest rates, implemented as a policy response to inflationary pressures, negatively affect bond prices and can undermine investor confidence. These factors—declining gold prices, high inflation, and rising interest rates—collectively challenge India's bond market (IndiaBonds, 2024).

While in **Indonesia**, the stock market faces challenges, including a 2.96% drop in stock fund investments in the first half of 2024, as foreign investors moved to developed markets like the U.S. Higher returns in these economies make Indonesian stock funds less appealing. Additionally, many Indonesian investors prefer short-term profits from high bank deposit interest rates over long-term investments, which limits industry growth and its economic contribution (Schaar, 2025). With regulatory support, these measures could improve bond market performance.

Additionally, the Shanghai Composite Index fell by 2.3% the previous week because Beijing's stimulus plans did not meet market expectations (Fung et al., 2019). However, the **Chinese** bond market remained stable. Economic data indicate increased investment in bonds due to a desire for safety amid stock market volatility. Financial Times analysts suggest this divide between equities and bonds is because investors are choosing safer assets over potentially higher gains. This trend shows a systematic shift of resources, which may change China's capital market structure in the long term.

On the other hand, the **Vietnamese** bond market is highly sensitive to macroeconomic factors, including stock market declines, rising inflation, and changes in foreign investment (Can & Nguyen, 2021). Rising inflation reduces the attractiveness of bond returns because it lowers spending power, increases business costs, and decreases bond value. When central banks raise interest rates to combat inflation, bond prices fall, increasing economic stress for businesses and consumers. These issues prevent Vietnam's bond market from becoming a reliable financing source for public and private entities.

Similarly, the **South Korean** stock market significantly affects investor sentiment. Rising stock prices may

make equities more attractive than bonds, leading to lower bond prices and higher yields. Furthermore, bond prices are sensitive to inflation, and concerns about higher interest rates worsen inflation expectations by negatively affecting purchasing power. Focus Economics reported in 2024 that fears of monetary tightening in South Korea were fuelled by inflation rates exceeding 5% in April 2024 (Bauer & Rudebusch, 2013). Consequently, bond markets reacted negatively, and yields rose sharply as investors anticipated further interest rate hikes by the Bank of Korea.

Finally, in **Turkey**, where the economy is often unstable, interest rate changes significantly affect bond market performance. Turkish companies face high borrowing costs compared to international markets, making issuing bonds less appealing (Aksoy, 2023). In this context, high interest rates increase the opportunity cost of holding bonds, making other investments more attractive.

Government bonds can support investors, economic growth, and financial stability by understanding and managing these factors. However, regional issues like slowing inflation in India and gold prices, rising interest rates in Turkey, and weak stock markets in China and Vietnam reduce investor confidence. Given the varied responses of selected Asia countries to the recent performance of the bond market, this study seeks to identify the relationships between macroeconomic indicators (i.e. inflation and interest rates), financial elements (i.e. stock market performance), and gold price, offering insights into the distinct characteristics and common trends across these Asia nations. By performing Multiple Regression analysis for each country, the study intends to identify patterns and measure the impact of macroeconomic variables, as well as stock market performance and gold price on bond market performance. The results will address knowledge gaps and promote diverse investment strategies and informed decision-making. Additionally, this study will propose regulatory policies to enhance bond market stability. Stronger regulatory frameworks can lower systemic risks, rebuild investor confidence, and strengthen the role of mutual funds in economic growth and financial security. The study's accuracy and reliability depend on the data sources used, necessitating a narrowed scope and restriction of the investigation period to 2024 due to data limitations.

The first significant contribution of this study is for market participants. By revealing how inflation, interest rates, performance of stock markets, and gold prices regulate bond market performance, this study informs investment managers and their investors. It offers investors the opportunity to make informed decisions based on existing market and economic realities, maximizing portfolio strategies for greater benefit. The data presented in this study will help financial institutions and investors gain a better understanding of the macroeconomic and financial variables affecting bond market performance in Asia-6 countries.

The second contribution of this study is for policymakers, as they can utilise the findings, particularly regarding the relationship between interest and inflation rates, and bond market performance. Evidence suggests that interest rates and inflation significantly impact bond yields in Vietnam and India, highlighting the importance of these macroeconomic factors in shaping bond market dynamics. In *Vietnam*, the bond market cannot be relied upon as a funding source for public and private entities because of inflation and stock market downturns (Duong, 2023). Similarly in *India*, inflation control improved the bond market's stability and attractiveness to investors (Jape & Ambhore, 2019). Consequently, policymakers should prioritize the implementation of well-coordinated fiscal and monetary policies that specifically target the macroeconomic variables identified in this study; such policies are crucial for creating a stable, efficient, and attractive bond market capable of fostering long-term investments and bolstering economic resilience.

Thirdly, understanding the link between financial indicators like stock and bond market performance helps financial analysts improve their client recommendations based on financial situations and risk tolerance. Analysts can suggest strategies that take advantage of rising stock prices. For example, when the stock market rises, analysts should advise clients to invest more in bonds to benefit from potential bond price increases in the future. This strategy diversifies the portfolio and secures capital gains during market uptrends, maximizing potential returns. Because of this correlation, analysts can provide practical advice, and bondholders can monitor market trends to make informed asset allocation decisions.

Finally, this study will benefit future researchers by serving as a reference for consistent proof and exceptional outcomes, enhancing present knowledge. It will improve comprehension of how inflationary pressures,

interest rate fluctuations, stock market volatility, and gold price releases influence bond market performance. Such studies can provide important new insights into the dynamics of Asia bond markets, laying the basis for risk management plans, investment guidelines, and prediction models specific to investors in this market sector. By defining the primary causes of bond market volatility in Asia, scholars may improve discussions on financial markets and macroeconomic stability, increasing our understanding of the correlation between economic and financial factors and asset values in the area.

We explore how gold prices, macroeconomic indicators, financial variables, and stock market indexes influence bond market prices in six Asia countries. Our goal is to determine which economic and financial factors most significantly affect bond market performance in these countries. This research benefits fund managers, investment analysts, stockbrokers, and investors by providing a framework for better decision-making. The paper includes a literature review, methodology, results, and conclusions with recommendations.

2. Literature Review

Quantitative easing tapering's negative consequences on Asian economies highlight the close ties between the US and Asian bond markets (Villafuerte & Yap, 2015). The goal is to give a comprehensive overview of macroeconomic and financial variables impacting bond market performance, leading to research methodologies and empirical analysis (Dhanaraj et al., 2015; Tainer, 2012). East Asian corporate bond markets have grown significantly because of strong economic growth and regulatory initiatives (Hack & Close, 2013).

In Asia, the gap between developed and developing countries is especially evident in the financial sector (Yudaruddin, 2022). Financial crises can arise from macroeconomic conditions affecting the firm's industry sectors (Abdelkader & Wahba, 2024). Asia must adjust to volatile external conditions and rising risk premiums. Increased cross-border capital flows and global integration pose new risks, so Asia must learn from pre-crisis experiences (Jeasakul et al., 2014; Villafuerte & Yap, 2015).

Bond markets are essential to modern economies and act as a link between investors and entities seeking capital. These markets' operational dynamics include bond yields and prices which are influenced by several factors. Macroeconomic indicators, inflation expectations, and monetary policy play key roles. Bond performance is affected by interest rates, issuer credit ratings, inflation, and economic conditions. Rising interest rates typically cause bond prices to drop because newer bonds with higher yields become more appealing. Conversely, falling interest rates can increase bond prices. Duration measures a bond's price sensitivity to interest rate changes. Credit ratings reflect an issuer's ability to meet its debt obligations; higher ratings suggest lower risk and better bond performance (Yulia et al., 2019).

Understanding macroeconomic linkages and financial variables affecting bond markets requires theoretical frameworks. A previous study used the approach to assess the market value of three Asian countries between 1990 and 2004 and to estimate the macroeconomic financial risk premium from 1990 to 2004 (Asteriou, 2008). Bond ratings are used as dependent variables to identify their factors (Wahyuningsih et al., 2025).

The concepts and frameworks used in this study align with previous models. Firstly, the Arbitrage Pricing Theory (APT) developed by Stephen Ross in 1976, explains how macroeconomic factors impact investment returns negatively. It suggests that an asset's price is based on its sensitivity to these factors. APT affects bond and stock market performance by helping investors understand and manage risks, leading to better decisions. If an asset is temporarily mispriced, investors can profit until the price aligns with its true value. Unlike the Capital Asset Pricing Model (CAPM), which focuses only on market risk, APT is more detailed, considering multiple risks that affect an asset’s return. In addition, APT explains the negative connection between bond market prices and interest rates by looking at systematic risks. During inflationary pressures, interest rates are a key economic factor that immediately affects how bonds perform. Attractive bonds with higher yields become more valuable even after interest rates decline due to market forces. A bond's duration affects its sensitivity to interest rates, determining how much its price changes with rate movements. When the yield curve changes, bond prices also change accordingly, creating arbitrage opportunities that investors can exploit (McKay & Peters, 2019). Therefore, three alternative hypotheses have been built.

H1: There is a negative relationship between stock market performance and bond market performance.
H2: There is a negative relationship between interest rate and bond market performance.
H3: There is a negative relationship between the inflation rate and bond market performance.

The performance of the bond market is highly interrelated with that of the *stock market*. Although distinct, bond and stock investors invest in a variety of stocks and other financial assets, leveraging their wealth to manage expenses. A study examining the relationship between stock and bond markets in Indonesia, utilizing a bivariate stochastic volatility model, captures volatility spillover effects and dynamic correlation patterns over time (Sia, 2023). The analysis reveals a unidirectional volatility spillover from the stock market to the bond market, demonstrating how changes in stock market volatility influence bond market behaviour. This study builds on theoretical frameworks such as the present value model, which suggests that stocks and bonds can be positively correlated due to shared sensitivity to discount rates, and the flight-to-quality hypothesis, which explains shifts in investment behaviour during periods of heightened risk. These findings are critical for portfolio managers and policymakers in Indonesia, highlighting the need to adapt strategies based on evolving market conditions and asset interdependencies. When equity market volatility rises, the demand for fixed-income securities increases, thereby increasing returns on bonds (Sharma & Kumar, 2020). Government bonds tend to align more closely with bond-like stocks, which are typically stocks of large, mature, low-volatility, profitable, dividend-paying firms that are neither high growth nor distressed (Baker & Wurgler, 2012). It is essential to consider the risk-return profiles of each asset class and tailor investment strategies to specific financial goals and risk tolerance levels.

Additionally, the performance of bonds is significantly influenced by *interest rates*, especially for funds that invest in fixed-income securities. Market interest rates and bond prices generally move in opposite directions, a phenomenon known as interest rate risk. When interest rates increase, the value of existing bonds usually decreases because new bonds offer a more attractive return, making older bonds less appealing to investors (Dixit & Gupta, 2020). Conversely, when interest rates decline, existing bonds with higher yields become more valuable, improving fund performance. Common proxies for interest rates include the real interest rate or the borrowing rate (McKay & Peters, 2019). Bond yields reflect the rate of return an investor will receive if they purchase a bond at a particular time (Usman et al., 2021). Another study concludes that bond prices and yields are inversely related to interest rate movements (Santosa, 2021).

Moreover, a thorough understanding of market changes requires analysing bond market performance in relation to rising *inflation*. Over time, inflation reduces the buying power of cash, thus directly influencing the earnings bond investors receive (Kang, 2012). An increase in inflation diminishes the purchasing power of bond dividends, so investors increasingly seek other investment opportunities. Market attractiveness diminishes along with bond prices. When inflation rises, central banks raise interest rates to preserve economic equilibrium. Bond market prices decline when interest rates increase because newly issued bonds promise elevated yields to maintain their market competitiveness (Dwi & Nelmida, 2019). The bond market operates under a universal principle where interest rates and bond market prices move in opposite directions. Central banks may lower interest rates as part of their deflation or low inflation economic strategies to stimulate growth. Under these circumstances, bond prices increase because investors recognize that the fixed payments from existing bonds demonstrate higher value than fresh bonds carrying lower interest rates.

On the other hand, Portfolio Theory suggests that adding gold to a portfolio can lower risk and increase stability during economic downturns. Gold often acts as an inflation hedge and haven during economic instability, making it a good portfolio diversifier (Díaz et al., 2022; Hassan et al., 2022). An increase in the price of gold usually indicates economic risk. Fund managers adjust their asset allocation based on these economic changes. A decrease in the price of gold when the economy is stable may encourage a shift to high-yielding mutual funds like bonds and equity stocks. These dynamics show how gold prices negatively influence bond market performance. Institutions are increasingly including gold as a major asset in global investments because of its stability (Khan et al., 2021). Therefore, another alternative hypothesis has been built.
H4: There is a negative relationship between the gold price and bond market performance.

Within bond market performance, the price of gold is an indicator used by nearly all mutual funds, especially those linked to commodities and precious metals or involved in closely associated sectors. Consequently,

individuals observe this relationship through personal gold holdings and how gold prices directly impact bond returns, particularly concerning exposure through gold-related assets or associated industries. Gold prices significantly influence bond and equity markets (Xu et al., 2017). Gold prices generally run high while bond performance behaves poorly when investments are in gold or gold stocks. For instance, during periods of inflation or immediately after a geopolitical disaster, the demand for gold generally increases. A 10-year government bond will have significant investments in commodities. However, when gold prices fall, performance suffers in such funds because demand decreases, and price drops lead to lost returns (Bai & Ho, 2022).

3. Research Methodology

This research investigates how changes in macroeconomic and financial factors—stock market performance, gold prices, inflation, and interest rates—affect bond market performance. It uses monthly data from 2014 to 2024. Hypotheses are tested to see if changes in these factors significantly impact bond market performance in six Asia countries. A quantitative approach is used to confirm relationships and develop generalizations that add to the theory (Jansen, 2021).

Multiple Linear Regression (MLR) analysis examines the relationship between several independent or predictor variables and a single dependent or criterion variable. MLR expresses the linear correlation between these independent and dependent variables. A theoretical framework is established to classify the variables and enhance understanding of their relationships. Our research design uses MLR analysis to quantify each variable's impact on bond market performance. The study details data collection methods from reliable financial databases such as Federal Reserve Economic Data, Trading Economics, and Stooq, as well as rigorous data analysis procedures to ensure the accuracy and robustness of the results. By controlling for potential confounding variables, the research aims to isolate the specific impact of each macroeconomic and financial factor by performing a multivariate analysis (MVA) via a regression analysis. The findings of this study are intended to provide valuable insights for market participants, policymakers, and financial analysts, assisting them in making informed decisions and developing strategies to stabilize the bond market in response to macroeconomic and financial changes.

The quantitative research method involves changing independent variables to see how they affect bond market performance. Quantitative research systematically investigates and quantifies macroeconomic and financial data and phenomena. It collects numerical data, analyzes it statistically, and the main goal is to establish relationships or causal connections amongst the variables in the model. This approach ensures a strong investigation, which makes the research findings more valid and reliable (Chetty, 2020). A model equation that has been created is shown below.

Model Equation:

$$\mathbf{LNBI = \alpha + \beta_1 LNSI + \beta_2 LNIR + \beta_3 LNIN + \beta_4 LNGP + \varepsilon_t} \quad (1)$$

Where:
DV = Logarithm Bond Indices (**LNBI**)
Alpha = $\boldsymbol{\alpha}$
Beta Coefficient for IV_1 – IV_4 = $\boldsymbol{\beta_{1\text{-}4}}$
IV_1 = Logarithm Stock Indices (**LNSI**)
IV_2 = Logarithm Interest Rate (**LNIR**)
IV_3 = Logarithm Inflation Rate (**LNIN**)
IV_4 = Logarithm Gold Price (**LNGP**)
Error term at time t = ε_t

All variables are expressed in logarithmic form. The dependent variable in **Equation 1** is ***LNBI***, representing *Bond Market Performance*. The independent variables include: *Stock Market Performance*, proxied by the log of stock indices, ***LNSI*** (Asgharian et al., 2015); *Interest Rate*, proxied by the log of the lending interest rate, ***LNIR*** (Dwi & Nelmida, 2019); *Inflation*, proxied by the log of the consumer price index, ***LNIF*** (Sia, 2023); and gold

price, proxied by the log of the US gold price, ***LNGP*** (Abdullah & Abu Bakar, 2015). The theoretical framework is based on the cited literature.

Figure 1: Theoretical Framework for a Bond Market Performance

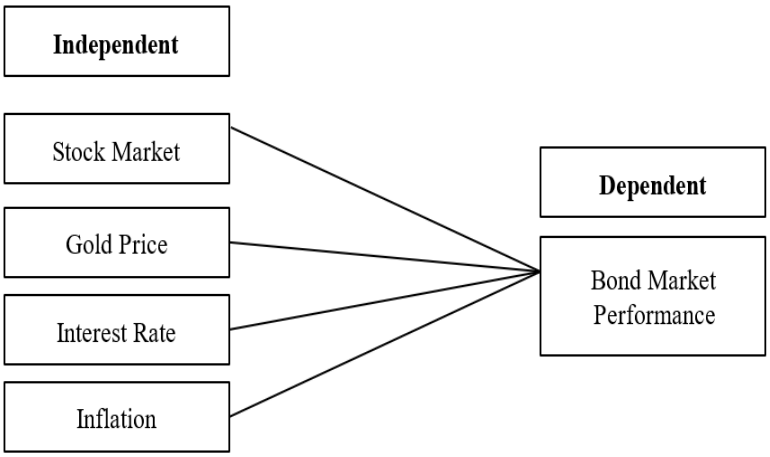


Figure 1 illustrates a theoretical framework linking potential determinants of selected macroeconomic and financial factors to bond market performance. The study's scope encompasses six Asia countries: India, Indonesia, China, Vietnam, South Korea, and Turkey. This research investigates how the dependent variable responds to external factors. Furthermore, a statistical method will be employed to analyse numerical and publishable data collected. Initially, outliers will be removed to reveal the underlying signal by conducting the research using Time Series Regression and EViews software. Monthly data from 2014 to 2024, representing the six Asia countries, will be analysed accordingly.

Before proceeding with time-series modelling, a diagnostic check should be performed to detect outliers, which helps in eliminating ambiguities in research processes. Three general checks need to be performed for time-series data when using a regression or ordinary least squares method. The first check is the *Variance Inflation Factor* procedure, which measures multicollinearity. Multicollinearity occurs in OLS regression when independent variables are linearly related, potentially leading to perfect multicollinearity. This affects the reliability of regression coefficients due to inflated standard errors. The VIF quantifies the inflation in regression coefficient variance due to collinearity. A VIF or tolerance equal to 1 suggests no multicollinearity in the model. Tolerances less than 0.1 or VIFs higher than 5 indicate severe multicollinearity, which requires remedial action and raises concerns (Akinwande et al., 2015).

The second test is for *Serial Correlation*, which happens when regression residuals are correlated, meaning errors aren't independent. This is common in time-series data where prices tend to move together. The autocorrelation coefficient measures the relationship between data points. The Durbin-Watson test is used to check for regression residual autocorrelation. Autocorrelation occurs when a timeline is similar across periods, potentially overestimating the standard error and making predictors seem important. The DW test statistic is compared to critical values to test for positive autocorrelation at significance level α. The test is inconclusive if 4-DW falls between the critical levels (Lee, 2025).

The final test is the *Normality Test on Residuals*. In regression analysis, it's assumed that the residuals have a normal distribution. If the test produces a *p*-value below the significance level, the null hypothesis is rejected, indicating non-normality in the residuals. However, a p-value above the significance threshold suggests the residuals are normally distributed because the null hypothesis can't be rejected. A breach of the normalcy assumption only becomes problematic when sample sizes are small. The assumption is less significant for large sample sizes because the F and t-tests, used to test hypotheses and create confidence intervals, are resistant to small departures from normality due to the central limit theorem (Frost, 2024).

4. Results

Initially, a diagnostic check was conducted for each country. Given that the Centered VIF values for all independent variables in Indonesia, China, and Turkey were below 5, all four independent variables—stock market performance, gold price, interest rate, and inflation—were retained in the time-series model. However, for India, Vietnam and South Korea, only three independent variables were maintained, with inflation excluded due to violation of the specified rule of thumb. The Durbin-Watson statistic for all countries was lower than the lower Durbin value at the first order, suggesting a significant serial correlation in the error term. Nevertheless, there was sufficient evidence to reject the null hypothesis (H0) at the second order, indicating that the error terms did not exhibit severe serial correlation at this level. Overall, the residuals of all six countries under investigation were normally distributed.

Regression analysis for India: Table 1 displays a summary of the regression results of the study.

Table 1: Summary of the regression results for India

India	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	-6.812056***	-0.916583	7.247018***	-
Beta Coefficient	Negative	-	Positive	-
Adj. R^2	58.9% (Moderate model)			

Based on the t-test results, we have sufficient evidence to reject the first and third null hypotheses, as both *p*-values are significant at the 1% level. In the case of India, the conclusion that there is a negative relationship between stock market performance and bond market performance aligns with theoretical findings by Sharma et al. (2020). In addition, the observed positive relationship between lending interest rates and bond market performance contradicts the established theory but aligns with the study by Santosa (2021). Furthermore, the adjusted R-squared value of 0.589 suggests that 58.9% of the variation in India's bond market performance is significantly influenced by fluctuations in stock market performance and interest rates.

Regression analysis for Indonesia: Table 2 displays a summary of the regression results of the study.

Table 2: Summary of the regression results for Indonesia

Indonesia	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	0.029178	-7.111480***	6.045078***	-2.402776**
Beta Coefficient	-	Negative	Positive	Negative
Adj. R^2	67.4% (Moderate model)			

The second, third, and fourth null hypotheses are rejected based on the *t*-test results, as the *p*-values are significant at the 1%, 1%, and 5% levels, respectively. The conclusion that there are negative relationships between gold price and inflation with bond market performance in Indonesia aligns with theoretical findings and is supported by studies from Bai and Ho (2022), Kang and Pflueger (2015), Dwi and Nelmida (2019), and Berry (2021). Furthermore, the adjusted R-squared value of 0.674 indicates that 67.4% of the variance in Indonesia's bond market performance is significantly explained by fluctuations in gold price, interest rates, and inflation.

Regression analysis for China: Table 3 displays a summary of the regression results of the study.

Table 3: Summary of the regression results for China

China	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	-1.709528*	-2.263051**	0.482669	-1.743020*
Beta Coefficient	Negative	Negative	-	Negative
Adj. R^2	53.4% (Moderate model)			

Based on the *t*-test results, there is enough evidence to reject the first, second, and fourth null hypotheses, given the *p*-values are significant at the 10%, 5%, and 10% levels, respectively. In the case of China, the conclusion that "there is a negative relationship between stock market performance, gold price, inflation, and bond market performance" aligns with theoretical findings. This is consistent with the findings by Sharma et al. (2020) on stock market performance, Bai and Ho (2022) on the gold price, and Dwi and Nelmida (2019) on inflation. Furthermore, the adjusted R-squared value of 0.534 suggests that 53.4% of the variation in China's bond market performance is highly influenced by fluctuations in stock market performance, gold price, and inflation.

Regression analysis for Vietnam: Table 4 displays a summary of the regression results of the study.

Table 4: Summary of the regression results for Vietnam

Vietnam	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	0.733505	-	-0.933200	-0.980328***
Beta Coefficient	-	-	-	Negative
Adj. R^2	72.4% (Strong model)			

According to the *t*-test results, there is enough evidence to reject the fourth null hypothesis, given that the *p*-value is significant at the 1% level. In the case of Vietnam, the conclusion that there is a negative correlation between inflation and bond market performance is consistent with both theoretical findings and the study conducted by Kang and Pflueger (2015). Additionally, the adjusted R-squared value of 0.724 indicates that 72.4% of the fluctuation in Vietnam's bond market performance can be attributed to changes in *inflation*.

Regression analysis for South Korea: Table 5 displays a summary of the regression results of the study.

Table 5: Summary of the regression results for South Korea

South Korea	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	-6.218898***	4.953680***	20.34752***	-
Beta Coefficient	Negative	Positive	Positive	-
Adj. R^2	80.6% (Strong model)			

Based on the *t*-test results, there is sufficient evidence to reject the first, second, and third null hypotheses, as their *p*-values are all significant at the 1% level. Specifically, in the case of South Korea, the finding of a negative relationship between stock market performance (Sharma et al., 2020) and bond market performance aligns with theoretical expectations. Furthermore, the adjusted R-squared value of 0.806 indicates that 80.6% of the variation in South Korea's bond market performance is significantly influenced by fluctuations in stock market performance, gold prices, and interest rates.

Regression analysis for Turkey: Table 6 displays a summary of the regression results of the study.

Table 6: Summary of the regression results for Turkey

Turkey	SI (X_1)	GP (X_2)	IR (X_3)	IF (X_4)
t-statistic (p-value)	1.805353*	1.098545	8.084480***	2.295856**
Beta Coefficient	Positive	-	Positive	Positive
Adj. R^2	84.4% (Strong model)			

Based on a *t*-test, there is enough evidence to reject the first, third, and fourth null hypotheses (H0), as the *p*-values are significant at the 10%, 1%, and 5% levels, respectively. In Turkey's case, the conclusion that there are positive relationships between stock market performance, interest rate, and inflation with stock market performance contradicts established theory. While the adjusted R-squared value of 0.844 implies that 84.4% of the variation in Turkey's bond market performance is significantly influenced by the movement of stock market performance, interest rate, and inflation.

Discussion

Based on findings for India, Indonesia, South Korea and Turkey which have a positive relationship with lending interest rates truly contradict the theory. The fact that the direction is supposed to be inversely related to interest rates and bond market performance, and the indicators could not be moved together. In addition, lower borrowing rates can attract foreign investment into the bond market, which can help to draw increased demand resulting in higher returns. It is relevant in emerging markets, where higher returns attract international investors. Furthermore, when lending rates are low, borrowing becomes cheaper and thus investment in bond markets increases. Consequently, reducing interest rates will increase bond yields while increasing demand for bonds as investors start to hold on to safer assets. This relationship is closely monitored by financial analysts as well as policymakers to ensure the best investment strategies and economic stability in the market. Moreover, only Turkey shows that there is a positive relationship between inflation and bond market performance, as indicated by the positive coefficient. A positive relationship between inflation and bond market performance suggests that the two move in the same direction. For instance, in Turkey, when inflation rises, the bond market tends to rise. Conversely, in Indonesia, China, and Vietnam, the negative relationship implies that inflation and bond market performance do not move together because when inflation rises, the bond market tends to fall.

In Turkey, a positive correlation exists between the stock market and bond market performance, indicating that both markets generally move in the same direction. Conversely, India, China, and South Korea exhibit negative correlations, where a rising stock market often corresponds to a declining bond market. This insight is valuable for policymakers, investors, and financial analysts, enabling them to make well-informed decisions. For instance, governments might adjust interest rates to foster growth in both markets, while financial analysts could advise investors to hold bonds when the stock market is strong, given their inverse relationship in certain countries. Governments should consider raising interest rates to maintain the attractiveness of the bond market during stock market booms, whereas financial professionals might recommend that investors in India, China, and South Korea hold onto their bonds to safeguard profits amidst a thriving stock market. This approach encourages portfolio diversification for enhanced profitability and risk reduction. Recognizing these relationships empowers governments, financial analysts, and investors to leverage both stock and bond markets effectively within their respective economies.

Finally, only South Korea exhibits a positive relationship with bond market performance, indicated by its positive coefficient sign. In contrast, Indonesia and China show a negative relationship due to their negative coefficient signs. The positive relationship between the gold price and bond market performance suggests that both markets generally move in tandem. For example, in South Korea, as the gold price rises, the bond market tends to follow suit. Conversely, in Indonesia and China, the negative relationship between gold price and bond market performance implies that these markets move in opposite directions; for instance, when the gold price decreases, the bond market tends to increase. Consequently, governments may implement diverse strategies

to bolster bond market expansion, depending on their specific economic situations and strategic objectives (Moon et al., 2015; Neemey & Sahay, 2019).

This study has accepted both inflation and the stock market performance as the crucial indicators amongst other economic and shocks since those variables have the strongest and significant impacts on the performance of a bond market in each of the countries. The strong correlation between both variables and bond market performance in those four Asia countries is largely due to a stability of economic growth that is paramount in the accused strategy; both are significant parameters that are associated with it. The findings are consistent with a study by Kumamoto and Zhuo (2020). Therefore, if any given country's economy is good, that is why the bond price as an intermediate will be done and offered in the market at a lower cost. Hence, it can reduce inflation for a country, thanks to its capacity to regulate prices in the bond market. Additionally, APT theory explains the negative relationship between bond market prices, stock market performance, and inflation rates through the lens of systematic risks. Both variables are critical economic factors that immediately influence bond performance, particularly during inflationary periods. Bonds with attractive, higher yields tend to maintain their prices even as interest rates rise due to market dynamics. A bond's duration is a key determinant of its sensitivity to interest rates, dictating the extent to which its price fluctuates with rate changes. Symmetrical shifts in the yield curve also cause bond prices to change, creating arbitrage opportunities that investors can capitalize on (McKay & Peters, 2019).

5. Managerial Implications and Recommendations

Most people know that interest rates increase living costs and reduce their money. Interest rates affect all parts of the economy and significantly impact investment profits, especially for investors. Therefore, this research helps investors create better investment strategies. Basically, when interest rates rise, the price of any bond will increase, as bond investors demand higher returns to compensate for the increased opportunity cost. Our findings indicate that interest rates in India, Indonesia, South Korea, and Turkey are *positively* related, while there is no impact on China and Vietnam. Lending interest rates significantly correlate with bond market performance across these four countries. Therefore, domestic investors in these four countries will see a "hold strategy" for bonds when market interest rates rise.

Market participants could examine how bond prices relate to the performance of other major assets like stocks, gold, and other commodities. Knowing these correlations is key to understanding how bonds behave in different markets. Bond's correlation with other assets can change, showing a negative correlation with riskier assets during economic uncertainty and a weaker or positive correlation in stable times. By measuring these correlations, market participants can understand the bond's role as a portfolio diversifier and hedge against market risks, informing investment strategies and risk management. The sudden rise in inflation can trigger chaos and panic amongst the market participants. Such global market events may cause investors to move funds into the bond market and other safer investments. Commodity price changes respond to current market conditions and signal fundamental economic problems, including recessions, currency devaluation, or financial crises.

The study's findings are relevant to Central Banks as *policymakers* because they reveal the relationships among economic shocks. Central banks can proactively adjust monetary policy by reducing interest rates or easing monetary policy, which in turn will boost demand in bond markets. In addition, fluctuations in share prices can also affect market confidence and the stability of a country's currency, hence increasing demand for bond investments. A significant decrease in stock market performance is a signal for investors to purchase more bonds because of the negative relationship between the two financial assets. Evaluating these price changes is especially important for economic policymakers, as they may indicate the need for intervention. For example, a central bank may raise interest rates to combat high inflation or lower them to address slow economic growth.

Understanding the interaction between the bond market with inflation and lending interest rates helps policymakers prepare for and counter economic shocks, aligning with strategic policies to enhance economic growth. This connection alerts the key indicator of global economic trends, influencing monetary policy decisions nationally and internationally.

Understanding the intricate relationship between financial indicators, such as stock and bond market performance, empowers financial analysts to refine their client recommendations, tailoring them to specific financial circumstances and risk tolerance. For instance, *financial analysts* might advocate strategies that capitalize on rising stock prices by diversifying the portfolio and securing capital gains during market uptrends to maximize potential returns. This correlation enables analysts to offer practical advice, guiding bondholders to monitor market trends vigilantly and make well-informed asset allocation decisions. Ultimately, the aim is to maximize potential returns while managing risk effectively.

These findings also serve as a valuable reference for *future researchers*. Understanding the relationships evaluated can simplify the analysis of theoretical implications and literature reviews. Future studies can apply the same model to investigate the relationship between economic and financial variables in other regions, such as MENA, Europe, and the Middle East, to highlight differences among countries. Moreover, the connection between bond market performance and economic indicators, as well as the gold price in Asia countries, is notable. This research can aid upcoming researchers in comprehending the relationship between the selected indicators, fostering their analytical skills and serving as a valuable reference for subsequent studies. Understanding relationships can inform investment strategies, especially during economic expansions when bonds can be considered for portfolio diversification.

As a summary, analyzing how these correlations change with macroeconomic conditions, monetary policies, and geopolitical events will give insights into market participants, central banks and policymakers, financial analysts, and researchers. Future studies may explore the impact of monetary policy changes on bond price movements, helping policymakers fine-tune monetary policies and achieve economic stability.

Conclusion

In conclusion, a study reveals that the relationship between inflation, stock market performance, and bond market performance is important, reflecting economic stability in Asia countries. Bond market performance is generally consistent with broader economic trends. Such global market events may lead investors to shift funds to bonds and other safer financial assets. Bond market performance reflects current market conditions and signals potential economic issues like recessions, currency devaluation, or financial crises.

Assessing these price fluctuations is particularly crucial for economic policymakers, as they may signal the necessity for intervention. For example, a central bank might raise interest rates to combat high inflation or lower them to stimulate a sluggish economy. Understanding the interplay between lending interest rates, inflation, and bond market performance enables policymakers to prepare for and counteract economic shocks, aligning with strategic policies aimed at enhancing economic growth. This interconnectedness enhances the relevance of these factors as indicators of global economic trends, influencing fiscal and monetary policy decisions at both national and international levels.

Furthermore, lending interest rates and bond market performance serve as multifaceted indicators of inflation and economic stability. It is especially important to monitor this bond market performance for those responsible for creating economic policies because they may indicate that interference is necessary. For example, a central bank will increase the interest rate if there is high inflation but will decrease interest rates if the economy grows slowly. Understanding how bond market performance and lending interest rate interact helps policymakers prepare for and counter economic shocks, which aligns with strategic policies meant to improve economic growth. This connection makes the lending interest rate an indicator of economic trends around the world, which affects fiscal and monetary policy decisions at the national and international levels.

The strong connection observed between stock market performance, and gold price can serve as a forecast for inflation. This suggests that increasing lending interest rates during inflationary pressures may lead to an increase in bond market performance as investors anticipate potential economic instability. Moreover, this study reveals that stock market performance, gold price, and bond market performance serve as indicators of both inflation and economic stability.

Overall, this research indicates that the interplay between market interest rates, inflation, stock market performance, and bond market performance is vital, mirroring global economic stability within Asia countries. Significant stock market volatility often aligns with broader economic factors. For instance, abrupt declines in

share prices can instigate market disruptions, potentially prompting investors to shift resources into safer assets like bonds. Fluctuations in commodity prices not only reflect current market dynamics but also signal underlying economic challenges, such as impending recessions, currency devaluations, or financial crises. Given these intricate relationships, investors must maintain vigilance over market dynamics and macroeconomic indicators to inform strategic asset allocation and risk management decisions.

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Urban Poverty and Income Inequality: A Demographic Cross-Section Analysis of Malaysian States and Districts

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Abstract: Poverty has long been a topic of conversation in all parts of the world. It is a big worry that one-fifth of the world's population is experiencing multidimensional poverty. According to the World Bank, poverty reduction is a complicated issue that must be addressed prudently and continuously. On that topic, Malaysia has also made great progress since its liberation from British colonialism decades ago. With a suitable strategy in place, the National Economic Planning (NEP) that was implemented from 1971 to 1990 resulted in significant economic growth, which translated into higher household incomes for citizens. Even though the NEP has made significant progress in lowering the poverty line, poverty has become more multidimensional, dividing the problem into a few sectors, such as rural poverty and urban poverty. Many states have removed their forests to establish rubber, oil palm, paddy, coconut, and vegetable crops as their agricultural sectors have expanded. FELDA, RISDA, and FELCRA are just a few of the government entities that are launching initiatives to provide land and employment to citizens. Solving poverty concerns is a difficult endeavor due to the dynamic complexity of demographics, ethnicity, education, and data reliability. Malaysia's government is working tirelessly to eliminate poverty, reduce economic inequality, and develop legislation to address the concerns, yet it is still not sufficient to eradicate poverty as a whole. This article will look at urban poverty among middle-income households (M40) and low-income households (B40) and how they cope with rising prices for necessities such as housing, food, services, health care, and education. The researcher aims to determine why M40 and B40 are the most affected and fall into urban poverty.

Keywords: *Poverty, household income, policy, income inequality, rural-urban migration, urban poverty.*

1. Introduction

As a small country with a population of 33 million, Malaysia has made significant progress toward becoming a high-income nation due to its strong economic growth. The shift from a low-income, agriculture-based economy to a manufacturing-driven one has reshaped the economic landscape, resulting in an average annual GDP growth of 8% over the past 30 years. Efforts to reduce income inequality have improved the quality of life for many citizens. The industrial revolution has boosted employment and job opportunities, attracting rural residents to major cities such as Kuala Lumpur, Shah Alam, Petaling Jaya, Klang, Penang, Melaka, and Johor Bahru. The government has implemented various initiatives to redistribute income, but these measures have shown limited success in reducing poverty and inequality. Despite some achievements, poverty and income inequality remain persistent socio-economic challenges.

Though poverty and income inequality are normally associated with rural populations, the new trend has now changed and widely spread to urban populations, and it has become a worrying socio-economic problem that the caused or urbanization has led to urban poverty. Rapid urbanization has led to urban poverty, creating new difficulties for rural migrants seeking better lives in industrialized cities. Although cities offer more jobs, many still struggle with high living costs. Urban poverty, a socioeconomic issue, prohibited most urban migrants from transferring to the previously stated industrialized cities in pursuit of better living conditions. Even though there are more jobs and opportunities in big cities, people still struggle to make ends meet. As in Table 1, the M40 and B40 income groups, which represent middle-income and low-income households, are the most affected. Urban living expenses are significantly higher, and inflation is unavoidable due to elevated price levels. Previous research on income disparity and poverty has focused on household spending, rural-urban income distribution strata, and ethnicity. In 2022, Malaysia's Poverty Line Income (PLI) was RM 2,560 (Table 1).

Table 1: Income Share, Median, Mean Household Income, and Income Threshold by Household Decile Group, Malaysia, 2022

Decile Group		Income Share (%)	Median Household Income (RM)	Mean Household Income (RM)	Income Threshold (RM)
T20	T2	30.3	20,776	25,719	15,870 and above
	T1	16.0	13,475	13,585	11,820 - 15,869
M40	M4	12.5	10,552	10,577	9,450 - 11,819
	M3	10.1	8,523	8,536	7,690 - 9,449
	M2	8.2	6,979	6,989	6,340 - 7,689
	M1	6.8	5,770	5,782	5,250 - 6,339
B40	B4	5.6	4,764	4,771	4,310 - 5,249
	B3	4.6	3,875	3,874	3,440 - 4,309
	B2	3.6	3,034	3,018	2,560 - 3,439
	B1	2.3	2,012	1,941	Less than 2,560

Previous studies on poverty and inequality have focused on household spending, rural-urban income distribution, and ethnicity. These studies coincided with major national policies: the New Economic Policy (NEP) 1971–1990, the New Development Policy (NDP) 1991–2000, and the New Vision Policy (NVP) 2000–2020. Despite consistent GDP growth over the past 50 years, the Gini coefficient has only slightly improved from 0.513 in 1970 to 0.404 in 2022. Disposable income inequality in 2022 stands at 0.393, as depicted in Table 2.

Table 2: Malaysia's Income Inequality 2016-2022, Gini coefficient by state and type of income, Malaysia, 2016, 2019 and 2022

State	Gross Income			Disposable Income		
	2016	2019	2022	2016	2019	2022
Malaysia	**0.399**	**0.407**	**0.404**	**0.391**	**0.393**	**0.393**
Johor	0.354	0.366	0.366	0.356	0.365	0.364
Kedah	0.393	0.354	0.359	0.400	0.351	0.361
Kelantan	0.389	0.378	0.385	0.396	0.375	0.393
Melaka	0.337	0.383	0.370	0.340	0.379	0.368
Negeri Sembilan	0.380	0.391	0.369	0.374	0.380	0.356
Pahang	0.324	0.330	0.308	0.318	0.321	0.305
Pulau Pinang	0.356	0.359	0.371	0.351	0.354	0.357
Perak	0.362	0.377	0.368	0.365	0.362	0.368
Perlis	0.327	0.334	0.336	0.331	0.331	0.336
Selangor	0.372	0.393	0.361	0.361	0.378	0.352
Terengganu	0.328	0.335	0.326	0.321	0.327	0.322
Sabah	0.402	0.397	0.395	0.405	0.394	0.387
Sarawak	0.386	0.387	0.382	0.384	0.377	0.379
W.P. Kuala Lumpur	0.378	0.350	0.380	0.362	0.342	0.369
W.P. Labuan	0.398	0.333	0.300	0.387	0.323	0.300
W.P. Putrajaya	0.369	0.361	0.368	0.347	0.345	0.346

Source: Department of Statistics Malaysia

The widening gap between the rich and the poor reflects growing inequality. Factors such as income, wealth, gender, education, healthcare, and employment contribute to this divide (Ogbeidi & Agu, 2015). Kuznets (1955) argued that migration from rural to urban industrial areas initially increases inequality, which later declines as economies mature. This study examines income inequality and urban poverty across all 14 Malaysian states and 160 districts. Industrialized states like Selangor, Wilayah Persekutuan, Pulau Pinang, Kedah, and Johor

show significant income gaps, contributing to rising urban poverty. The current economic climate has worsened this issue, especially in highly urbanized areas. The study aims to analyze macroeconomic indicators poverty, household income, and inflation, to assess the impact of income disparity and urban poverty in urbanized districts. Urban poverty has become a major concern in several states due to rapid urbanization.

Thus, the research objectives are as follows;

- To investigate urban poverty that results from income inequality in the urban population.
- To analyze the M40 and B40 household income categories' sustainability in an urban area with a high cost of living.

2. Literature Review

Income inequality

In Malaysia, extensive research has examined income disparity and poverty across different ethnic groups (Khalid & Yang, 2020; Ragayah, 2008), rural-urban inequality (Shari, 2000; Abdul-Hakim, 2001), gender inequality (Lee & Choong, 2019), and state-level inequality (Tey et al., 2019). However, research specifically linking macroeconomic conditions to income inequality remains limited, with mixed results (Deyshappriya, 2017). Many studies focus only on a few macroeconomic indicators, such as exchange rates and inflation (Bulíř & Gulde, 1995) or government debt (You & Dutt, 1996), offering inconsistent conclusions

By the same token, some current literature has concluded with mixed findings. Thus, there is no definite agreement on the relationship between macro-exogenous variables and inequality. Kuznets (1955) emphasized the parabolic relationship between income and inequality by presenting the well-known theory called the Kuznets Curve, which is discussed by Bruno et al. (1996), Fishlow (1995) and Deininger and Squire (1997), and concluded that there is no substantial connection between income and inequality. In addition, (Cole and Towe, 1996; Razin, Sadka & Yuen, 1996) majority of studies focus on small group countries and individual countries, such as developing countries, by conducting cross-sectional and conventional methods. There are many disputes vis-à-vis discussing income inequality and its impact on economic growth. The majority of contradicting effects of income inequality on macroeconomic variables continue to show the contradicting aspects of the relationship between the preferred macroeconomic variables and income inequality (Martin, 2023).

Islam et al. (2017) showed that economic growth has reduced poverty and income disparity, though growth alone does not fully explain poverty differences. In Malaysia, manufacturing-led growth has significantly reduced poverty. Wu & Rao (2016) observed an inverted U-shaped relationship between income inequality and urbanization at the provincial level. Their study also found that rural-urban inequality is influenced by inter-provincial migration and wage gaps, raising questions about how each factor contributes. Kuznets (1955) proposed a parabolic relationship between income and inequality, known as the Kuznets Curve. However, subsequent studies by Bruno et al. (1996), Fishlow (1995), and Deininger & Squire (1997) found no strong evidence supporting this relationship. Other research mainly focuses on individual or small groups of developing countries using cross-sectional and traditional methods (Cole & Towe, 1996; Razin et al., 1996).

According to Wang, Pei, Wang and Qin (2024), income inequality is complex and unpredictable, with research often yielding inconclusive results. Political and social dynamics further complicate analysis, and predictions can be disrupted by economic changes, technological shifts, or sudden changes in spending patterns. Future research should adopt cautious and diversified approaches. Despite these efforts, few studies have examined income inequality using demographic or multidimensional macroeconomic variables. This article seeks to explore other explanatory factors. Tey et al. (2019) found that inequality among Malaysian states continues to grow, despite efforts to distribute wealth evenly at both state and district levels. They concluded that disparities in income per capita are closely linked to ethnic and rural-urban population distributions, migration patterns, employment structures, and education levels. These findings underline the gaps in current literature and highlight the need for multidimensional approaches and reassessment in future studies.

Poverty

Nair and Sagaran (2015) argued that urban poverty involves multiple deprivations, which can trigger a domino effect. In developing countries, rising urban poverty is increasingly tied to rapid urbanization and rural-to-

urban migration. Jamil and Mat (2015) emphasized that poverty can be inherited across generations, trapping individuals in a cycle of deprivation. This cycle brings numerous issues, including mental health problems, poor living conditions, inadequate education, and food insecurity, which lead to depression and anxiety (Rudi et al., 2023). Malaysia's multi-ethnic context demands an inclusive approach to defining and addressing poverty. Leng et al. (2018) highlighted the need for multidimensional strategies rather than income-focused definitions to effectively tackle urban poverty. Demographic differences among urban-rural and multiethnic groups must also be considered, particularly when designing financial support tailored to household socioeconomic conditions. Absolute poverty and relative poverty are no longer perfect measurements for poverty level measurement. In 2010, the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Program (UNDP) introduced the Multidimensional Poverty Index (MPI). This new metric incorporates indicators such as education, health, and living standards. According to Alkire & Foster (2011), urban poverty involves overlapping deprivations that worsen with rapid urbanization. The number of urban poverties in developing countries is very alarming and poses unpleasant, perilous problems due to the rapid urbanization of urban-rural migration. Implementing a human rights approach to poverty reduction has gained a deep understanding of the multi-dimensional nature. Furthermore, Alkire et al. (2015) stated that MPI has broadened poverty measurement frameworks. Malaysia adopted MPI in 2015 to complement the PLI, marking a shift toward more inclusive poverty assessments under the 11th Malaysia Plan. The MPI enables more targeted interventions by identifying specific areas of deprivation (Rasool et al., 2011).
H1: Urbanization creates income inequality that leads to urban poverty

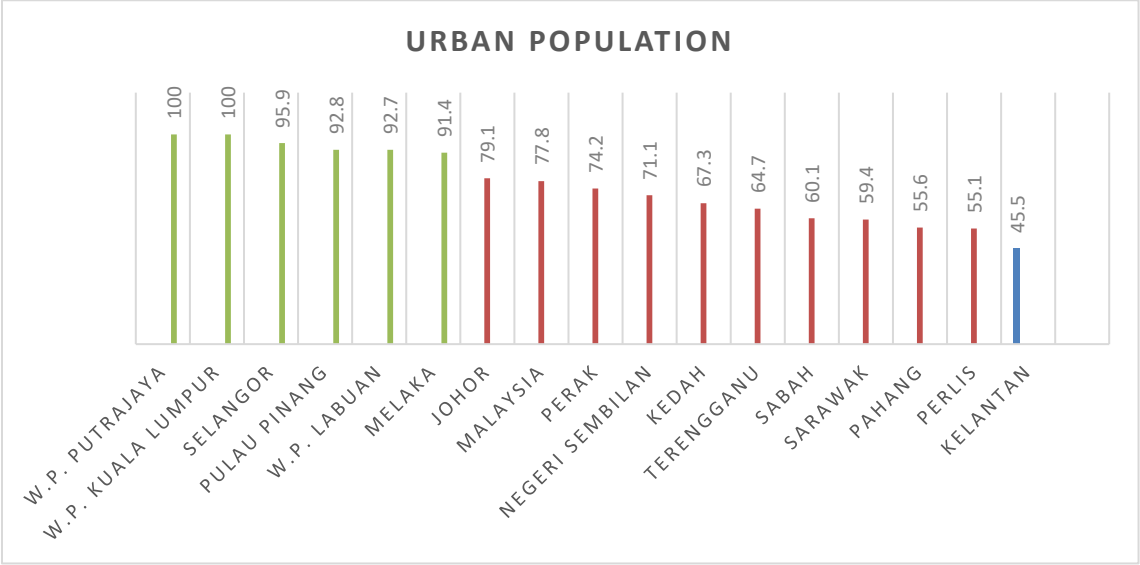
Household Income
Ahad et al. (2023) found that low household income affects the well-being of lower-level government employees. Though they receive regular salaries, their income is often insufficient to meet the higher cost of living in cities. Living in a metropolis requires a larger monthly financial commitment than living in rural areas. Most B40 households have little to no savings due to low disposable income. Financial literacy, or financial efficacy, is critical. Those with higher financial efficacy are more likely to use formal financial tools like savings accounts or fixed deposits. In contrast, many B40 households avoid these tools due to income constraints. Some who do save take higher risks, expecting greater returns. Ibrahim et al. (2012) found that many government employees feel secure with their retirement choices, but rising costs, inadequate pensions, and longer life expectancy could make retirement more challenging. Murad et al. (2014) reported higher household incomes in suburban Kuala Lumpur, but many low-income households, particularly Malays and Indians, still reside in these areas. Tan et al. (2018) emphasized that people with low incomes in rural areas remain highly vulnerable, and more must be done to reduce income inequality.
H2: The high cost of living in urban areas significantly reduces the purchasing power of households in the M40 and B40 income categories, limiting their ability to afford essential goods and services.

3. Research Methodology

This report uses data from the Household Income and Basic Amenities Survey 2022, Income Inequality in Malaysia 2022, Poverty in Malaysia 2022, and the Population and Housing Census 2020. The Department of Statistics Malaysia (DOSM) conducted the surveys across all states to assess household distribution, poverty levels, and income disparity, particularly in the post-COVID-19 period. The survey employed probability sampling and represented 7.9 million Malaysian households in 2022. The sample was selected based on household data from the 2020 census.

According to the Household Income Survey 2022, as presented in Figure 1, a total of 77.8% of Malaysian households reside in urban areas. At the state level, the Federal Territories (Kuala Lumpur, Labuan, and Putrajaya), Selangor, Pulau Pinang, Melaka, and Johor recorded urban household percentages ranging from 79.1% to 100%, exceeding the national average. In contrast, Sarawak, Pahang, Perlis, and Kelantan recorded less than 60% urban households.

Figure 1: Percentage of Households in Urban Areas by State, 2022



Note: Urbanization rate refers to the number of households living in urban areas
Source: HIS & BA 2022 Department of Statistics Malaysia

Household income is assessed by both median and mean values. In 2022, the median monthly household income was RM8,479, showing an annual growth of 2.5%. The mean income also rose, growing 2.4%. The survey found that 62.8% of total household income came from paid employment, followed by self-employment (15.2%), property and investment income (12.3%), and current transfers (9.7%). A key objective of the survey is to evaluate the well-being of Malaysians and identify socio-economic differences between urban and rural households. It also provides a database for determining the Poverty Line Income (PLI). In 2022, the PLI was RM2,589, with the absolute poverty rate at 6.22%.

Income inequality is commonly assessed using tools such as the Lorenz Curve, Gini Coefficient, Theil Index, and Atkinson Index. Studies by Sagala, Akita, and Yusuf (2014), Sarabia, Jordá, and Remuzgo (2016), and Wu & Rao (2016) have applied these techniques to examine the relationship between urbanization and income disparity. This article focuses on analyzing the Multidimensional Poverty Index (MPI) and income inequality (measured by the Gini Coefficient), using selected macroeconomic variables. The goal is to explore their impact on the socioeconomic well-being of the population, especially in the context of increasing urbanization. This paper presents a quantitative model assessing the impact of urbanization on income inequality and uses Multiple Linear Regression (MLR) models. There is one dependent variable and four independent variables in this model, as follows:

Dependent variable: Gini Coefficient (Y)
Independent variable: Poverty (X_1), Household Income (X_2), Inflation (X_3), Urban (X_4),
The multiple linear equation of this model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \mu$$

Where;
Y = Gini Coefficient
$X1$ = Poverty
$X2$ = Household Income
$X3$ = Inflation
$X4$ = Urban
μ = Error
$\beta 0$ = Intercept point
$\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$ = Partial coefficients to $X1$, $X2$, $X3$ and $X4$

This study analyzes cross-sectional data from 160 districts across 14 states in Peninsular Malaysia, Sabah, and Sarawak for the year 2022. The data is secondary and sourced from the Household Income and Basic Amenities Survey 2022, Income Inequality in Malaysia 2022, Poverty in Malaysia 2022, and the Population and Housing Census 2020. The analysis uses the Gini coefficient as a proxy for income inequality (dependent variable). The independent variables are poverty, household income, and inflation. The main objective is to examine how these macroeconomic factors influence income disparity, especially in relation to urbanization. To explore these relationships, the study employs Descriptive Statistics, Ordinary Least Squares (OLS), Robust Least Squares, Multicollinearity tests, Histograms, and Heteroskedasticity analysis. These methods help determine regression coefficients and standard errors, which indicate the significance of the relationships between variables. The Gini coefficient is widely used in literature as a measure of income inequality (Ha et al., 2019; Deyshappriya, 2017). It ranges from 0 (perfect equality) to 1 (perfect inequality), where lower values represent a more equitable income distribution.

4. Results

Table 3: Descriptive Statistics

	GINI	HOUSEHOLD_INCOME	POVERTY	INFLATION	URBAN
Mean	0.343717	5973.338	12.10687	2.215625	129588.0
Median	0.346585	5324.500	9.050000	2.100000	32435.50
Maximum	0.448690	13673.00	52.70000	2.900000	1982112.
Minimum	0.225170	3153.000	0.000000	1.800000	0.000000
Std. Dev.	0.039462	2115.765	10.03383	0.296212	253582.3
Skewness	-0.331489	1.787593	1.637667	0.811369	3.751461
Kurtosis	3.232588	6.587862	6.310830	2.860300	21.81645
Jarque-Bera	3.290907	171.0314	144.5961	17.68530	2735.684
Probability	0.192925	0.000000	0.000000	0.000144	0.000000
Sum	54.99475	955734.0	1937.100	354.5000	20734087
Sum Sq. Dev.	0.247602	7.12E+08	16007.76	13.95094	1.02E+13
Observations	160	160	160	160	160

Table 3 presents the descriptive statistics and normality diagnostics for the key variables analyzed in this study. The GINI coefficient, which reflects income inequality, has a mean of 0.3437 and a standard deviation of 0.0395. The skewness value of -0.3315 indicates a slight negative skew, while the kurtosis of 3.2326 suggests a distribution close to normal. The Jarque-Bera test yields a probability of 0.1929, indicating that the null hypothesis of normality cannot be rejected. Thus, the GINI distribution is approximately normal.

The household income variable has a mean of 5973.338 and a standard deviation of 2115.765. It exhibits strong positive skewness (1.7876) and high kurtosis (6.5879), indicating a distribution with a long right tail and pronounced peakedness. The Jarque-Bera test confirms non-normality with a probability of 0.0000. Similarly, the poverty rate shows a mean of 12.1069 and a standard deviation of 10.0338, with positive skewness (1.6377) and elevated kurtosis (6.3108). These values suggest a non-normal distribution characterized by heavy tails. The Jarque-Bera test supports this conclusion, yielding a probability of 0.0000. The inflation variable has a mean of 2.2156 and a standard deviation of 0.2962. It displays slight positive skewness (0.8114) and a kurtosis value of 2.8603, indicating a distribution that is moderately close to normal. However, the Jarque-Bera test result of 0.0001 suggests a minor deviation from the normality assumption. The urban population variable exhibits a mean of 129,588.0 and a notably high standard deviation of 253,582.3, reflecting substantial variability across regions. It is highly positively skewed (3.7515) and demonstrates extreme kurtosis (21.8165), indicating a highly non-normal distribution with a long right tail and significant peakedness. The Jarque-Bera test confirms this with a probability of 0.0000.

In summary, the descriptive statistics reveal that the GINI coefficient is approximately normally distributed with a slight negative skew. In contrast, household income, poverty rate, and urban population exhibit significant positive skewness and high kurtosis, indicating non-normal distributions with heavy tails. Inflation

appears moderately normal but shows slight positive skewness and a minor deviation from normality. The Jarque-Bera test results suggest that, apart from GINI, all other variables significantly deviate from a normal distribution. These findings provide important insights into the central tendency, dispersion, and shape of the variable distributions, which are essential for guiding subsequent statistical analyses and model selection.

Table 4: OLS and RLS

Regression Equation:
$GINI=\beta0+\beta1POVERTY+\beta2HOUSEHOLD_INCOME+\beta3INFLATION+\beta4URBAN+\epsilon$

	Dependent Variable: GINI		
Independent Variable	OLS Model (1)	RLS Model (2)	Centered VIF
Constant	0.315280	0.299359	NA
POVERTY	0.002000**	0.002060**	1.505562
HOUSEHOLD INCOME	2.30E-06**	4.16E-06**	2.547976
INFLATION	-0.006868**	-0.003832**	1.326170
URBAN	4.38E-08	3.43E-08**	1.877596
R^2	0.239665	0.215600	-
Adj-R^2	0.220043	0.195357	-
Rw-squared	-	0.288921	-
Adj- Rw-squared	-	0.195357	-
Rn-squared statistic	-	47.77983**	-
F-test	0.000000	0.000000**	-
Durbin-Watson test	1.357599	-	-
Breusch-Godfrey Serial Correlation LM Test	17.71990	-	-
Heteroskedasticity Test	-	7.516613	-

Notes: Figures in parentheses are standard errors. *, ** and *** indicate the 1%, 5% and 10% significance levels, respectively.

From the OLS regression test (Table 2), we can observe that the constant term (C) is 0.315280, indicating the expected GINI value when all independent variables are zero. This is statistically significant with a p-value of 0.0000. The coefficient for POVERTY is 0.002000, which is positive and significant (p-value 0.0000). This suggests that a 1-unit increase in POVERTY is associated with a 0.002 increase in the GINI index, indicating higher income inequality. The coefficient for HOUSEHOLD_INCOME is 2.30E-06, which is positive but not statistically significant (p-value 0.2708). This suggests that changes in household income do not have a significant direct effect on the GINI index in this model. The coefficient for INFLATION is -0.006868, which is negative and not statistically significant (p-value 0.5237). This implies that inflation does not have a significant impact on the GINI index in this model. The coefficient for URBAN is 4.38E-08, which is positive and significant (p-value 0.0039). This indicates that an increase in the urban population is associated with an increase in the GINI index, suggesting higher income inequality in more urbanized areas.

The R-squared value of 0.239665 indicates that approximately 24% of the variability in the GINI index can be explained by the independent variables in the model. The Adjusted R-squared value of 0.220043, slightly lower than the R-squared, adjusts for the number of predictors in the model. The F-statistic with a p-value of 0.000000 indicates that the model is statistically significant overall, meaning that the independent variables, collectively, have a significant effect on the dependent variable. The Durbin-Watson stat of 1.357599 suggests some positive autocorrelation in the residuals, as the value is somewhat lower than the ideal value of 2. In conclusion, the OLS regression model suggests that POVERTY and URBAN population have a significant positive effect on income inequality (GINI), while HOUSEHOLD_INCOME and INFLATION do not have a significant impact within this model. The overall model explains a moderate proportion of the variance in the GINI index.

From the Robust Least Squares (RLS) test (Table 4), we can observe that the constant term (C) is 0.299359, indicating the expected GINI value when all independent variables are zero. This is statistically significant with a p-value of 0.0000. The coefficient for POVERTY is 0.002060, which is positive and significant (p-value 0.0000). This suggests that a 1-unit increase in POVERTY is associated with a 0.00206 increase in the GINI index, indicating higher income inequality. The coefficient for HOUSEHOLD_INCOME is 4.16E-06, which is positive and statistically significant (p-value 0.0451). This suggests that household income has a small but significant positive effect on the GINI index. The coefficient for INFLATION is -0.003832, which is negative and not statistically significant (p-value 0.7203). This implies that inflation does not have a significant impact on the GINI index in this model. The coefficient for URBAN is 3.43E-08, which is positive and significant (p-value 0.0211). This indicates that an increase in the urban population is associated with an increase in the GINI index, suggesting higher income inequality in more urbanized areas.

The R-squared value of 0.215600 indicates that approximately 22% of the variability in the GINI index can be explained by the independent variables in the model. The Adjusted R-squared value of 0.195357 adjusts for the number of predictors in the model. The Rw-squared value of 0.288921 suggests a slightly better fit when using robust measures. The R-squared statistic of 47.77983 with a p-value of 0.000000 indicates that the model is statistically significant overall, meaning that the independent variables, collectively, have a significant effect on the dependent variable. Compared to the OLS model, the RLS model has a slightly lower R-squared value (0.215600 vs. 0.239665 for OLS), indicating a similar but slightly worse fit. The significance of HOUSEHOLD_INCOME in the RLS model (p-value 0.0451) suggests that outliers or leverage points may have been affecting the OLS results, where it was not significant (p-value 0.2708). Both models indicate that POVERTY and URBAN have significant positive effects on GINI, while INFLATION does not. In conclusion, the RLS regression confirms that POVERTY and URBAN population significantly contribute to income inequality (GINI). HOUSEHOLD_INCOME is also significant in the RLS model, indicating a positive effect on GINI. The overall model fit is moderate, explaining about 22-29% of the variance in the GINI index, with robust measures slightly improving the model fit.

Based on the results of the multicollinearity test, as presented in Table 4, the centered VIF for HOUSEHOLD_INCOME is 2.547976, indicating a moderate correlation with other predictors in the model. However, this value remains within acceptable limits and does not suggest serious multicollinearity concerns. The centered VIF for POVERTY is 1.505562, reflecting minimal correlation with other variables. Similarly, the centered VIFs for INFLATION and URBAN are 1.326170 and 1.877596, respectively, both of which indicate negligible multicollinearity. In general, a VIF value of 1 denotes no correlation between a predictor and other variables. Values between 1 and 5 suggest moderate correlation but are typically acceptable. VIF values exceeding 5 may signal problematic multicollinearity, potentially inflating the standard errors of regression coefficients. Given that all centered VIF values for the predictors—HOUSEHOLD_INCOME, POVERTY, INFLATION, and URBAN—are well below the commonly accepted threshold of 5, multicollinearity is not a significant issue in this regression model. This suggests that the coefficient estimates are stable and reliable, and that no strong linear relationships exist among the independent variables.

The Breusch-Godfrey test results, as shown in Table 4, indicate the presence of serial correlation in the residuals. This finding is supported by the Obs*R-squared statistic of 17.71990, also with a p-value of 0.0001, reinforcing the evidence of autocorrelation in the residuals. Overall, the Breusch-Godfrey test confirms the presence of serial correlation at up to two lags, thereby violating one of the key classical linear regression assumptions. This serial correlation can lead to inefficient Ordinary Least Squares (OLS) estimators and may invalidate standard inference procedures. To address this issue, potential remedies include incorporating lagged dependent variables, applying Newey-West standard errors to correct for autocorrelation, or employing alternative model specifications such as the Autoregressive Integrated Moving Average (ARIMA) framework.

The R-squared value is 7.516613 in Table 4, with a p-value of 0.1110, which is also greater than 0.05, further supporting the conclusion that there is no significant heteroskedasticity. The Gleiser test results suggest that there is no significant evidence of heteroskedasticity in the regression model's residuals. The residuals' variance appears to be constant across different levels of the independent variables, which supports the assumption of homoskedasticity. Therefore, the standard errors of the regression coefficients are likely to be reliable, and the results of hypothesis tests in the regression analysis are valid.

Figure 2: Histogram Test

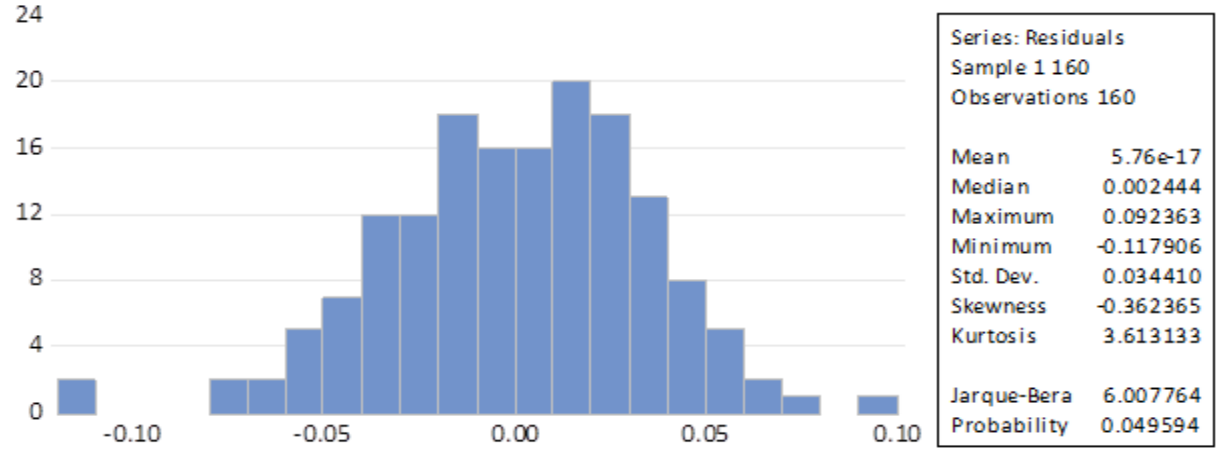


Figure 2 shows that the mean of the residuals is 5.76×10^{-17}, which is essentially zero. This means the residuals are evenly distributed around zero. The median is 0.0024, also close to zero, suggesting the distribution is fairly symmetric. The residuals range from a minimum of -0.118 to a maximum of 0.092, and the standard deviation is 0.034, indicating that most residuals fall within a narrow band around the mean. The skewness of -0.36 shows a slight leftward tilt in the distribution, while the kurtosis of 3.61 is slightly above the normal value of 3, indicating heavier tails than a normal distribution—this is known as leptokurtic behavior. The Jarque-Bera test statistic is 6.01 with a p-value of 0.0496. Since the p-value is just below 0.05, it suggests that the residuals are *slightly* non-normally distributed at the 5% significance level. The histogram of residuals visually supports this, showing a shape close to a bell curve but with minor deviations. In summary, the residuals are approximately normally distributed, with slight asymmetry and heavier tails. The regression model appears to fit reasonably well, but the small departure from normality may hint at the presence of outliers or non-linear patterns. If normality is a key assumption for further analysis, more robust modelling techniques could be explored.

Discussion

The issue of inequality is multifaceted and deeply entrenched, requiring a rigorous examination of its structural underpinnings. Addressing it involves confronting long-standing political, technological, and socio-cultural norms that are often institutionalized at both regional and national levels. Given its complexity, inequality remains a contentious and persistent challenge in policy discourse. To facilitate meaningful dialogue and build trust among stakeholders, it is crucial to approach inequality from a historical perspective. This approach enables a better understanding of how wealth and opportunity have been distributed over time, and how entrenched power dynamics continue to shape contemporary socioeconomic outcomes. A historical lens also creates the foundation for inclusive, transparent discussions on the legitimacy and consequences of current patterns of wealth distribution.

Effectively addressing inequality requires evidence-based strategies. However, the availability and quality of data, particularly disaggregated income data, are often inadequate. Such data are critical to identifying the scale, scope, and sources of inequality, yet in many contexts, they are limited or entirely lacking. What is measured, and conversely what is omitted, reflects national priorities and significantly influences how public policies are designed and how development aid is allocated. Policy interventions to mitigate inequality must be informed by a country's existing knowledge of income distribution, sectoral or demographic priorities, and the sensitivity of various stakeholders to inequality-related issues. These interventions should be both context-specific and evidence-driven. Where reliable data are available, they should be used to guide the design of targeted programs that respond to the needs of vulnerable populations.

The policy recommendations outlined here draw upon traditional poverty alleviation strategies but stress the importance of structural clarity, coherence, and responsiveness. Addressing inequality is not merely a matter of redistributing income; it requires systemic reform that considers the interlinkages between institutional practices, historical legacies, and contemporary economic realities.

5. Managerial Implications and Recommendations

Financial capital plays a pivotal role in poverty alleviation initiatives, particularly within urban contexts. These interventions typically target community groups with entrepreneurial potential, such as micro-enterprises and small-scale hawkers. Classified as part of the urban poor, these groups often face persistent barriers in accessing financial capital and generating sustainable income (Warr, 2004). To address these challenges, financial capital programs are implemented to assist in business development. Funds are expected to be recycled, with returns directed to the organizing agency and reallocated to other eligible groups.

Several government agencies in Malaysia have adopted microcredit strategies to support such efforts, including Bank Negara Malaysia, the Small and Medium Industries Development Corporation (SMIDEC), Tabung Ekonomi Kumpulan Usahawan Niaga (TEKUN), Majlis Amanah Rakyat (MARA), Amanah Ikhtiar Malaysia (AIM), and various federal ministries. These agencies aim to empower micro-enterprises and informal sector entrepreneurs by providing financial resources to stimulate business activities, thereby addressing income inequality and reducing poverty. The success of these programs is contingent upon robust monitoring systems and sustained engagement with recipients to ensure that the intended outcomes of enhanced income generation and narrowing income disparities are realized.

Additionally, entrepreneurial initiatives must incorporate capacity-building elements, such as training in critical thinking, financial literacy, and self-confidence. These components are vital to ensuring business sustainability and economic relevance. Government support should extend beyond financing to include the facilitation of collaborations with industry experts and seasoned entrepreneurs, enabling recipients to gain access to product development knowledge and market strategies. Regular monitoring mechanisms are necessary to mitigate the misuse of funds and ensure alignment with program objectives.

In parallel, development policies such as regional economic corridors have been implemented to stimulate employment and address regional income disparities. As spatial inequality continues to pose policy challenges, it is essential to evaluate the effectiveness of these programs to inform future interventions. Malaysia's urban entrepreneurship programs represent a strategic shift toward eradicating urban poverty, with a focus on extremely disadvantaged households. These initiatives feature no-interest, collateral-free loans, simplified application processes, and mandatory training and supervision to ensure the viability and repayment of funded projects. Policy focus should also prioritize intra-ethnic, urban-rural, and regional inequalities over inter-ethnic disparities, as the former are often more entrenched and impactful. Particular attention should be directed toward the bottom 40% (B40) of income earners, across all ethnic groups, whose economic positions have deteriorated in recent years.

Improving the well-being of urban B40 households necessitates a renewed emphasis on capability-building programs that enhance income and quality of life. This includes skills upgrading, industry-job matching, and lifelong learning. Priority should also be placed on increasing productivity and sustaining agro-based industries such as poultry, livestock, and vegetable farming, which are suitable for rural communities. These initiatives have the potential to create employment and improve household earnings. Similarly, cottage and traditional industries (e.g., handicrafts, carpentry, and food processing) require tailored support in financial aid, marketing, and product development to remain competitive. Basic training in project management and accounting, coupled with quarterly monitoring, can help track educational progress and upskilling outcomes.

Further, technical and vocational education must be strengthened to equip students with the competencies required by the labor market. This approach provides viable alternatives based on individual skills and interests, fostering inclusive development and preventing marginalization. In this context, distributive justice policies should emphasize equal opportunities for all, enabling marginalized communities to enhance their economic resilience.

Religious institutions such as *Baitulmal* and zakat agencies also play a critical role in addressing poverty and income inequality, particularly among Muslim households in rural and urban settings. Data from the Department of Statistics Malaysia (DOSM, 2022) indicates that many rural Muslim households face economic hardships, with significant portions in urban areas qualifying as *asnaf* (eligible zakat recipients). Effective disbursement of zakat requires careful assessment of household needs, ranging from financial aid and

education to housing and business capital. Stronger collaboration among state zakat institutions, the Department of Statistics, the Department of Social Welfare, and the National Registration Department can enhance the effectiveness of targeted interventions, in alignment with the Sustainable Development Goals (SDGs) endorsed by the World Bank.

Sustained engagement and comprehensive monitoring are essential to ensure that assistance is used productively. Past experiences highlight that some microenterprise recipients struggle with business sustainability due to inadequate knowledge of financial management, marketing, and product innovation. Equipping beneficiaries with essential business skills is thus imperative. According to Adnan et al. (2017), zakat recipients who receive productive assistance often strive toward self-sufficiency, ultimately transitioning from aid dependence to economic contributors. Over time, these individuals may even become zakat payers, thereby supporting broader, long-term development goals. In conclusion, a multi-faceted strategy involving financial capital, institutional support, entrepreneurship, skills development, and inclusive policy design is essential for reducing income inequality and alleviating poverty. These efforts must be integrated, context-specific, and closely monitored to ensure sustainable and equitable economic development.

Conclusion

Income inequality and poverty are not singular issues but manifestations of multiple deprivations that impact both urban and rural communities in Malaysia. Often underestimated, these challenges extend beyond material insufficiency to include deficits in education, healthcare, housing, and access to basic services. While the present study highlights these issues, it is limited by the unavailability of disaggregated data on the success rates of existing development policy programs. Future research should prioritize evaluating the outcomes of these initiatives to inform evidence-based policymaking.

Urbanization, while driving economic growth, has also worsened spatial inequality and contributed to the rise of urban poverty in Malaysian cities. Recent estimates by the Department of Statistics Malaysia (DOSM, 2022) show that urban poverty affects approximately 3.8% of urban households, with pronounced disparities in household income, access to employment, and quality of life. This growing divide underscores the urgency of targeted interventions.

To disrupt the persistent cycle of poverty, strategies must ensure a more equitable distribution of wealth that reaches all affected demographics. Poverty in Malaysia is multidimensional, spanning income, education, health, and living standards, and thus requires customized, context-specific interventions. For instance, poor health may hinder educational progress, which in turn limits income-generating opportunities. Recognizing and addressing such interlinkages is critical for designing effective poverty alleviation programs.

This study's urban–rural comparative analysis serves as a foundational step toward this goal. It highlights the need for precision in targeting anti-poverty interventions according to distinct poverty profiles. Effective programs must be tailored not only to geographic location but also to socio-demographic characteristics, such as age, gender, and household composition, to maximize impact.

Despite its limitations, the empirical insights from this study offer valuable guidance to policymakers and practitioners. They underscore the necessity of addressing income, education, vocational training, housing, healthcare, environmental quality, and access to urban infrastructure as interconnected levers for improving the socioeconomic conditions of disadvantaged populations. Policymakers must adopt a holistic, multisectoral approach, supported by robust funding mechanisms, to address poverty and income inequality effectively. At the policy level, federal ministries and agencies must coordinate closely with state-level administrations to implement inclusive programs. Leveraging existing data from DOSM, targeted outreach can be conducted to identify and support vulnerable households more effectively. State-level engagement enables tailored aid delivery, ensuring that interventions respond to localized needs. Importantly, the current approach to poverty reduction, which often lacks coordination and fails to address structural inequalities, must be re-evaluated.
This study contributes to the literature by emphasizing the importance of multidimensional and spatially sensitive approaches to poverty and inequality in Malaysia. It identifies a gap in the empirical evaluation of development policies and calls for future research to measure program effectiveness more rigorously. Policymakers should adopt a data-driven, integrated framework that not only targets income redistribution

but also fosters sustainable human development. Future research should aim to quantify the impacts of specific poverty-reduction programs, identify the most effective policy instruments, and develop localized poverty indices to support more targeted and impactful interventions. A coordinated, evidence-based strategy remains essential to reducing income disparity and achieving equitable socioeconomic progress in both urban and rural areas.

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The Supply Chain of Misinformation: How Fake News Impacts Global Supply Decisions

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Abstract: In today's volatile information ecosystem, the proliferation of fake news and misinformation presents a new and underexplored risk to global supply chain operations. With supply chain decisions increasingly dependent on digital signals, market trends, and geopolitical narratives, inaccurate or deliberately misleading information can lead to poor procurement choices, supplier disengagement, inventory misalignments, and panic-driven disruptions. This paper conceptualizes the phenomenon of misinformation as a form of "informational contamination" within supply chain networks. Drawing on sensemaking theory and contingency theory, the paper develops a framework that traces how misinformation originates, propagates, and ultimately influences global supply chain decision-making. The proposed framework introduces constructs such as the misinformation source, transmission channels, organizational interpretation mechanisms, and the resulting strategic or operational responses. This study contributes to the literature on supply chain risk management by extending current frameworks to include informational asymmetry and digital signal reliability, while also offering guidance for mitigating misinformation risks through verification protocols, digital media monitoring, and cross-functional communication resilience.

Keywords: *Misinformation, fake news, supply chain decisions, sensemaking theory, risk management, informational disruptions, digital signals, information contamination*

1. Introduction

In the era of hyperconnectivity and digitization, information has become the lifeblood of global supply chains. Strategic decisions regarding sourcing, procurement, logistics, and inventory management increasingly rely on real-time data, digital signals, and external market intelligence (Ali, Rajagopal, Sundram, Saihani, & Noranee, 2020; Handra & Sundram, 2023; Rasi et al., 2022; Razak, Othman, & Sundram, 2015; Sundram, Ghapar, Lian, & Muhammad, 2023). However, the global information environment is now saturated with misinformation and fake news, posing a critical yet underrecognized threat to the integrity of supply chain decision-making (Lazer et al., 2018; Starbird, 2019). The spread of false information—whether unintentional misinformation or deliberate disinformation—can lead to reactive, misinformed, and costly supply chain strategies (Tandoc et al., 2018; Ahmed et al., 2020).

This risk has become particularly visible in the aftermath of crises such as the COVID-19 pandemic, where fake news about shortages of raw materials, lockdown policies, or port closures prompted knee-jerk procurement decisions and unnecessary inventory hoarding (Choi, 2021; Sharma et al., 2022). Similarly, geopolitical misinformation—such as manipulated narratives around sanctions or conflict escalation—has distorted sourcing decisions and trade route planning (Ghosh & Scott, 2018; Radziwill & Benton, 2017). The traditional scope of supply chain risk management typically includes physical disruptions like natural disasters and strikes, but informational disruptions—driven by misleading content and viral narratives—are now emerging as equally destabilizing forces (Van der Vegt et al., 2019; Paschen et al., 2020).

Figure 1: Prevalence of Exposure to False or Misleading Information on Social Media in Selected Emerging Economies

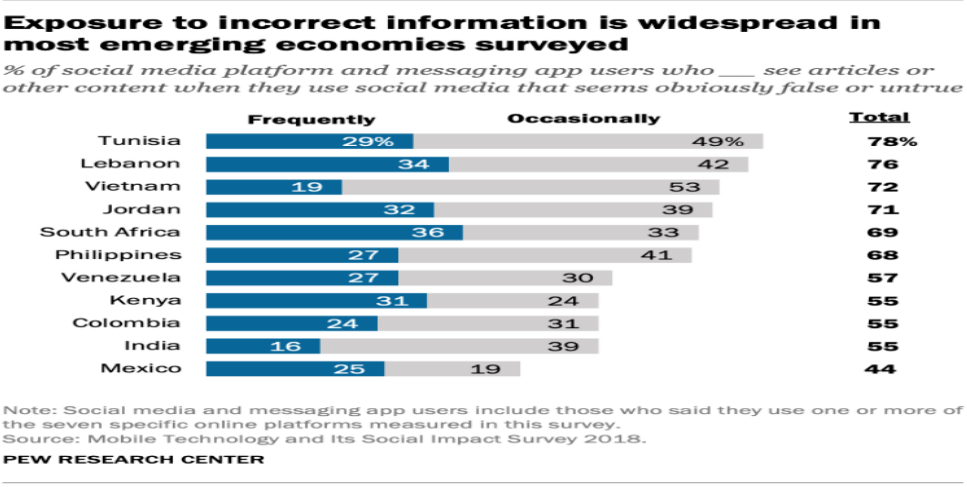
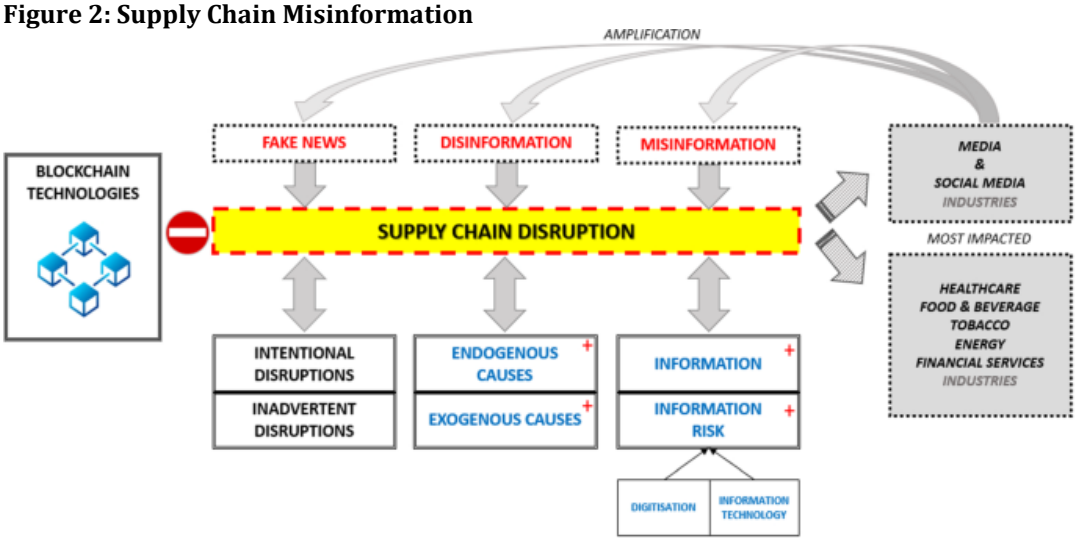


Figure 1 from the Pew Research Center (2018) shows that large shares of social media users in several emerging economies report exposure to false or misleading content—up to 78% in Tunisia and 76% in Lebanon. At scale, such narratives can jolt supply chains: they skew consumer perceptions, spark panic buying or boycotts, and tarnish supplier and brand reputations. A single rumor about product safety or origin can whipsaw demand, scramble replenishment logic, and produce costly inventory misalignments. In this environment, supply chain managers need an integrated toolkit—clear communication protocols, targeted risk-mitigation playbooks, and robust digital monitoring and verification—to detect, dampen, and correct misinformation before it hardens into operational disruption. Despite rising concern, scholarship at the intersection of fake news and global supply chain dynamics remains limited (Narayanan et al., 2024a; Narayanan et al., 2024b; Narayanan et al., 2024c; Narayanan, Ghapar, Chew & Sundram, 2024a; Narayanan, Ghapar, Chew & Sundram, 2024b; Sundram, Narayanan & Irwan, 2025).

Existing research in supply chain management focuses largely on tangible risks, operational agility, and digital transformation (Ivanov & Dolgui, 2020; Dubey et al., 2021), while the cognitive and informational dimensions of decision-making remain relatively unexplored. Moreover, the interdisciplinary literature on misinformation, while rich in political science and communication studies, has yet to be sufficiently applied to operations and supply chain contexts (Bovet & Makse, 2019; Shu et al., 2020). This lack of conceptual integration leaves a critical gap in understanding how fake news influences the interpretative frameworks of supply chain professionals, and how it may lead to risk amplification or suboptimal decision outcomes (see Figure 2).

Figure 2: Supply Chain Misinformation



To close this gap, the paper advances a conceptual model of a "supply chain of misinformation" that traces how misleading signals move through digital networks and ripple into global sourcing and planning choices. Grounded in sensemaking theory (Weick, 1995) and contingency theory (Donaldson, 2001), the model frames misinformation as a latent, context-dependent risk that co-evolves with managerial cognition, organizational routines, and structural weak points. In this view, false or distorted inputs are not merely a communications nuisance; they skew demand signals, shift reorder points and safety-stock policies, bias supplier evaluation, and erode inter-firm and stakeholder trust. Recasting misinformation as a supply chain risk highlights concrete managerial levers—procurement governance, inventory rules, supplier oversight, and stakeholder engagement—through which firms can buffer, detect, and adapt to misinformation shocks. By synthesizing insights from information disorder studies, behavioral operations, and digital supply chain literature, the paper offers a foundation for future research on mitigating informational asymmetry and enhancing decision resilience in global supply networks.

2. Literature Review

The Role of Information in Supply Chain Management

Information is central to the functioning and optimization of supply chains, affecting forecasting accuracy, procurement planning, logistics routing, and responsiveness to disruptions (Christopher, 2016; Ivanov, 2021). Effective information flow enhances supply chain visibility, enabling stakeholders to act promptly based on demand signals, supplier statuses, and geopolitical updates (Choi, Wallace, & Wang, 2018; Dubey et al., 2021). With the digitization of supply chain operations through Industry 4.0 technologies, organizations increasingly rely on external digital signals—news media, social media analytics, and market intelligence platforms—to guide strategic and operational decisions (Sodhi & Tang, 2021; Queiroz et al., 2020). However, this heightened dependence on external data introduces vulnerabilities, especially when such information is unverified or manipulated. Scholars emphasize that inaccurate or biased information can impair decision quality, erode trust among stakeholders, and amplify operational risks (Sarkis, Zhu & Lai, 2011; Ivanov & Dolgui, 2020). Yet, few studies have addressed how the *quality* and *credibility* of external information affect supply chain decision-making outcomes (Papadopoulos et al., 2022; Blome et al., 2014).

Misinformation and Fake News: Definitions and Spread Mechanisms

Misinformation refers to false or misleading information shared without intent to harm, while disinformation is deliberately crafted to deceive (Wardle & Derakhshan, 2017; Tandoc, Lim, & Ling, 2018). In digital ecosystems, both forms of false information spread rapidly via social media platforms, automated bots, and algorithmic amplification, often outpacing corrections and fact-checks (Lazer et al., 2018; Shu, Wang, & Liu, 2020). Recent literature identifies several characteristics of fake news dissemination: emotional appeal, visual virality, and low barriers to content creation and distribution (Pennycook & Rand, 2019; Ahmed et al., 2020). Misinformation thrives in crisis scenarios, where uncertainty creates an information vacuum that is quickly filled with speculation or fabricated narratives (Starbird, 2019; Sharma, Adhikary, & Borah, 2022). This phenomenon is particularly relevant to supply chains, which are deeply embedded in complex and volatile international contexts susceptible to rumor-driven fluctuations (Paschen, Kietzmann, & Kietzmann, 2020; Radziwill & Benton, 2017).

Supply Chain Risk and the Emerging Role of Informational Disruptions

Conventional supply chain risk frameworks focus on physical and financial shocks—natural disasters, supplier failure, and geopolitical flare-ups—while largely underestimating the destabilizing force of misleading information (Tang & Veelenturf, 2019; Wieland & Wallenburg, 2012). Growing evidence shows that such "informational disruptions" can spur panic responses, warp risk judgments, and decouple planning from real demand (Choi, 2021; Dubey et al., 2021). Reflecting this gap, Ivanov and Dolgui (2020) urge a wider risk lens for digital supply chains—one that accounts for the reliability of information inputs and the decision biases they trigger. In the same vein, Van der Vegt et al. (2019) and Paschen et al. (2020) warn that misinformation can seep into AI-driven analytics, hard-coding spurious signals into automated routines and magnifying their downstream effects. While behavioral operations research acknowledges cognitive biases in human decision-making (Gino & Pisano, 2008; Croson, Schultz, & Siemsen, 2013), its intersection with misinformation in SCM remains underexplored.

Gaps in Literature and the Need for a Conceptual Framework

Although misinformation has been studied in political science, health communication, and journalism, its impact on business operations—especially supply chain decision-making—remains under-theorized (Bovet & Makse, 2019; Tandoc et al., 2018; Shu et al., 2020). There is currently no unified conceptual framework that explains how misinformation flows through a supply chain context, how it is interpreted by decision-makers, and what strategic or operational outcomes it triggers. This paper addresses this gap by proposing an integrated framework grounded in sensemaking theory (Weick, 1995) and contingency theory (Donaldson, 2001). It introduces the concept of a "misinformation supply chain" comprising the source, transmission, reception, and decision-making response, offering a new lens to understand and mitigate informational disruptions in global supply chains (Ibrahim, Sundram, Omar, Yusoff, & Amer, 2017; Muhammad, Narayanan, Ghapar, Chew, & Sundram, 2025; Wong Chee, Sundram, Bakar, & Narayanan, 2024).

Theoretical Underpinning

Understanding how fake news influences supply chain decisions requires integrating insights from organisational behaviour, information systems, and strategic management. This paper adopts a dual-theoretical lens—sensemaking theory and contingency theory—and supplements it with insights from information ecology and media richness theory to capture the dynamic interaction between actors, information, and context within global supply chains.

Sensemaking Theory

Sensemaking theory (Weick, 1995) explains how people and organizations turn ambiguous or novel cues into plausible narratives that guide action. In a misinformation context, supply chain managers must parse fragmented and often conflicting signals to decide what to do next. The task becomes harder during disruptions, when time pressure and information overload warp attention and perception (Maitlis & Christianson, 2014; Whiteman & Cooper, 2011). When false cues enter this sensemaking process, they distort what gets noticed, how events are framed, and when managers "close" on an explanation—inviting premature conclusions and misaligned strategic shifts (Selvarajah et al., 2025; Narayanan, Rui, Sundram, & Irwan, 2025; Sundram et al., 2018).

Contingency Theory

Contingency theory argues that no single strategy is best in all circumstances; effectiveness depends on the fit between choices and context (Lawrence & Lorsch, 1967; Donaldson, 2006). In global supply chains, the way firms respond to misinformation therefore hinges on factors such as industry dynamics, workforce digital literacy, media-monitoring sophistication, and geographic dispersion. Organizations with decentralized, modular structures and agile digital networks can sense and absorb informational shocks more quickly, while highly integrated or rigid designs tend to magnify exposure through slow decision cycles and single points of failure (Sousa & Voss, 2008; Ginsberg & Venkatraman, 1985).

Information Ecology and Media Richness Theory

Stepping beyond behavioral lenses, the information-ecology perspective situates organizations within a web of information actors, technologies, and cultural norms that shape how data is filtered, interpreted, and trusted (Nardi & O'Day, 1999). This ecology is especially salient in multi-tier supply chains, where unverified claims can cascade across upstream and downstream partners without systematic validation, compounding systemic risk. In parallel, media richness theory (Daft & Lengel, 1986) reminds us that channels differ in their capacity to convey equivocal content. The growing reliance on low-richness platforms (e.g., X/Twitter, WhatsApp) for operational updates increases the likelihood that complex or uncertain signals will be simplified, misread, or stripped of context. Taken together, these perspectives provide a multidimensional footing for explaining how false cues seep into supply networks and distort decisions (Selvarajah et al., 2025; Narayanan, Rui, Sundram, & Irwan, 2025; Sundram et al., 2018). By integrating psychological, structural, and informational lenses, the framework advanced in this paper offers a holistic path to map, diagnose, and mitigate misinformation-driven supply chain risk.

3. Conceptual Framework

This paper proposes a conceptual model called the Supply Chain of Misinformation Framework, which illustrates how fake news and misleading narratives propagate through supply chain ecosystems and distort organizational decision-making. The model consists of five interrelated stages: (1) Source of Misinformation, (2) Transmission Channels, (3) Organizational Reception and Filtering, (4) Cognitive and Strategic Interpretation, and (5) Supply Chain Decision Outcomes. These stages are influenced by external and internal moderators such as information verification capabilities, digital infrastructure, and organizational culture.

Source of Misinformation

Misinformation can originate from many corners—partisan media, political propaganda, opportunistic or rogue suppliers, and even AI-generated content. In most cases, these actors are not targeting supply chains; they aim to provoke emotional or ideological reactions (Marwick & Lewis, 2017; Friggeri et al., 2014). Yet the spillover is real: when firms tap into the same news feeds, social platforms, or intelligence providers, these narratives can propagate as common-mode signals, ripple through planning and sourcing routines, and ultimately unsettle global production systems.

Transmission Channels

Once generated, misinformation flows through digital transmission channels such as social media platforms, messaging apps, syndicated news aggregators, and even supply chain software dashboards linked to real-time feeds (Vosoughi, Roy, & Aral, 2018; Zubiaga et al., 2016). Unlike verified media sources, these channels often lack gatekeeping mechanisms, increasing the velocity and reach of false claims. In globalized supply chains, these channels cross organizational and geographic boundaries with little resistance.

Organizational Reception and Filtering

Organizations receive this information and interpret it based on their technological readiness, media literacy, and internal control mechanisms. Firms with poor verification systems or overreliance on automated data ingestion tools are more susceptible to absorbing misinformation as fact (March & Simon, 1958; Tan, Pan, & Zuo, 2021). Additionally, the presence of echo chambers—where decision-makers only receive confirmatory information—further reduces the ability to challenge misleading narratives.

Cognitive and Strategic Interpretation

Once internalized, the information is subjected to sensemaking processes. Managers attempt to decode the significance of the data in light of existing strategies and market assumptions (Weick, 1995; Maitlis & Sonenshein, 2010). Cognitive biases such as confirmation bias, anchoring, or availability heuristic can influence how the misinformation is interpreted, potentially leading to overreaction or strategic misalignment (Kahneman & Tversky, 1979; Bazerman & Moore, 2012).

Supply Chain Decision Outcomes

Misinformation-affected interpretation can result in flawed supply chain decisions such as panic procurement, supplier disengagement, inventory overshooting, or withdrawal from critical markets (Yu, Jacobs, & Salisbury, 2021; Yoon, Talluri, & Rosenzweig, 2020). Over time, repeated exposure to such disruptions can erode supplier trust, damage reputations, and reduce organizational resilience.

4. Propositions

Anchored in the proposed framework, we advance propositions that explain how misinformation shapes supply chain decisions through sensemaking dynamics, contingency fit, and cognitive-behavioral mechanisms. Together, they treat informational disruptions as systemic—not incidental—features of global supply networks.

Proposition 1: Misinformation Exposure and Supply Chain Risk

Organizations that absorb more unverified external signals are likelier to make errors in procurement, logistics, and supplier management, especially when internal verification is weak (Kwon, Cha, Jung, Chen, & Wang, 2017; Tan, Pan, & Zuo, 2021). *Testable form:* H1: Exposure to unverified information is positively associated with

decision-making errors; the relationship is stronger when verification capacity is low.

Proposition 2: Digital Literacy and Filtering Systems as Mitigators
Investments in digital media literacy, automated filters, and verification protocols reduce the impact of misinformation during interpretation and choice (Scholz, Smith, & Steill, 2020; Sivarajah, Kamal, Irani, & Weerakkody, 2017). *Testable form:* H2a: Digital literacy negatively moderates the effect of misinformation exposure on decision errors. H2b: The presence of verification/traceability tools weakens that effect.

Proposition 3: Organizational Structure and Response Adaptability
Decentralized, modular, and empowered structures adapt more rationally to misinformation shocks than centralized, bureaucratic designs (Liao, Hong, & Rao, 2010; Zhou & Benton, 2007), consistent with contingency theory (fit to uncertainty). *Testable form:* H3: Organizational agility positively moderates the relationship between misinformation exposure and decision quality (i.e., dampens the harm).

Proposition 4: Echo Chambers and Cognitive Bias in Decision-Making
When decision makers inhabit echo chambers—receiving repeated, homogeneous cues—misinformation is reinforced, corrective signals are discounted, and strategic responses drift (Del Vicario et al., 2016; Ecker, Lewandowsky, & Chadwick, 2020). *Testable form:* H4: Echo-chamber intensity is positively associated with cognitive lock-in and mediates the link between misinformation exposure and suboptimal risk mitigation.

Proposition 5: Misinformation-Induced Disruptions Undermine Supply Chain Resilience
Chronic informational disruptions undermine trust, inflate operating costs, and weaken long-run resilience by damaging collaboration and slowing crisis response (Tang & Musa, 2011; Chowdhury & Quaddus, 2017). *Testable form:* H5: Cumulative misinformation exposure is negatively associated with supply chain resilience (redundancy, adaptability, recovery speed) via reduced inter-firm trust and collaboration.

5. Discussion and Implications

This conceptual paper extends the discourse in supply chain risk management by introducing the *Supply Chain of Misinformation* framework, which maps how false or misleading information flows through digital networks and affects supply chain decision-making. Unlike traditional models that focus on physical, financial, or operational risks, this framework addresses the cognitive and informational dimensions of global supply chains, offering a new perspective on how misperceptions, narrative contagion, and digital signal distortion can compromise organizational resilience.

Theoretical Implications
First, the paper advances supply chain risk theory by integrating sensemaking and contingency perspectives to explain how organizations interpret and act on misinformation under different contextual conditions. It formalizes two constructs—"informational contamination" and "cognitive vulnerability"—that shift the focus beyond simple data inaccuracy to the behavioral consequences of absorbing false signals within supply chain decisions.

Second, the framework specifies a layered disruption pathway that traces where misinformation enters and how it propagates: from its origin, through transmission channels, into organizational filters, onward to managerial interpretation, and finally into operational actions. By naming these entry points and failure modes, the model highlights concrete levers for diagnosis and intervention (e.g., source provenance checks, channel selection, filter diversity, decision-latency controls), providing a clear roadmap for mapping and mitigating misinformation-driven risk.

This process-oriented view opens new avenues for examining how cognitive biases and systemic weaknesses influence strategic supply chain choices. Third, the paper complements existing models in behavioral operations and information systems by suggesting a feedback loop, where decisions made under misinformation pressure can themselves become future misinformation sources. This recursive risk dynamic underscores the need for longitudinal monitoring of informational signals in supply networks.

Managerial Implications

From a practical perspective, supply chain professionals must recognize that misinformation is not only a communications or public relations issue, but a strategic threat. Managers must actively invest in information verification protocols, train teams in digital literacy, and establish media auditing systems to filter and cross-check data used for sourcing, procurement, and supplier engagement decisions. Moreover, firms should consider creating cross-functional misinformation response teams—comprising supply chain managers, IT personnel, crisis communication experts, and procurement officers—to evaluate high-risk narratives and determine whether and how they should be operationalized. Embedding risk-sensing capabilities into ERP systems and digital twins could further support early detection of anomalous or potentially misleading signals.

Policy and ESG Implications

At the policy level, governments and industry associations may need to include information integrity as part of ESG (Environmental, Social, and Governance) reporting frameworks. Just as transparency in labor or environmental practices is audited, so too should organizations be assessed for how they handle external information and prevent misinformation-driven decisions. Standard-setting bodies such as ISO or GRI could integrate informational resilience metrics as part of future reporting guidelines.

Conclusion

This paper conceptualizes misinformation as a systemic and cognitive risk to global supply chains, proposing the *Supply Chain of Misinformation* framework as a diagnostic and explanatory tool for understanding how false narratives affect decision-making. Through the integration of sensemaking and contingency theories, it highlights the mechanisms by which misinformation originates, spreads, and influences organizational behavior at multiple nodes in the supply chain. The proposed framework is not intended to be exhaustive but rather offers a foundational structure for future empirical inquiry. As supply chains become more digitally integrated and globally complex, informational accuracy becomes a strategic asset. Therefore, developing robust informational hygiene practices is not only critical for supply chain continuity but also for ensuring ethical, resilient, and adaptive supply networks in the age of digital misinformation. Future research should empirically test the propositions outlined in this paper, explore industry-specific vulnerabilities, and examine the role of technological interventions—such as AI-based misinformation detection and blockchain-verified data streams—in strengthening the supply chain's immune system against informational disruptions (Sivan et al., 2024a; Sivan et al., 2024b; Vatumalae, Rajagopal, & Sundram, 2020).

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Reimagining Holistic Health Tourism in Malaysia: Unlocking the Economic Potential with Sustainable Wellness Integration

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Abstract: The global wellness economy is undergoing a paradigm shift from reactive healthcare to proactive and integrative well-being. Malaysia, with its rich cultural heritage, biodiversity, and established medical infrastructure, could be uniquely positioned as part of the leading holistic health tourism providers. Malaysia's health tourism sector traditionally emphasized medical services and has long been recognized to attract patients seeking quality and affordable healthcare. Yet the global shift toward preventive and integrative wellness presents a timely opportunity to expand the country's health tourism offerings beyond conventional medical interventions to a holistic health tourism hub. This conceptual paper explores the potential of holistic health tourism in Malaysia, encompassing a wider spectrum of physical, mental, emotional, and spiritual well-being services. It examines Malaysia's strengths, the challenges faced, and potential strategies to elevate the nation as a premier holistic health tourism destination in Asia. Drawing on a recent literature review, this paper suggests that by strategically developing and promoting the country's diverse natural, cultural heritage, and wellness resources, Malaysia can tap into a growing market, diversify its tourism portfolio, and significantly contribute to its economic development. The paper concludes with strategic implications for policymakers, industry players, and future researchers.

Keywords: *Holistic health tourism, wellness tourism, travel, economic impact, sustainability development*

1. Introduction

The convergence of healthcare, wellness, and tourism has given rise to a new frontier: holistic health tourism. Unlike conventional health tourism or also referred to as medical tourism, which focuses on curative services that aim to cure diseases, relieve symptoms, or promote recovery from illness or injury, holistic health tourism encompasses physical, mental, emotional, spiritual, and environmental well-being.

The global health and wellness industry is experiencing unprecedented growth. This is driven by a rising awareness of preventive care, lifestyle diseases, and the pursuit to gain overall well-being (Global Wellness Institute, 2025). Malaysia has successfully carved a niche in medical tourism, where the country is recently ranked number one at the international level as a preferred medical tourism destination and has outperformed competitors such as Singapore, India, and Turkey (Nizam, 2025). With the offering of advanced healthcare infrastructure, skilled medical professionals, and competitive pricing, medical tourism in Malaysia has evolved into a strategic economic sector, catalyzing healthcare innovation and generating substantial revenue streams. Revenue generated from medical tourism has grown significantly from RM572 million in 2011 to RM2 billion in 2023 (Siddiqui, 2025). But as global health tourism evolved beyond medical procedures, it is a timely opportunity to expand Malaysia's health tourism offerings by unlocking the economic potential of the country's holistic health tourism.

Malaysia's strategic location, multicultural identity, and established healthcare system offer a fertile ground for this evolution (Idrus et al., 2020; Wellness Tourism, 2025). Nonetheless, with all the resources the country has, the sector remains under-theorized in terms of its economic potential and integrative policy design (Nazir & Kumar[a], 2025). By strategically expanding to a more comprehensive holistic health tourism offering, a country can unlock new avenues for economic growth, foster sustainable development, and enhance its global reputation as part of premier wellness destinations (Figueiredo et al., 2024). Thus, Malaysia, endowed with rich biodiversity, cultural pluralism, and robust healthcare infrastructure, has the potential to develop integrative wellness tourism frameworks that support community well-being, stimulate local economies, and position the nation competitively within the global wellness tourism market, while aligning with the principles

of sustainability and the UN SDGs. This paper examines Malaysia's strengths, the challenges faced, and potential strategies to elevate the nation to be part of the premier holistic health tourism destinations in Asia. This paper aims to conceptualize holistic health tourism by examining key elements that define it, Malaysia's unique suitability to nurture and lead in this field, and the potential the sector brings to the country's economy.

2. Literature Review

This section explores the evolving landscape of health tourism by firstly distinguishing between conventional medical tourism and the flourishing sector of holistic health tourism. It will then be followed by examining the global trends driving this shift, analyzing Malaysia's current standing and strengths, identifying existing challenges, and exploring potential strategies for the country to emerge as part of the premier holistic health tourism destinations.

Defining the landscape: Medical tourism vs Holistic Health Tourism

Conventional health tourism or medical tourism refers to traveling to another country to receive healthcare services, including elective procedures, complex surgeries, and experimental treatments (Muzaffar & Hussain, 2016; Castro et al., 2019). The United Nations World Tourism Organization defines medical tourism as a type of tourism activity involving evidence-based medical resources and services for diagnosis, treatment, cure, prevention, and rehabilitation (Smith & Puczkó, 2014).

Holistic health tourism, also known as wellness tourism, is a form of travel that emphasizes improving overall well-being by combining physical, mental, and spiritual activities with travel. Nazir and Kumar[b] (2025) defined holistic health tourism as travel that is motivated by the pursuit of comprehensive well-being, incorporating medical services, wellness therapies, spiritual practices, and eco-conscious experiences. Thus, holistic health tourism goes beyond traditional medical tourism by focusing on preventative care, rejuvenation, and self-improvement in peaceful and natural settings.

Table 1: Key Definitions in Medical and Holistic Health Tourism

Concept	Definition(s)
Medical tourism or health tourism	Traveling to another country to receive healthcare services, including elective procedures, complex surgeries, and experimental treatments (Muzaffar & Hussain, 2016; Castro et al., 2019).
Holistic health tourism or wellness tourism	Travel that is motivated by the pursuit of comprehensive well-being, incorporating medical services, wellness therapies, spiritual practices, and eco-conscious experiences (Nazir and Kumar[a], 2025).

Motivations to engage in holistic health tourism include stress reduction, detoxification, spiritual healing, self-transformation, and the pursuit of long-term health in natural settings (Haldar, 2023; Bardukova, 2024; Seabra et al., 2014; Rocha et al., 2016). Therefore, holistic health tourism reflects a shift from illness treatment to health optimization, where it meets different consumer needs and thus operates in a separate segment (Global Wellness Institute, 2025). By examining the nature of both segments, holistic health tourism is not a competitor but serves as a strategic complement to enrich Malaysia's health tourism. This functional distinction allows both domains to coexist and collectively broaden Malaysia's appeal as a comprehensive health tourism destination. The synergy between the two strengthens Malaysia's competitive advantage in the region, enabling the country to diversify its offerings, tap into emerging global wellness trends, and support longer-term national healthcare and economic objectives.

According to Figueiredo et al. (2024) and Dini and Pencarelli (2022), holistic health tourism is more than just spa visits; it is a multidimensional experience that integrates physical, mental, emotional, and spiritual well-being. Some of the key components of holistic health tourism highlighted by Figueiredo et al. (2024) and Dini and Pencarelli (2022) are shown in Table 2.

Table 2: Key components of Holistic Health Tourism

Components	Definition(s)
Medical and Wellness Integration	Combines conventional medical treatments with wellness activities like yoga, meditation, and nutrition counselling.
Mind-Body-Spirit Connection	Emphasizes therapies that address emotional and spiritual well-being, such as mindfulness retreats, energy healing, and spiritual journeys.
Nature and Environment	Destinations that feature natural settings (forests, beaches, hot springs) that promote relaxation and ecological harmony.
Cultural and Traditional Therapies	Includes indigenous healing practices, Malay massage, Ayurveda, traditional Chinese medicine, and local rituals that reflect cultural authenticity.
Preventive and Lifestyle Oriented Care	Focuses on long-term health through stress reduction, fitness, healthy eating, and lifestyle coaching.
Sustainability and Community Engagement	Aligns with the UN SDGs by promoting eco-friendly practices and involving local communities in tourism development.
Personalized Wellness Experience	Tailors programs to individual needs (whether for recovery, rejuvenation, or transformation) that are often supported by expert consultations and digital tools.

Source: Figueiredo et al. (2024) and Dini and Pencarelli (2022)

Growth Trend and Economic Contribution of Holistic Health Tourism

Holistic health tourism is a rapidly growing trend in the global tourism market, offering new services and attracting providers to meet changing consumer demands (Stará & Peterson, 2017). This sector has shown resilience and growth despite economic challenges, with luxury hotels expanding their wellness offerings to include spa treatments, health therapies, and spiritual activities (Koncul, 2012). Recent trends in wellness tourism emphasize holistic retreats featuring yoga, meditation, traditional experiences, and nature-based activities, particularly in Asian countries (Tripathi & Said, 2023). It reflects a paradigm shift away from traditional medical and recreational tourism towards experiences that foster complete well-being that encompasses physical, emotional, intellectual, spiritual, social, and environmental dimensions (Dini & Pencarelli, 2022). Strategically, countries that expand their wellness offerings beyond conventional medical services can reap substantial economic and branding benefits. Figueiredo et al. (2024) argue that by investing in holistic health experiences that integrate nature, culture, spirituality, and lifestyle management, nations can unlock new economic pathways, elevate community well-being, and align with the United Nations Sustainable Development Goals (SDGs). Moreover, Bhuyan et al. (2025) stress the role of wellness tourism in nurturing nature-based experiences and community inclusion. Their findings illustrate how wellness tourism supports SDGs by encouraging eco-conscious behavior, reducing urban health stress, and fostering indigenous knowledge preservation.

The COVID-19 pandemic has significantly impacted the wellness tourism sector, necessitating adaptations to post-pandemic consumer expectations (Błotnicka et al., 2024). Liao et al. (2022) report that global wellness tourism reached a market size of US$817 billion, driven by increased consumer demand for integrative health experiences. Projections indicate the market will continue to expand, with wellness tourism being a key driver of the growth (GlobeNewswire, 2025). Key trends identified include sustainable development, technological integration, and personalized experiences. As the wellness concept continues to evolve beyond a marketing label, it is reshaping the tourism industry and driving market changes (Stará & Peterson, 2017; Błotnicka et al., 2024).

Health tourism has emerged as a significant contributor to economic growth in many countries. Studies have shown that health tourism sectors can generate substantial economic benefits through direct, indirect, and induced effects on output, employment, household income, and value added (Eusébio et al., 2013). The industry satisfies demand for high-quality healthcare at competitive prices, boosts foreign exchange inflows, and expands job opportunities (Khoa & Nhu Y, 2021). A cross-country panel data analysis found that a one-point increase in health tourism revenues as a percentage of GDP leads to significant increases in GDP growth rate and per capita GDP growth rate (Ağazade, 2024). Both short-term and long-term increases in health tourist numbers positively impact economic growth (Haghighat & Masoomzadeh, 2020).

The tourism sector in Malaysia contributed RM220.6 million (15.2% of GDP) in 2018, underscoring its macroeconomic significance (Latiff et al., 2020). The average expenditure of health tourists in Malaysia is significantly higher than that of regular tourists (Musa et al., 2012). Key motivations for health tourists seeking treatments and services in Malaysia include value for money, reputation, and medical services (Musa et al., 2012). Holistic health tourism, as a complementary sector, has the potential to stimulate multiple industries—healthcare, hospitality, agriculture, and wellness product manufacturing. Thus, holistic health tourism can generate high-value employment, promote rural development, and stimulate demand for halal-certified wellness products. It also supports Malaysia's New Key Economic Areas (NKEA) by integrating tourism with healthcare and agriculture. Expanding Malaysia's health tourism with the integration of wellness tourism shows promise as a driver of economic growth, warranting further investment and policy attention.

3. Malaysia's Current Position and Strengths in Holistic Health Tourism

Malaysia has emerged as a significant player in the medical tourism industry, experiencing growth since 1998 (Khairunnisa & Hatta, 2017). The country's success is attributed to factors such as competent international-level doctors, advanced medical equipment, affordable costs, and effective communication in English (Khairunnisa & Hatta, 2017; Zain et al., 2023). In 2022 medical tourism sector in Malaysia surpassed Healthcare Travel Council's (MHTC) targets by generating USD286 million (Alvarez & Marsal, 2024).

Meanwhile, Malaysia has significant potential in holistic health tourism. The nation's strengths in the domain are summarized in Table 3. According to Subramaniam and Thuraiselvam (2025), Malaysia ranks among the top ten wellness economies in the region. The country possesses advantages where it could leverage its natural resources, cultural heritage, and infrastructure (Subramaniam & Thuraiselvam, 2025). With an abundance of inherent resources, including rich natural landscapes, diverse cultural practices that incorporate traditional healing methods, and a variety of wellness sectors that combine traditional wellness retreats with contemporary approaches (Jamaludin et al., 2024; Faraj et al., 2024; Laing et al., 2007), Malaysia could emerge as a successful holistic health tourism provider.

One of Malaysia's strengths in wellness tourism is deeply rooted in its rich traditional multiculturalism healing practices, ranging from traditional Malay healing to Chinese traditional acupuncture treatments and Indian ayurveda practices (Seow et al., 2024; wellnesstourism.com, 2025). It offers a culturally immersive and naturally grounded alternative to conventional wellness experiences. These indigenous modalities, such as traditional Malay massage (*urut Melayu*), herbal tonics (*jamu*), spiritual healing rituals, as well as Islamic wellness principles, are not only therapeutic but also reflect centuries of ancestral wisdom passed down through generations (Mohd Dahlan et al., 2021; Abdul Ghani et al., 2015). Countries like Indonesia are leveraging their unique cultural assets, such as traditional medicine and rituals, to develop medical wellness-based health tourism and attract premium health-conscious tourists (Dewi, 2025). Malaysia should take advantage of reinforcing these traditional healing practices.

Malaysia's natural biodiversity further amplifies its wellness appeal. The traditional wellness treatments, which are frequently offered in serene natural settings, such as rainforest retreats, riverside spas, or hot spring resorts, enhance the sensory and spiritual healing (Subramaniam & Thuraiselvam, 2025), like the one offered by Rumah Hutan Bonda in Batangkali Selangor. The country's lush rainforests and geothermal springs provide ideal backdrops for forest bathing, herbal therapy workshops, and eco-wellness retreats. According to Wellness Tourism Magazine (2025), these experiences are increasingly sought after by international travelers seeking authentic, nature-based healing modalities.

Table 3: Malaysia's Potential Strength in Holistic Health Tourism

Strength category	Description	Source
Healthcare infrastructure	Affordable and high-quality medical services integrated with wellness experiences.	Nazir and Kumar[b] (2025)
Cultural heritage and traditions	Malaysia has rich offerings in traditional Malay healing, herbal therapies, and spiritual wellness practices.	Idrus et al. (2020); Jamaludin et al. (2024)
Multicultural identity	Diverse ethnic influences that enable inclusive wellness modalities (Malay, Chinese, and Indian).	Seow et al. (2024)

Natural assets and biodiversity	Rainforests, beaches, and highlands are ideal for eco-wellness and nature-based healing retreats.	Subramaniam and Thuraiselvam (2025)
A growing number of wellness tourism facilities	More spas, resorts, and wellness centres, driven by rising demand for rejuvenation and health-focused travel, are being established.	Idrus et al. (2020); Nazir and Kumar[a] (2025)
Strategic location	Proximity to major Asian markets and strong air connectivity for regional wellness travelers.	Nazir and Kumar[b] (2025)
Youth market potential	Gen Z's rising interest in wellness experiences and lifestyle-based travel.	Subramaniam and Thuraiselvam (2025)
Tourist satisfaction and loyalty	High revisit intention is driven by emotional value and memorable wellness experiences.	Seow et al. (2024)

As wellness tourism in Malaysia is gaining prominence as a strategy to attract both domestic and international visitors, it is gaining traction through investments in traditional healing, spa resorts, and eco-retreats (Nazir & Kumar[a], 2025; Idrus et al., 2020). A unique combination of traditional wellness with modern wellness amenities could be leveraged to prosper this particular segment. Spa and wellness services play a crucial role in the hotel industry, resorts, and tourist destinations (Hashemi et al., 2015), thus contributing to the growth of holistic health tourism. Urban vacationers are increasingly motivated to visit spa and wellness centers, driven by factors such as relaxation, health, beauty, and self-development (Velayuthan et al., 2019). The growing trend is reflected in the rising number of spa and wellness centers across Malaysia. The industry's success is attributed to individuals' heightened health and wellness concerns (Velayuthan et al., 2019). Luxury experiences, such as those offered at the CHI spa at Shangri-la in Sabah, Malaysia, contribute to the diverse wellness tourism offerings in the country (Chan, 2008).

Malaysia's geostrategic location in Southeast Asia offers a distinct advantage for wellness tourism development. Positioned at the crossroads of major regional air routes, Malaysia enjoys excellent connectivity to key markets such as China, India, Indonesia, and the Middle East. According to Nazir and Kumar[b] (2025), this accessibility facilitates inbound travel for short-term wellness retreats and long-stay health tourism, particularly among regional travelers seeking affordable, high-quality care. They emphasized that Malaysia's location enables it to serve both primary and secondary medical tourists, supported by a robust healthcare infrastructure and competitive pricing. The country's proximity to high-demand markets, coupled with visa-friendly policies and multilingual service providers, enhances its appeal as a gateway wellness destination in Asia (Nazir & Kumar[b], 2025).

The youth segment, particularly Generation Z, represents a growing and underutilized market in Malaysia's wellness tourism landscape. Subramaniam and Thuraiselvam (2025) found that Gen Z travelers are increasingly drawn to experiential wellness offerings, such as mindfulness retreats, eco-adventures, and digital detox programs. Their preferences lean toward authenticity, affordability, and social engagement, making them ideal candidates for community-based wellness tourism. According to the study, Gen Z tourists in Klang Valley exhibit strong interest in personal growth and mental well-being, thus aligning with global trends in holistic health travel. Their digital fluency and reliance on peer reviews and social media amplify the visibility of wellness destinations, creating a multiplier effect for branding and outreach (Seow et al., 2024).

Tourist satisfaction is a critical determinant of revisit intention and destination loyalty in wellness tourism. Seow et al. (2024) conducted a structural equation modeling study involving 361 tourists at Malaysian wellness centers and found that emotional value, quality of service, and perceived rewards significantly influenced satisfaction levels. Notably, unique travel experiences such as personalized care, serene environments, and cultural immersion were more predictive of revisit intention than general satisfaction alone. The study also revealed that electronic word-of-mouth (e-WOM) plays a mediating role, where satisfied tourists are more likely to share positive experiences online, thereby enhancing destination image and attracting new visitors.

4. Challenges in Expanding Holistic Health Tourism in Malaysia

Despite the potential, Malaysia faces several challenges in fully developing its holistic health tourism sector. Drawing from recent literature, this section elaborates on some of the key barriers. The summary of Malaysia's

challenges can be found in Table 4. According to Nazir and Kumar[b] (2025), the industry faces a shortage of certified trained professionals in holistic wellness practices, such as traditional Malay medicine, spa therapy, and integrative health services. Without standardized training and certification, service quality varies significantly, which could affect tourist satisfaction and trust. They also highlighted that despite government support, the wellness tourism sector in Malaysia suffers from fragmented coordination among stakeholders. Moreover, there is a lack of unified branding and strategic alignment between public agencies, private wellness providers, and tourism operators. This disjointed approach could weaken Malaysia's global competitiveness in the wellness tourism market. Nazir and Kumar[a] (2025) also highlighted that although Malaysia has natural assets like hot springs, rainforests, and cultural healing traditions, many wellness destinations are located in rural or underdeveloped areas. Poor infrastructure and limited accessibility deter international tourists from exploring these offerings.

A systematic review by Idrus et al. (2020) found that only a handful of studies have been conducted on wellness tourism in Malaysia, with most focusing on tourist motivation rather than service quality or infrastructure development. While medical tourism's economic impact is well-documented, the broader economic contributions of holistic wellness remain less explored. This lack of empirical data limits evidence-based policymaking and strategic planning (Idrus et al., 2020).

Table 4: Malaysia's Challenges in Expanding Holistic Health Tourism

Challenges	Description	Source
Human capital gap	Shortage of certified trained professionals and lack of standardization	Nazir and Kumar[b] (2025)
Fragmented Policy Framework	Lack of an integrative national policy linking wellness, tourism and healthcare sectors	Nazir and Kumar[b] (2025)
Low research visibility	Few indexed studies and limited interdisciplinary research on Malaysia's wellness tourism.	Idrus et al. (2020)
Limited branding and promotion	Weak destination branding as compared to regional competitors like Thailand and Indonesia.	Idrus et al. (2020); Dewi (2025); Nazir and Kumar[b] (2025)
Community integration	Marginalize local entrepreneurs and traditional healers, especially when wellness offerings are often led by private investments and become commercialized without cultural sensitivity.	Lee et al. (2020); Nazir & Kumar[a] (2025)

Marketing and branding are vital to Malaysia's success in positioning itself as a premier wellness tourism destination. Lack of a distinctive brand identity could slow down the process. Malaysia's wellness tourism brand often overlaps with its broader medical tourism image. The absence of a clear, standalone identity for wellness tourism dilutes Malaysia's appeal in this niche compared to countries like Thailand or Bali, which have cultivated strong wellness-centric reputations (Nazir & Kumar[b], 2025). As a country that is rich with traditional healing heritage (such as Malay massage, Chinese acupuncture, or Indian ayurveda and yoga), herbal remedies and Islamic wellness principles, they are not fully leveraged in branding strategies, while they could be a powerful differentiator if integrated into a cohesive narrative that appeals to wellness travelers seeking authenticity (Nazir & Kumar[a], 2025).

Sustainable wellness tourism can't thrive without meaningful integration with local communities. Many wellness tourism developments are led by private investors or urban-based operators (Nazir & Kumar[a], 2025; SP Models Kingdom, 2025; Lee et al., 2020), which can sideline local entrepreneurs and traditional healers. Many retreats and eco-wellness facilities are spearheaded by urban-based investors and developers, particularly in high-demand zones such as Klang Valley, Langkawi, and Cameron Highlands (SP Models Kingdom, 2025). This scenario could lead to unequal economic participation. Without inclusive policies, the economic benefits may bypass the very communities that host these wellness retreats. Moreover, wellness tourism planning in Malaysia often lacks participatory frameworks that involve local voices in decision-making, which leads to a lack of community engagement in planning (Idrus et al., 2020; Nazir & Kumar[b], 2025). This top-down approach can lead to resistance, mistrust, or even conflict over land use and resource allocation.

Strategies for Elevating Malaysia as a Premier Holistic Health Tourism Destination

To overcome the challenges and unlock Malaysia's full potential, several strategic approaches could be adopted. Marketing and branding are two powerful promotional tools to elevate the country's wellness tourism sector (Prommaha, 2015; Ordabayeva & Yessimzhanova, 2016). In Malaysia, marketing efforts remain inconsistent across platforms and stakeholders (Tourism Malaysia, 2022). To effectively differentiate Malaysia's holistic health tourism offerings from competitors in a crowded global market, the country requires a strong, consistent brand identity and targeted marketing campaigns where the country must address the issue of promotion, niche market identification, branding, and quality of healthcare (Aniza et al., 2009). The identity of Malaysia's holistic health tourism is often overshadowed by the more dominant medical tourism narrative (Nazir & Kumar[a], 2025). This lack of a distinct brand dilutes Malaysia's positioning in the global wellness market, especially when compared to regional competitors like Thailand and Indonesia, which have successfully branded themselves around spiritual retreats and nature-based healing. Malaysia should strengthen its branding and international positioning by differentiating wellness tourism from medical tourism and highlighting its multicultural healing traditions and natural assets (Hashim et al., 2019). The Tourism Malaysia Marketing Plan 2022–2026 acknowledges the need for integrated communication strategies, yet wellness-specific messaging is often generic and fails to highlight Malaysia's unique assets, such as urut Melayu, rainforest-based herbal therapies, and indigenous healing rituals. This results in a missed opportunity to emotionally connect with wellness travelers seeking authenticity and cultural immersion.

Malaysia must adopt a multi-pronged strategy that integrates cultural authenticity, sustainable development, and inclusive stakeholder engagement. One key approach is to provide training and certification for traditional healers and local wellness practitioners. By integrating policy design and stakeholder collaboration, a coordinated development and sustainable growth that involves government bodies, private healthcare providers, wellness operators, tourism agencies, and local communities could be achieved. This not only preserves cultural heritage but also enhances service quality and global credibility (Nazir & Kumar[a], 2025). Training programs can be extended to rural and indigenous healers, enabling them to participate in the formal wellness economy. This not only preserves intangible cultural heritage but also promotes inclusive economic development by integrating local knowledge into mainstream tourism offerings.

Investing in specialized infrastructure could support the development of holistic wellness facilities. Purpose-built wellness facilities, such as eco-integrated resorts, forest-based spas, and thermal spring sanctuaries, can significantly enhance the experiential quality of wellness offerings, particularly when designed to harmonize with Malaysia's rich biodiversity and cultural heritage (Nazir & Kumar[a], 2025). These infrastructures could incorporate sustainable design principles and smart technologies, including AI-driven diagnostics, digital wellness platforms, and green building certifications, to meet the expectations of post-pandemic wellness travelers (Idrus et al., 2020). According to Nazir and Kumar[a] (2025), public-private investment models, supported by incentives from agencies such as the Malaysian Investment Development Authority (MIDA), can catalyze the development of high-quality wellness hubs while ensuring regulatory oversight and community inclusion.

Table 5: Malaysia's Strategic Approaches to Elevate Holistic Health Tourism

Challenges	Description	Source
Destination branding enhancement	Strengthening Malaysia's wellness identity through storytelling, cultural immersion, and digital outreach.	Idrus et al. (2020)
Human capital development	Training wellness professionals and standardization certification to improve service quality.	Idrus et al. (2020); Nazir and Kumar[a] (2025)
Traditional-Modern integration	Combining traditional healing with modern spa and wellness infrastructure.	Idrus et al. (2020)
Infrastructure investments	Upgrading wellness resorts, medical tourism facilities, and digital platforms to support high-quality hubs.	Nazir & Kumar[a] (2025)
Community-based inclusion	Encouraging local entrepreneurship and integrating traditional healers into formal wellness ecosystems.	Nazir & Kumar[a] (2025)
Sustainably smart model	Emphasizing wellness tourism development that aligns with the UN SDGs, integrating eco-conscious practices.	Nazir & Kumar[a] (2025)

In order to ensure Malaysia's holistic health tourism sector grows inclusively and responsibly, sustainability and community benefits must also be prioritized. This is an important strategy for the long-term viability of the sector. The expansion of holistic health tourism must adhere to sustainable development goals (SDGs), minimize environmental impact, preserve cultural heritage, and provide direct benefits to local communities. This will enhance residents' quality of life. As highlighted in Malaysia's Sustainable Tourism Recovery Project (2024), inclusive tourism models that engage local communities not only improve visitor experiences but also build resilience against environmental and economic shocks. Thus, a sustainability-first approach ensures that wellness tourism contributes meaningfully to both national development and community well-being.

Discussion

Holistic health tourism has high economic spillover value. The multiplier effects from direct, indirect, and induced sources can generate high-value employment from multiple sectors, promote rural development, and stimulate demand for halal-certified wellness products. It also supports Malaysia's New Key Economic Areas (NKEA) by integrating tourism with healthcare and agriculture. Holistic health tourism has the capacity to stimulate upstream and downstream sectors such as pharmaceuticals, agriculture (e.g., herbal ingredients), and wellness products (Yusof & Salleh, 2023). Eco-retreats and halal spas also catalyze rural economic diversification and reduce urban migration. This niche sector can further boost local economies through job creation, SME development in halal wellness products, and rural eco-tourism. Its community-based potential ensures equitable economic distribution and social empowerment.

To stay aligned with the national goals, the roadmap for holistic health tourism must be developed by the Sustainable Development Goals (SDGs). This alignment ensures that Malaysia's wellness tourism sector not only contributes to economic growth but also advances social equity, environmental stewardship, and cultural preservation. Specifically, Goal 3 (Good Health and Well-being) supports the integration of preventive and traditional health services, while Goal 8 (Decent Work and Economic Growth) encourages the creation of inclusive employment opportunities through community-based wellness enterprises and entrepreneurs.

To operationalize this alignment, policy recommendations should include the institutionalization of traditional healing practices through certified training programs that uphold both cultural integrity and international service standards. This would empower local practitioners, particularly women and indigenous healers, while enhancing Malaysia's credibility as a wellness destination. Additionally, policies must incentivize eco-conscious infrastructure development, such as low-impact wellness retreats and green-certified spa facilities, to fulfill Goal 12 (Responsible Consumption and Production) and Goal 13 (Climate Action). Furthermore, the roadmap should embed inclusive governance mechanisms, ensuring that local communities are actively involved in planning, decision-making, and benefit-sharing. This participatory approach, as piloted in the Malaysia Sustainable Tourism Recovery Project (UNDP Malaysia, 2022), has demonstrated success in fostering resilience and cohesion among stakeholders in Setiu, Manjung, and Mersing. Finally, a national branding strategy that differentiates holistic health tourism from medical tourism while emphasizing Malaysia's multicultural healing traditions will support Goal 17 (Partnerships for the Goals) by attracting international collaborations and investment.

To align Malaysia's tourism offerings with the evolving preferences of Muslim travelers, Malaysia could extend the Muslim-Friendly Assurance and Recognition (MFAR) programme to include holistic health tourism providers. Currently, MFAR (administered by the Islamic Tourism Centre (ITC) recognizes businesses in sectors such as accommodation, medical facilities, and travel operations that meet Muslim-friendly standards, including halal food availability, prayer facilities, and ethical service practices (Islamic Tourism Centre, 2025; The Edge Malaysia, 2025). By extending MFAR to wellness and eco-tourism providers, Malaysia can tap into a growing segment of Muslim travelers who seek spiritually aligned, nature-based, and health-conscious experiences. This could include halal-certified spa treatments, gender-segregated wellness facilities, modest attire-friendly hot springs, and eco-retreats that respect Islamic values such as cleanliness, privacy, and environmental operation and governance. From a policy point of view, halal holistic health tourism aligns with Malaysia's National Tourism Policy 2020–2030 (MOTAC,2022). The new niche of halal holistic wellness could open up new opportunities for the industry player.

5. Conclusion and Recommendations

Malaysia is at a strategic inflection point to redefine its holistic health tourism narrative. The expansion towards holistic well-being presents a significant opportunity for Malaysia to further boost its health tourism offerings beyond medical procedures. This conceptual paper offers beneficial insights and an overview of Malaysia's strengths, the challenges faced, and potential strategies to tap the market and fully develop the sector. By embracing a holistic, culturally grounded, and economically inclusive model, the nation can unlock new growth frontiers while enhancing societal well-being. Malaysia's wellness tourism sector holds considerable promise as a driver of sustainable and inclusive economic development. Malaysia's positioning as a multicultural, Muslim-majority nation with a developed healthcare infrastructure makes it uniquely suited to become a holistic health tourism hub.

While current initiatives signal positive momentum, the industry's long-term success hinges on strategic reforms that balance cultural preservation, service innovation, and stakeholder inclusivity. This study underscores the need for institutionalizing traditional wellness practices through certified training, investing in eco-integrated infrastructure, and amplifying Malaysia's unique value proposition through targeted branding and international positioning. Equally critical is the prioritization of sustainability and community empowerment, ensuring that local voices are central to wellness development strategies. By aligning these efforts with global wellness trends and sustainable development goals, Malaysia is well-positioned to evolve into a regional leader in holistic health tourism, one that offers not only restorative experiences to global travelers but also lasting socio-economic benefits to its communities.

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Determinants of Perceived Travel Risk Among Travelers in Puncak Alam, Selangor: The Role of Purchasers' Behavior, Legal Challenges and Insurance Availability

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Abstract: This study investigates the determinants of perceived travel risk among travellers in Puncak Alam, Selangor, a growing suburban destination in Malaysia. In an era marked by global uncertainty, travellers' perceptions of risk significantly influence travel behaviour, destination choice and engagement in tourism activities. This research examines how purchasers' behaviour, legal challenges and insurance availability shape individual perceptions of travel-related risks. The study posits that these perceptions are further influenced by geographical and socio-economic characteristics of the host environment. This study adopted a quantitative descriptive research methodology design, collecting data from 150 respondents selected through convenience sampling, a type of non-probability sampling method. A structured questionnaire was used as the data collection tool, and the results were analyzed using descriptive statistics and correlation analysis with the help of SPSS software. The results will reveal that the three variables, which are the purchaser's behaviour, legal frameworks, and insurance accessibility, play a significant role in shaping perceived travel risk. The findings might provide valuable insights for tourism operators, policymakers, and insurance providers in crafting targeted risk management strategies and communication frameworks. By understanding these contributing factors, stakeholders can enhance traveller safety perceptions, support informed travel decisions, and promote sustainable tourism development in emerging destinations. This research contributes to the broader literature on travel risk perception and offers practical implications for improving destination image and tourism service quality in Malaysia.

Keywords: *Perceived risk, risk perception, travelers, purchasers' behavior, legal challenges, insurance availability*

1. Introduction and Background

Travel-related risk is broadly defined as any threat to travellers' physical or psychological well-being that may disrupt their journey. International travel inherently exposes individuals to a variety of risks ranging from health and safety to financial and infrastructural, depending on both destination and travellers' characteristics. In 2024, Malaysia recorded over 25 million international arrivals with a 24.2% increase from 2023, signalling greater exposure to these multifaceted risks and placing pressure on public infrastructure, insurance markets, and health systems (Reuters Staff, 2025).

Understanding travel risk requires examining both objective and subjective dimensions of risk, as well as their interplay with destination image and tourist attitudes. Caber et al. (2020) showed that perceived risks across health, safety, and finances shape travellers' destination evaluations and decisions, suggesting that destination management must address not only real dangers but also travellers' risk perceptions through clear communication and reassurance.

In the Malaysian context, pre-travel risk beliefs profoundly influence behaviour. Che Hasan et al. (2022) found that pre-travel health advice and prior exposure to destination risks significantly enhance vaccine knowledge and attitude and a finding echoed by qualitative studies showing that perceived susceptibility and experience drive risk-reducing behaviours among university students (2022). Yet, most travellers maintain stable risk perceptions pre- and post-travel, unless personally impacted by harm or illness.

Furthermore, Grigoriadis et al. (2025) demonstrate through the Social Amplification of Risk Framework that political instability, terrorism, and negative media coverage adversely affect destination choice and amplify perceived travel risks. The surge in tourism risk research since COVID-19 emphasizes the growing influence of

both real and perceived threats on travel behaviour and marketing strategies.

Finally, several recent incidents in Malaysia underscore the range of travellers' risks from hypothermia-related fatalities on Mount Kinabalu (Sabah tourism authorities considering fitness criteria), to ongoing maritime kidnapping threats in eastern Sabah, and high-profile transport accidents involving foreign tourists. These cases reinforce that travellers' safety remains a paramount concern for destination competitiveness and policy response.

RO1: To investigate the relationship between the purchaser's behaviour with perceived travel risks among travellers.
RO2: To examine the relationship between legal challenges with perceived travel risks among travellers.
RO3: To investigate the relationship between insurance availability with perceived travel risks among travellers.

2. Literature Review

Risk Perceptions among Travelers: Risk and tourism are fundamentally intertwined, as leisure travel inherently involves exposure to both physical and psychological threats. In conceptualizing perceived risk, scholars have noted the overlapping and often inconsistent use of terms such as uncertainty, worry, fear, and anxiety, causing definitional confusion (Setiawan et al., 2024). Perceived risk encompasses individuals' judgments regarding both the likelihood and severity of potential harm (Slovic et al., 2016). This distinction is critical: known probabilities pertain to "risk," while unknown probabilities invoke "uncertainty", a conceptual split rooted in ambiguity aversion theory.

Tourism risk research overwhelmingly explores subjective risk perceptions, since tourists respond to perceived rather than actual risk (Setiawan et al., 2024). Tourism is a high-experience domain where evaluations are based on anticipation and uncertainty, leading consumers to rely on heuristics and emotional cues (Setiawan et al., 2024).

Risk perceptions vary across situations and decision-making contexts. Researchers argue that individuals weigh certain risk dimensions more heavily depending on the context (e.g., transport vs medical risk) (Setiawan et al., 2024; Najar & Rather, 2023). Furthermore, experience plays a key moderating role: travelers learn from prior trips, reducing perceived risk and increasing confidence for future travel (Chen & Gursoy, 2001; Maulana et al., 2022).

Finally, tourism research demonstrates perceived risk's significant influence on destination image, travelers' behavior, and loyalty. For example, disruptions such as political turmoil or health crises can distort destination image through media amplification, affecting future travel intentions (Grigoriadis et al., 2025). A multi-dimensional analysis by Maulana et al. (2022) identifies five distinct risk dimensions, which are potential loss, psychological, health, social, and financial, and shows they shape accommodation and travel choices post-COVID-19.

Purchaser's Behavior: Destination image profoundly shapes both the travel decisions of prospective tourists and the experiences of those already vacationing. Recognizable objective risks such as crime, illness, political unrest, or terrorism can stem from negative events, directly influencing this image. Scholars define risk perception as travelers' awareness and concern about social or environmental issues at a destination; heightened awareness often leads to increased sensitivity to risk in future travel choices.

While risk may have positive (e.g., thrill-seeking) and negative (e.g., financial loss) dimensions, most research emphasizes the undesirable aspects. Travelers' behavioral intentions are influenced by their sense of responsibility, which is closely tied to perceptions of their own impact, echoing findings in consumer and sustainable behavior literatures (recently corroborated by Setiawan et al., 2024).

Importantly, travelers' characteristics influence sensitivity to risk and choice: price-conscious backpackers may forgo insurance, while families prioritize comprehensive coverage. Research shows that perceived risk

and destination image interact to influence visit intentions. A 2022–2023 Indonesian study found that health and socio-psychological risk affected visit decisions directly and indirectly through destination image (Anzani et al., 2022). Likewise, a 2023 MDPI study confirmed that destination image strongly influences travel intention, mediated by COVID-19 perceived risk across cognitive, affective, and security dimensions. In

Malaysia, Kumar, Shagirbasha & Konar (2023) reported that destination image and perceived COVID-19 risk jointly shaped Malaysian urban tourism behavior, underlining the practical importance of these constructs.

In the context of risk-taking tourism (e.g., adventure travel), scholars increasingly recognize risk as an intrinsic element of the travel experience. Thrill-driven tourists willingly accept bodily harm risks for experiential rewards (Allman et al., 2022). However, a lack of personal experience with hazards such as political instability or terrorism amplifies reliance on media and vicarious information, making prior knowledge essential for informed decision-making.
H1: There is a relationship between the purchaser's behavior with perceived travel risks among travelers.

Legal Challenges: Trust is a foundational element of financial and insurance systems. In travel contexts, money mediates trust between consumers and institutions, with insurance and professional expertise playing key roles in restoring balance, often accepted without question. Recent research highlights how media framing influences perceived risk: new media use tends to amplify health-related concerns, prompting travelers to adopt protective behaviors, while traditional media's framing effects are less clear.

Customer perceptions of unfairness in insurance can trigger negative behaviors. Equity theory suggests that consumers assess fairness by comparing inputs (such as paid premiums) to received outputs; a perceived imbalance may motivate adverse actions (Johnson & Lee, 2022). Attribution theory further explains how consumers interpret insurance outcomes: they frequently assess whether adverse outcomes are due to company negligence or personal fault (Smith & Wang, 2023).

Insurance logic in travel is clear. Consumers must purchase policies in advance to mitigate potential harm. Providers must actively educate travelers about their coverage of what is and isn't included, potential claims scenarios, and situational caveats to build trust and prevent misunderstandings. Travel insurance literacy is positively associated with trust and purchase intention, especially among digitally engaged travelers (Taylor et al., 2023).

Moreover, framing effects can significantly influence insurance uptake. Studies using experimental interfaces reveal that presenting insurance premiums with loss-framing (highlighting what travelers stand to lose) increases purchase intention, especially among younger users (Lahoti et al., 2023).

For travelers venturing into remote or risky areas, understanding the timing and limitations of rescue and coverage, such as delays in medical evacuation, is crucial. Insurance providers should ensure travelers grasp these realities in advance, enabling informed decisions and aligning expectations with policy terms.
H2: There is a relationship between legal challenges with perceived travel risks among travelers.

Insurance Availability: The media's portrayal of hazards plays a pivotal role in shaping public risk perceptions. Some threats are sensationalized, others downplayed. Recent studies confirm that fear-laden headlines significantly amplify perceived risk, whereas neutral reporting diminishes urgency, even affecting preventive behavior (Qian et al., 2024). Specifically in travel, framed narratives about terrorism or pandemics can sway destination choices and safety behavior (Xie et al., 2023).

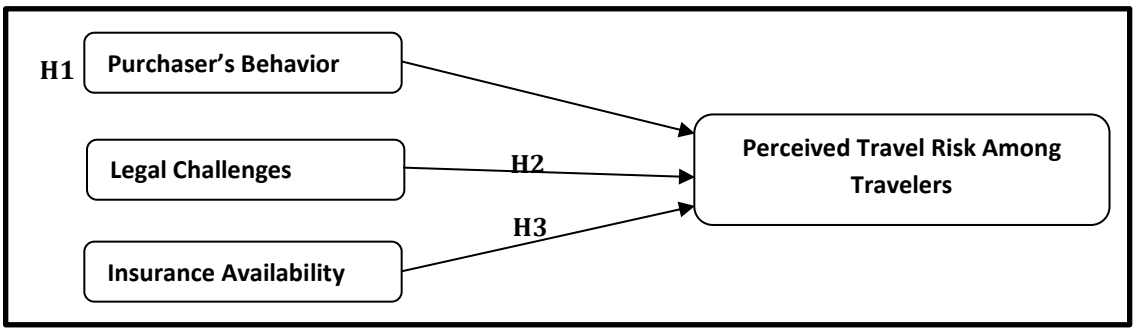
Lacking first-hand experience, tourists rely heavily on secondary sources, media, social platforms, and peer feedback when assessing destination safety. Comprehensive reviews indicate that perceived destination risk directly influences purchase intentions, pressing travelers toward safer options or higher insurance coverage (Cui et al., 2016).

Regarding insurance fairness, contemporary studies reveal that justice judgments hinge on consumers' perceived control. A 2025 survey in Europe found individuals deem data-driven or behavior-based insurance

fair only if they understand and can influence the outcome; otherwise, perceived fairness drops sharply (Zuiderveen et al., 2025). This echoes early attribution research, but with a modern data focus: external factors such as regulation may be accepted, while internal mismanagement triggers dissatisfaction and behaviors like churn or negative word-of-mouth.

H3: There is a relationship between insurance availability with perceived travel risks among travelers.

Figure 1: Conceptual Framework



3. Research Methodology

The research methodology for this study involved distributing a structured questionnaire to approximately 50,000 individuals in Puncak Alam, Selangor. The structured questionnaire served as the primary data collection tool, systematically gathering information to assess the relationships between the independent variables, which are purchasers' behaviour, legal challenges, and insurance availability, with the dependent variable, perceived travel risks among travellers.

The study adopted a correlational research design to analyze the relationships between the independent variables and perceived travel risks among travellers in Puncak Alam, Selangor. The researcher applies the quantitative research methodology, and the sampling method proposed for this research is convenience sampling, which falls under the category of non-probability sampling techniques**.** Convenience sampling involves selecting participants who are readily accessible and willing to participate**,** rather than being randomly chosen from the broader population. This method is often used in exploratory research due to its practicality**,** time efficiency**,** and cost-effectiveness**,** especially when the target population is difficult to access or when a large sample is not essential for generalizability. Although a sufficient sample size for this research would ideally exceed 350 individuals who travel every month, a targeted sample of 150 respondents has been selected for this study. These respondents are drawn from three key groups: travel agents, professionals in the insurance industry, and frequent travellers themselves. In this study, all the data will be analysed by using the Statistical Package for the Social Sciences Software (SPSS). This sampling approach is designed to capture diverse perspectives relevant to travel-related risk while maintaining feasibility within the research constraints. The findings are expected to offer valuable insights into the Puncak Alam community's awareness and preparedness levels and experiences with expected risk exposure while travelling.

4. Conclusion

This study highlights the multifaceted nature of perceived travel risk among travellers in Puncak Alam, Selangor, by examining the interrelated roles of purchasers' behavior, legal challenges, and insurance availability.

The findings confirm that each variable significantly contributes to travellers' risk perceptions, with implications for decision-making, destination trust, and preparedness. Specifically, travellers who are more informed and proactive in managing risks through insurance and legal awareness tend to exhibit lower perceived risk and greater confidence in travel planning. Legal uncertainties and limited access to comprehensive insurance further amplify perceived vulnerabilities, especially in unfamiliar or high-risk destinations. These insights underscore the need for targeted interventions, including risk communication, insurance literacy, and policy reforms that reinforce travellers' protection.

By advancing understanding of how personal behavior, systemic constraints, and market accessibility shape risk perceptions, this research contributes meaningfully to tourism risk scholarship. The study's outcomes are instrumental for stakeholders aiming to build resilient, trustworthy, and traveller-centric tourism ecosystems.

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Exploring Students' Acceptance in Using Immersive Virtual Reality (IVR) and Metaverse Integrated Learning Environment

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Abstract: The combination of immersive technologies such as Virtual Reality (VR) and the Metaverse is changing the educational patterns by offering interactive, personalized, engaging learning experiences. This research studied the student acceptance in immersive VR and Metaverse-based learning environments through the Technology Acceptance Model (TAM) model. This research examined the influence of perceived usefulness, perceived ease of use, and attitude on behavioral intention among university students in University Teknologi MARA (UiTM) Puncak Alam. By using a quantitative research design, data were collected from 103 undergraduate students via a structured questionnaire. Through regression analysis, it was revealed that only perceived ease of use and attitude significantly influenced students' behavioral intentions to adopt virtual reality in their learning activities, but not perceived usefulness. These findings highlighted the importance of a friendly user interface and positive emotional engagement in the adoption of virtual reality. The results also contributed to the ongoing discussion on education technology acceptance and provided some insights for software designers, educators, and policymakers for designing and implementing the virtual environment online effectively. Some suggestions for future research were also suggested to explore more variables, such as trust, self-efficacy, and institutional support to further enhance the understanding of adoption behavior across diverse educational methods.

Keywords: *Immersive Virtual Reality, Metaverse, Learning, Education, Technology Acceptance Model*

1. Introduction and Background

The modern education is undergoing a transformative shift, driven significantly by the integration of immersive technologies, particularly Virtual Reality (VR) and the Metaverse. The history of virtual reality in education started in the 1960s, with the experimental simulators such as Morton Heilig's Sensorama that is used for training and entertainment (Jerald, 2015). Nevertheless, virtual reality is being used in formal educational settings only materialized in the early 1990s, driven by the advancement in computer graphics and head-mounted display designs (Pantelidis, 1993). Virtual reality has transitioned from a promising, experimental tool to an accessible and commercial learning tool through the ever-changing technology. This scenario enables learners to engage with sophisticated three-dimensional, interactive environments and simulations, nurturing deeper learning across diverse disciplines, including medicine, engineering, and language acquisition (Radianti et al., 2020).

Virtual Reality is defined as a fully immersive, computer-generated environment that facilitates realistic and embodied user interaction with digital objects and spaces (Milgram & Kishino, 1994). Metaverse is defined as an extension of Virtual Reality, a persistent, shared, and social three-dimensional digital space that effortlessly integrates digital and physical realities. In this expanded definition, users are allowed to engage in learning, collaboration, and creative activities within a comprehensive virtual universe (Mystakidis, 2022). The purpose of the Metaverse in education is to cultivate highly interactive and collaborative learning experiences that surpass the conventional limitations of traditional classrooms, thus promoting learning environments that are more flexible, inclusive, and globally interconnected (Freina & Ott, 2015).

As technologies continue their rapid advancement and integration into educational standards, one critical question emerges: understanding the student acceptance and adoption behaviors of virtual reality in the learning process. The Technology Acceptance (TAM) Model was first developed by Davis (1989), offers a robust theoretical framework for systematically exploring technology adoption. This model originally suggests that an individual's behavioral intention to use a novel technology is primarily influenced by their perceived usefulness

(the conviction that the technology will enhance task performance) and their perceived ease of use (the belief that utilizing the technology will be effortless). In this study TAM Model serves as an important analytical tool for assessing student behavioral intentions in using newer learning technology. This model focuses more narrowly on individual cognitive evaluation, which aligns well with the context of voluntary students' use of immersive Virtual Reality and Metaverse platforms in higher education.

The characteristic of immersive qualities of Virtual Reality, added with the extensive connectivity offered by the Metaverse, present unparalleled opportunities for cultivating active, participatory, and highly personalized learning experiences (Radianti et al., 2020). Nevertheless, despite the significant promise held by these innovations, important questions persist regarding the students' perceptions, acceptance levels, and their behavioral intentions to adopt such technologies within the setting of formal educational contexts. By applying the established TAM Model, this study aims to systematically investigate the important factors that drive students' acceptance and intention to utilize immersive virtual reality and metaverse-integrated learning environments. The findings from this study will also contribute valuable insights into the transformative role of immersive technologies like Virtual Reality in shaping the future of education. Further, these findings may also contribute to some recommendations for instructional designers, educational institutions, and policymakers in the intricate and evolving landscape of digital learning.

2. Literature Review

The Technology Acceptance Model (TAM) is one of the important foundational frameworks in understanding users' acceptance and use of technology. Originating from Davis (1989), the model theorizes that perceived usefulness (PU), perceived ease of use (PEOU), and attitude toward use (ATU) significantly influence an individual's behavioral intention (BI) to adopt newer technology. Recent developments and empirical research conducted between 2022 and 2025 have further validated and expanded the TAM Model across various industries, technologies, and demographic groups. This literature review highlighted key findings from recent studies and journal articles, emphasizing the dynamic roles of perceived usefulness (PU), perceived ease of use (PEOU), and attitude toward use (AT) on behavioral intention (BI).

Previous research revealed that perceived usefulness and perceived ease of use positively influenced students' perceptions and intentions to use mobile payments, which is a newer technology in payment methods (Bahaj, 2025). This study also confirms the robustness of the TAM model in the adoption of newer technology among younger demographics, illustrating that cost considerations plus other factors as explained previously are becoming more prominent in shaping behavioral intentions. Wargadinata (2025) extended TAM Models to the context of rural AI healthcare applications. The study highlighted that organizational capability and user self-efficacy significantly enhanced acceptance of AI-based technologies at the village level. The better the infrastructure and organizational support, the higher the users' self-confidence and subsequent intention to adopt the technology (Wargadinata, 2025). These studies are some of the important studies that highlighted the robustness of the TAM framework that can be used in many different scenarios.

Shen et al. (2024) have conducted a study that confirmed the significance of perceived usefulness and ease of use in shaping users' willingness to adopt virtual reality technologies in education. Further study by Shen et al. (2024) in different industry settings found that perceived usefulness also appeared as the more influential determinant, indicating that users prioritize functional benefits over simplicity when dealing with complex and high-risk technologies. This concept is also agreed by a study from Rosli and Saleh (2024), wherein they found perceived usefulness, personal innovativeness, and perceived enjoyment significantly influenced students' behavioral intentions in acceptance of virtual reality and metaverse in educational applications. Nevertheless, perceived ease of use did not have a significant direct impact on behavioral intention, suggesting that in immersive technologies, users may accept usability challenges if the perceived benefits and enjoyment are high (Rosli & Saleh, 2024).

In García et al. (2024) study, they have found that perceived ease of use remained the key driver for continuous learning engagement. Their findings in this study reinforced the classic TAM Model assumption that ease of access and interaction support sustained technology use in educational settings are important in accepting and adopting newer technology. Wibowo et al. (2024) applied TAM Model to analyze digital business intentions among students and found that perceived usefulness (PU) and perceived ease of use (PEOU) have a high

influence on adopting digital business platforms. This study further reinforces TAM's versatility across various domains, especially in the post-pandemic digital economy, where online entrepreneurship is on the rise.

Musyaffi et al. (2024) also emphasized factors influencing adoption, like perceived usefulness and performance expectancy were crucial, aligning with earlier findings by Martin et al. (2022). Their research underlined the importance of perceived performance benefits in driving adoption among small businesses with limited resources. Alzahrani (2023) also analyzed the TAM Model through the perspective of university educators using technologies in educational institutions and found that both perceived usefulness (PU) and perceived ease of use (PEOU) significantly influenced the intention, mediated by self-efficacy. This study has shown an alignment with TAM Model extensions by incorporating other factors such as motivational and capability, to better explain technology acceptance among professional users.

Choung et al. (2022) and Nagy & Hajdu (2022) both examined the role of trust in artificial intelligence systems, found that trust indirectly affected behavioral intention through perceived usefulness (PU) and attitude (AT). Nagy & Hajdu (2021) identified trust as a stronger predictor than perceived ease of use (PEOU) in artificial intelligence-based online shopping systems. Further, these studies highlighted the importance of trust as one of many external variables in accepting artificial intelligence, suggesting a need to further extend the TAM Model to include psychological and emotional constructs.

3. Research Methodology

This study used a quantitative, descriptive research design aimed at investigating the influence of perceived usefulness (PU), perceived ease of use PEOU), and attitude (AT) on behavioral intention (BI) in adopting newer specific learning technology among university students. The TAM Model served as the theoretical foundation, providing a structured framework to evaluate the relationships between the constructs.

The target population for this study consisted of students from the Faculty of Business and Management at Universiti Teknologi MARA (UiTM) Puncak Alam Campus. A non-probability convenience sampling method was adopted to distribute the survey to students who were accessible and willing to participate. A total of 103 responses were collected. This sample size exceeded the commonly recommended threshold for regression analysis, which is typically set at 10 to 15 observations per predictor variable (Hair et al., 2019), and is therefore considered sufficient for reliable analysis and generalization within the study context.

Data were collected using a self-administered structured questionnaire, adapted from established instruments from the TAM Model (e.g., Davis, 1989; Venkatesh & Davis, 2000). The questionnaire comprised four main constructs: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATT), and Behavioral Intention to Use (BI). Each construct was measured using 4–5 items on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The questionnaire was pilot-tested to ensure clarity and reliability of the items. The survey was distributed electronically via university networks and social media platforms. Students were invited to participate voluntarily, without coercion or prejudice. All participants were assured of anonymity and confidentiality, and informed that their responses would be used solely for academic purposes.

The data were analyzed using SPSS software. Descriptive statistics were used to summarize demographic information and general trends in responses. Reliability analysis was conducted using Cronbach's alpha to assess the internal consistency of the constructs. A value of $\alpha \geq 0.70$ was considered acceptable, indicating good internal reliability (Nunnally & Bernstein, 1994). For hypothesis testing, multiple linear regression analysis was performed to observe the influence of Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (AT), on Behavioral Intention to Use (BI). The level of statistical significance was set at $p < 0.05$, following standard inferential guidelines (Cohen, 1988; Pallant, 2020).

This study was conducted in accordance with ethical research standards. Before participation, students were presented with a brief overview of the study and a consent form embedded in the survey. Participation was voluntary and students could withdraw at any point. The survey did not include any prejudiced, discriminatory, or sensitive questions, ensuring a fair and respectful research process.

4. Results

This section presents sets of results relating to the profile of respondents with regard to demographic and geographic characteristics (gender, age, level of education, and region).

Profile of Respondents: Table 1 presents the demographic characteristics of the sample. The sample comprised mostly female respondents (n = 96, 92.3%), with a smaller proportion of males (n = 8, 7.7%). All participants were within the 18–24 age range (n = 104, 100%), and all were pursuing an undergraduate (diploma/bachelor's) level of education (n = 104, 100%). In terms of household income, the majority earned below RM50,000 per year (n=80, 76.9%), followed by RM150,001–RM200,000 (n = 16, 15.4%) and RM50,001–RM100,000 (n = 8, 7.7%). Regarding prior experience with Virtual Reality (VR), 69.2% of participants (n = 72) indicated that they had used VR before, whereas 30.8% (n = 32) had not. The frequency of using Virtual Reality (VR) for learning varied among respondents, with 53.8% (n = 56) reporting that they had never used Virtual Reality (VR), 30.8% (n = 32) had used it occasionally and 15.4% (n = 16) rarely used it at all.

Table 1: Demographic and Geographic Information of Students

Variables	Category	Frequency (n)	Percentage (%)
Gender	Female	96	92.3
Gender	Male	8	7.7
Age	18–24	104	100.0
Education Level	Undergraduate (Diploma/Bachelor's)	104	100.0
Household Income (Annually)	Below RM50,000	80	76.9
Household Income (Annually)	RM150,001–RM200,000	16	15.4
Household Income (Annually)	RM50,001–RM100,000	8	7.7
Have you ever used Virtual Reality (VR)?	Yes	72	69.2
Have you ever used Virtual Reality (VR)?	No	32	30.8
Frequency of VR Usage for Learning	Never	56	53.8
Frequency of VR Usage for Learning	Occasionally	32	30.8
Frequency of VR Usage for Learning	Rarely	16	15.4

Descriptive Statistics: The descriptive statistics for the key constructs, presented in Table 2, indicate that students generally responded positively to the immersive VR and metaverse learning environment. For perceived usefulness (PU), this construct had a mean of 4.19 (SD = 0.68), suggesting that students found the technology highly beneficial for supporting their learning. This finding is consistent with prior research (Davis, 1989; Radianti et al., 2020). Meanwhile, attitude towards use (AT) also registered a mean of 4.21 (SD = 0.68), indicating that most participants in general have favorable perceptions towards using immersive virtual reality for learning. This aligns with the TAM Model (Davis, 1989) and studies by Mystakidis (2022). Further, perceived ease of use (PEU) received a mean score of 3.92 (SD = 0.71), suggesting that participants felt reasonably comfortable navigating the virtual platforms. This result is comparable to prior research (Radianti et al., 2020). Lastly, behavioral intention to use (BI) yielded a mean of 4.00 (SD = 0.71), indicating that students expressed strong intentions to adopt and continue using the immersive learning platforms. This finding was consistent with other empirical studies done by Venkatesh et al. (2003).

The relatively low standard deviation figures across all constructs (0.68–0.71) further imply a moderate consensus in perceptions and behavioral intention within the sample. These findings supported the theoretical tenets of the TAM Model and highlighted the potential of virtual reality as an effective and well-received tool for modern education and learning.

Table 2: Descriptive Statistics

Variables	Factor Name	Mean	Std. Dev. (SD)
PU	Perceived Usefulness	4.192	0.6804
PEU	Perceived Ease of Use	3.917	0.7060
AT	Attitude Towards Use	4.205	0.6769
BH	Behavioral Intention	3.995	0.7071

Regression Analysis: Regression Analysis is a statistical method used to examine and quantify the relationships between one or more independent variables (predictors) and a dependent variable (outcome). It helps researchers understand the extent and direction to which certain factors influence an outcome. For instance, in technology acceptance studies, it can determine how perceptions like usefulness, ease of use, and attitudes predict learners' behavioral intentions (Field, 2013). Regression is a cornerstone of statistical modeling due to its ability to assess the strength and significance of relationships, and to estimate and predict outcomes from observed data (Tabachnick & Fidell, 2019).

The results (see Table 3) indicated that the overall model was highly significant and accounted for a substantial proportion of the variance in behavioral intention to use (BI). The three constructs altogether explained approximately 81.2% of the variance (R^2 = .812, Adjusted R^2 = .806) in the outcome variable, suggesting that the combined effects of attitude, perceived usefulness, and perceived ease of use, these three constructs had a strong and meaningful influence on students' behavioral intentions. With a standard error of the estimate of 0.242, the model demonstrated satisfactory predictive accuracy.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901[a]	.812	.806	.24156

a. Predictors: (Constant), Attitude, Perceived Usefulness, Perceived Ease of Use

The results of the multiple regression analysis (see Table 4) revealed that perceived ease of use (PEU) was the strongest and significant determinant of behavioral intention (BI) (B = 0.744, β = .717, t = 8.22, p < .001). This suggested that respondents who found easy easy-to-operate virtual reality (VR) learning environment were more likely to adopt and utilize it. This finding was consistent with the tenets of the Technology Acceptance Model (TAM), which suggested that perceptions of ease of use significantly influence technology acceptance and usage behavior (Davis, 1989). Similar results have been reported in other studies within the context of educational technology, where ease of use has emerged as an important determinant of behavioral intention (Venkatesh et al., 2003; Radianti et al., 2020).

Attitude towards the Virtual Reality (VR) also demonstrated a significant positive effect (B = 0.223, β = .234, t = 2.49, p = .015), indicating that students with favorable attitudes were more likely to have the intention to adopt and utilize the technology. This finding was in line with prior studies that highlighted the role of attitude as a critical mediator in technology acceptance (Davis, 1989; Venkatesh et al., 2003).

In contrast, for this study, perceived usefulness (PU) was not a significant predictor (B = -0.027, β = -.029, t = -0.38, p = .708), suggesting that its direct role in shaping behavioral intention was less distinct within this specific sample. This result diverged from the traditional TAM Model framework findings, where perceived usefulness (PU) was typically a strong determinant of intention (Davis, 1989). Nevertheless, similar findings had been observed in certain educational technology studies, where ease of use and attitude outweighed usefulness, most likely due to a lack of students' prior exposure and comfort when immersing in digital learning environments during the learning process (Radianti et al., 2020).

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.260	.185		1.400	.165
	perceived Usefulness	-.027	.071	-.029	-.375	.708

perceived Ease of Use	.744	.091	.717	8.217	<.001
Attitude	.223	.090	.234	2.485	.015

a. Dependent Variable: Behavior Intention

Discussion

This study revealed the significant influence of attitude and perceived ease of use on students' behavioral intention to adopt immersive virtual reality and metaverse learning environments. Students generally held favorable views, with high average scores for perceived usefulness (PU) (M=4.19, SD=0.68) and attitude towards use (AT) (M=4.21, SD=0.68), consistent with existing technology acceptance literature (Davis, 1989; Mystakidis, 2022; Radianti et al., 2020). The strong score for perceived ease of use (PEU) (M=3.92, SD=0.71) also indicated that students found these platforms were easy to navigate, thus reinforcing their role in new learning technology acceptance (Davis, 1989).

Regression analysis also confirmed that these three factors collectively explained 81.2% of the variance in behavioral intention (BI). Perceived ease of use (PEU) was the most influential predictor (B=0.744,p<.001), highlighting its critical importance for interactive technology adoption, a finding supported by previous research in digital learning environments (Venkatesh et al., 2003; Radianti et al., 2020). Attitude (AT) also showed a significant positive relationship (B=0.223,p=.015), aligning with traditional TAM Model findings (Davis, 1989; Venkatesh et al., 2003).

Interestingly, Perceived Usefulness was not a significant direct predictor (B=−0.027, p=.708), which deviated from typical Technology Acceptance Model (TAM) results (Davis, 1989). Nevertheless, this outcome was aligned with other Virtual Reality (VR) and Metaverse studies where factors such as emotional factors, like attitude, were more impactful than usefulness, especially when learners already recognize the efficacy of digital tools (Radianti et al., 2020). This finding suggested that for highly interactive platforms, creating seamless user experiences and fostering positive emotional connections might be more crucial and important (Makransky, Terkildsen, & Mayer, 2019) for adoption than merely demonstrating functional benefits.

Ultimately, many of these findings highlighted how technology acceptance by humans is evolving, especially in the era of virtual reality (VR) and immersive learning in humans. Humans in general are very interested to learn from new, interesting environments and in this case, through virtual reality. From this study, it is also observed that the importance of virtual reality (VR) and metaverse designers and researchers in prioritizing the development of virtual technology and metaverse platforms that are both intuitively usable and emotionally engaging to promote sustainable engagement and adoption for the students.

5. Managerial Implications and Recommendations

This study provides key insights for educational institutions and developers regarding the effective implementation of immersive VR and metaverse platforms in academic settings. The important finding that perceived ease of use (PEU) was the dominant predictor of behavioral intention necessitates a strategic focus by managers and instructional designers on designing intuitive user-interface design and seamless interaction. Prioritizing investments in tailored training sessions and inherently user-friendly interfaces can significantly reduce cognitive demands, bolster user self-efficacy, and thereby promote wider technology uptake (Davis, 1989; Venkatesh et al., 2003).

Academic institutions should focus on designing intuitive platforms and fostering and fostering engaging learning experiences. But before full-scale implementation, evaluating students' readiness is essential. This can be done through a brief survey or any diagnostic tools assessing prior exposure to immersive technology, digital technology, and confidence level. Moreover, fostering a positive attitude towards these immersive platforms is indispensable. Integrating engaging interactive components, gamified experiences, and features that support social learning can enhance user engagement and stimulate prolonged utilization (Radianti et al., 2020). To further optimize the advantages offered by these technologies, comprehensive institutional backing—encompassing robust IT infrastructure, readily available access to necessary devices, and targeted digital literacy workshops—is critical for mitigating initial adoption barriers and building user proficiency (Wargadinata, 2025).

While perceived usefulness did not serve as a direct determinant in the present study, it remains imperative to articulate its benefits effectively. This involves clearly linking VR and metaverse learning opportunities with students' academic objectives and future career aspirations (Shen et al., 2024). Such an integrated approach empowers institutions to develop an ecosystem wherein immersive technologies evolve from exploratory tools into indispensable elements of the pedagogical landscape, thereby securing their enduring value and sustained integration.

For a similar study in the future, Slater and Sanchez-Vives (2016) proposed that future research should investigate additional external factors—such as trust, self-efficacy, and institutional support—to deepen insights into adoption behavior across varied educational settings. This is to be done because there are many factors out there that may influence the adoption of newer technology in all aspects of life. In this case, the using of virtual reality is used in many industries. Further, with the introduction of better, faster processor technology and the growth of artificial intelligence (AI), the learning process can be done in many interesting ways.

Conclusion

This study explored student acceptance of immersive Virtual Reality (VR) and Metaverse-integrated learning environments through the lens of the Technology Acceptance Model (TAM). The findings confirmed that perceived ease of use and attitude toward use significantly influenced students' Behavioral Intention, while Perceived Usefulness did not emerge as a significant predictor. These results suggest that ease of interaction and emotional engagement are more critical than functionality in shaping students' willingness to adopt immersive technologies in higher education.

From a theoretical perspective, this study reinforces the applicability of TAM in emerging educational technology contexts and highlights the evolving nature of technological acceptance, particularly the rising importance of affective factors. Practically, the findings underscore the necessity for educational institutions and developers to prioritize user-friendly interface design, emotional engagement strategies, and readiness assessments to ensure successful implementation.

However, this study is limited by its single-institution sample and gender imbalance, which may affect the generalizability of findings. Future research should incorporate more diverse populations and consider additional constructs such as trust, social influence, and self-efficacy. Additionally, comparative research across different cultural and institutional settings can deepen understanding of how immersive learning is accepted globally.

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Market Sentiment and Stock Return Volatility in Malaysia: Evidence using the GARCH-X Model

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Abstract: Market sentiment has been found to be one of the key determinants of stock market volatility, especially in globally interconnected economies such as Malaysia. With the growing influence of retail investors operating in advanced digital trading environments, understanding the role of sentiment in shaping market behavior has become more critical. Despite existing regulatory frameworks designed to protect investors from manipulation and misconduct, current surveillance practices still rely on traditional indicators such as price and trading volume. These indicators may not fully capture how the market works in a real investment setting. This study addresses a critical gap by empirically examining the effects of market sentiment (measured through the Consumer Sentiment Index) along with other macroeconomic variables on stock return and its volatility in Malaysia. Using the GARCH-X Model on stock return data from January 1990 until January 2025, we find that CSI has a positive and significant relationship with stock returns, indicating that Malaysia's stock market returns were more strongly influenced by investor confidence than by geopolitical events and monetary policy factors. In addition, the results from the GARCH-X model show that the stock market does not always move in line with the macroeconomic fundamentals in the short term. Additionally, the model suggests that in the short term, stock returns become more volatile during periods of market instability, with volatility amplifying when new shocks emerge. However, in the long run, the market tends to adjust and return to equilibrium. These findings underscore the need for regulatory authorities to enhance real-time volatility monitoring tools and promote better access to structured, legal, and accessible data sharing in ensuring effective market responses during periods of crisis or adverse global events.

Keywords: *Market Sentiment, Malaysia Stock Market, GARCH-X Model, Stock Return Volatility*

1. Introduction and Background

As stipulated in the Capital Market Stability Review 2024 by the Securities Commission Malaysia (SC), market sentiment is one of the key drivers that will navigate the volatility within the domestic capital market, as a result of the interconnectedness of the global markets. Understanding how collective market sentiment can determine the level of stock market volatility is important to allow for better interpretation of price changes and the behavioral patterns of the underlying volatility. To date, there have been three regulations and frameworks within the Malaysian stock market context that address market sentiment by targeting the behaviors and practices that shape it. These frameworks include the Section 175-False or Misleading Appearance of Active Trading, Section 176-Stock Market Manipulation, and Section 177-Making False or Misleading Statements of the Capital Markets and Services Act 2007 (CMSA) that prohibit investors from engaging in stock market manipulation through pump and dump schemes that are carried out to artificially increase the value of the stock by misleading investors. These frameworks emphasize the essential function of sentiment regulation in preserving market integrity and stability, particularly in an increasingly globalized economic landscape.

In this context, the size of Malaysia's equity market underscores the importance of market sentiment as a determinant of stock market behavior. As of April 2025, the total market capitalization of securities listed in Bursa Malaysia amounted to RM 1,878.46 billion (Securities Commission Malaysia, 2025), reflecting the substantial value at stake. Recent studies conducted by Kong and Tang (2024) indicate that the sentiment factor plays a significant role in IPO shares' performance in Malaysia. When sentiment is higher, more investors (informed and less informed investors) are enthusiastic about IPO in general, and not only subscribing to high-

quality IPOs only. In addition, Kim and Ha (2010), who studied the effect of market sentiment on stock market anomaly, have found that anomalies become stronger or more profitable when investors in the market are overly optimistic. These findings suggest that shifts in market sentiment can substantially influence market volatility, mispricing, and returns. The implications may be more crucial, particularly in segments with more foreign investor shareholdings, such as the financial sector. Sudden shifts in investor mood can result in large equities selling off, which can drag down overall stock market performance.

Bursa Malaysia's Market Surveillance focus is to ensure the market operates in a fair and orderly manner to promote efficient price discovery and investor protection (Bursa Malaysia, 2025). If there are any significant and unexplained price or volume movements in the stock market, Bursa Malaysia Securities will issue an unusual market activity (UMA) query to the suspected publicly listed company to prompt public disclosure of information that could explain such trading activities. These actions imply that Bursa Malaysia and the SC rely on traditional indicators, such as sudden spikes in price and abnormal trading volume, in triggering UMA queries. It lacks sentiment-sensitive regulation in the current tech-driven retail investors' behavior. Thus, empirical research on market sentiment is essential to reform the existing surveillance, policy tools, and investor protection framework.

With the growing effect of digital technologies, retail investors have participated more actively and are increasingly guided by online platforms in making investment decisions. Even though the Capital Markets and Service Act (CMSA) requires accurate disclosures from publicly listed companies, such disclosures do not fully reflect the impact of irrational investor behaviors, which include speculative bubbles and fear-of-missing-out (FOMO) behaviors. These kinds of behaviors can interfere with stock market stability and lead to suboptimal investment outcomes (New Straits Times, 2025). The objective of this study is to empirically examine the effect of market sentiment, as proxied by Consumer Sentiment Index (CSI), along with selected macroeconomic variables (geopolitical risk, foreign portfolio investment, and market interest rate) on stock market volatility in the Malaysian stock market. By including the sentiment-based behavioral indicators into the stock return volatility model using the GARCH-X approach, this study introduces structured empirical evidence on how non-technical economic sentiment shapes equity pricing and trading behaviors. The rest of this article is structured as follows: Section 2 reviews relevant literature, Section 3 outlines the main methodology, Section 4 presents the results, and Section 5 discusses implications and concludes.

2. Literature Review

Market Sentiment and Stock Market Volatility

Attitudes, expectations, and sentiment refer to the psychological mood of consumers. These variables are determinants of an individual's actions in buying and selling decisions. Besides the supply side, the shift in demand level in response to these actions also determines the price level of goods and services that we pay today. Similarly, in the stock market, the collective behaviors and actions by investors are what drive the stock prices and volatility to change. Recent studies by Xiao, Jiang and Zhang (2024) have shown that investor sentiment helps to reduce the negative impact of policy uncertainty. An optimistic investor mood can help to moderate the downside risk from policy-related shocks.

In the current digital environment, the types of sentiment possessed by investors may be directly influenced by the way media frames certain events or crises. A study by Li et al. (2024) found that the tone of media reporting plays a significant role in shaping market sentiment. The study covered the COVID-19 period by investigating how COVID-19 news significantly spills over to stock market volatility. The risk spillovers may be more significant for the Asia-Pacific stock market since the countries exhibit strong economic interconnectedness with each other, which may increase stock market sensitivity (Sun et al., 2025). The vulnerability of one market can transmit instability to another market through the economy and financial network.

Recent studies on the effects of market sentiment on stock market volatility have concentrated on the United States and China markets. The majority of the findings posited that sentiment significantly affects the realized return and volatility (Abdelmalek, 2022), and its impact is stronger during crisis periods (Hsu et al., 2021) and bullish phases (Xie et al., 2023). When facing a complex and uncertain economic environment, people are often

unable to deal with the information rationally. Emotion, cognitive bias, and overconfidence are likely to lead to irrational, bad decisions (Ruan et al., 2018).

Geopolitical Risk, Foreign Portfolio Investment, and Interest Rates and Market Volatility

Geopolitical events such as wars, diplomatic tensions, or trade disputes create uncertainty and heighten investor risk aversion. According to (Caldara & Iacoviell, 2022), geopolitical risk (GPR) is "the risks associated with wars, acts of terrorism, and tensions between states that affect the normal and peaceful course of international relations". Studies show that geopolitical risk can trigger capital outflows, currency depreciation, and heightened volatility, especially in emerging markets (Lai et al., 2023). GPR often drives "bad volatility" during periods of market downturns or distress, with its effect being particularly strong at return quantiles below the mean or median, indicating its role as a driver of "bad volatility" during periods of market downturns or distress. This can cause a massive sell-off of stocks by investors (Lamine & Zribi, 2024)

With the recent outbreak of the Iran-Israel military conflict in 2025 and the U.S. and China Trade Wars, global geopolitical risks experienced intense turbulence once again. As a result, investor sentiment has turned pessimistic, and cross-border capital flows have continued to intensify. The mounting geopolitical risks have exerted significant pressure on the real economy and financial systems, leading to substantial fluctuations in global stock markets (Pan et al., 2023; Wang, 2025). The effects of GPRs on stock returns tend to weaken over time, while their impact on volatility tends to strengthen, suggesting persistent risks for investors.

Foreign portfolio flows are highly sensitive to geopolitical shifts and investor sentiment. GPRs may cause withdrawals from emerging economies, while investors seek safer, more stable markets (Wang, 2025). Earlier empirical studies also confirm that foreign investment inflows are significantly affected by sentiment spillover among investors (Luong, 2025), monetary policies (Loang et al., 2024), a country's income level and trade openness (Batala et al., 2021). These factors may also cause a significant shift in stock market performance (Ghulam et al., 2021) since they are among the key drivers for high foreign direct investment. However, the impact of foreign investments on the stock market may vary based on the types and investment weight of institutional investors that invest in the domestic stock market. It was found in the past that, when domestic institutional investors' inflows are higher than foreign institutional investors' inflows, the foreign flows will have little impact on stock market volatility (Aggarwal et al., 2022).

Besides that, the market interest rate is also crucial in determining the stock market performance and stability. The evidence is mixed. At one end, an increase in interest rates may result in lower stock performance. This is because rising interest rates increase the financing cost of companies, leading to a decrease in net profit, thereby making a negative impact on the stock price. At the same time, compared with stock, fixed-income financial products such as deposits and bonds become more attractive. Investors may shift money into these fixed-income products, causing stock market turnover to shrink and share prices to fall. Another contradicting view suggests that a lower interest rate may lead to lower share performance. Findings reported in Mohnot et al. (2024) show that a lower interest rate, which usually results from central bank actions to expand money supply, may lead to a lower future share price. However, this may be particularly true if the lowering of interest rates is done as a policy response to deteriorating economic conditions, which may cause the investors to perceive this as a negative signal about future earnings. Sometimes, firms may not take advantage of the lower borrowing costs when corporate confidence is low. Given all these past findings, incorporating geopolitical risk, foreign portfolio investment, and market interest rate alone may not provide a conclusive finding on how the stock market performs. Incorporating sentiment indicators into the volatility model may provide a better overview of how these variables are tied together in explaining the changes in stock market volatility in emerging markets.

Integrating Sentiment and Macroeconomic Variables in Volatility Modeling

Given the mixed findings on the individual effects of GPR, FPI, and interest rates, a more comprehensive model is needed. Recent research findings have shown the importance of investor sentiment as a critical factor that determines stock market volatility, especially in emerging markets. Studies from Paramanik & Singhal (2020) and Ph & Rishad (2020) indicate that sentiment indicators significantly influence stock market volatility in the Indian context, implying that market behavior cannot be fully explained by traditional economic variables alone. In addition, Xie et al. (2023) empirically show that investor sentiment has a notable and asymmetric

impact on stock return volatility during periods of market optimism or distress. These evidences underline the value of incorporating behavioral signals into volatility modeling due to the predictive power of sentiment analysis in forecasting market volatility (Deveikyte et al., 2022). Few studies integrate sentiment indicators such as the CSI alongside key macroeconomic variables like geopolitical risk, foreign portfolio investment, and market interest rates. Therefore, this study aims to fill this gap by empirically examining the impact of market sentiment and selected macroeconomic factors on stock market volatility in Malaysia, using the GARCH-X approach.

3. Research Methodology

The ARCH methodology, led by Engle (1982), suggests a method for measuring uncertainty if it is serially correlated. The empirical methodology used in this study extends the ARCH model. Let ξ_t be a model's prediction error, b a vector of parameters, and x_t a vector of predetermined explanatory variables in the equation for the conditional mean.

$$y_t = x_t b + \xi_t \qquad \xi_t | I_{t-1} \sim N(0, h_t) \quad (1)$$

Where; h_t Is the variance of ξ_tGiven information I at time t-1. The GARCH specification, as developed by Bollerslev (1986), defines h_t As:

$$h_t = u_0 + \sum_{i=1}^{p} A_i h_{t-i} + \sum_{j=1}^{j} B_j \xi^2{}_{t-j} \quad (2)$$

Where; u_0, A_i, and B_i Being nonnegative parameters. The parameter u_0 Serves as the minimum volatility value, which prevents the variance from going lower than this level (Staikouras, 2006). Based on equation (2), the conditional variance h_t It is a linear function of its own lagged p conditional variances, and the lagged q of squared residuals. If the $\sum A_i + \sum B_j = 1$, Then the GARCH specification turns into an integrated GARCH (IGARCH) process, indicating that the current shocks persist indefinitely in conditioning the future variance as indicated in Engle and Bollerslev (1986) and Lamoureux and Lastrapes (1990).

Following Apergis and Rezitis (2011), this study used the GARCH-X model. This model considers the effects of the short-run deviations on the conditional variance. The equation (2) then becomes:

$$h_t = u_0 + \sum_{i=1}^{p} A_i h_{t-i} + \sum_{j=1}^{j} B_j \xi^2{}_{t-j} + \gamma_1 C^2{}_{t-1} \quad (3)$$

In terms of persistence, for the GARCH-X model to be stationary, the $\sum A_i + \sum B_j < 1$. We also need u_0>0 and all A_i and $B_j \geq 0$ for i=1,…,p and j=1,2,…q. i…,j

The short-run deviations are proxied by the squared and lagged error-correction term. $C^2{}_{t-1}$. This term, known as the error correction term ($ECM^2{}_{t-1}$), represents the residuals from a cointegrating vector that associates stock returns and identified macroeconomic factors. The parameter γ_1 explains the effects of short-run deviations between the macroeconomic variables from the long-run cointegrated relationship on the conditional variance of the residuals for the stock returns equation. If the value of γ_1 is positive, it means that stock returns become more volatile and possibly less predictable as the deviation of stock returns from certain macroeconomic factors gets larger. The presence of such deviations in the conditional variance may be exploited to get more precise and reliable confidence intervals in forecasting stock returns.

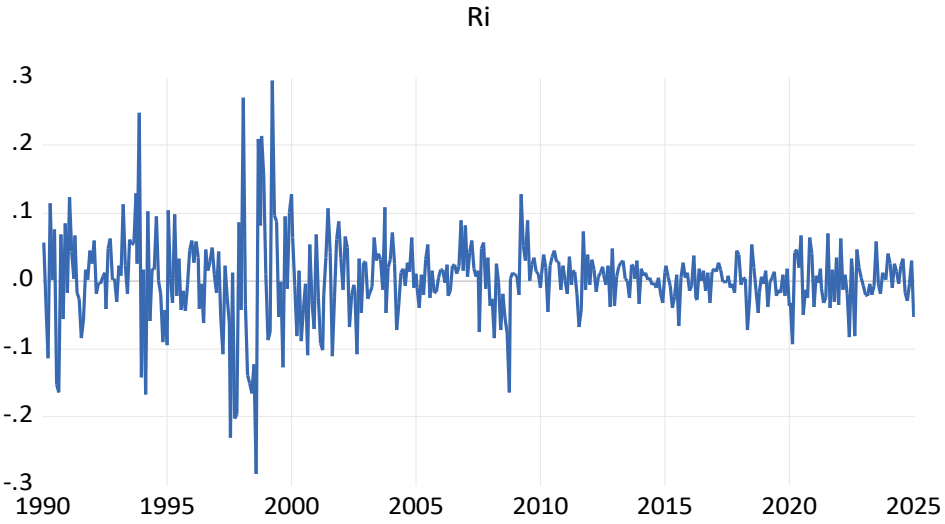
4. Results

Data: The empirical analysis is carried out using monthly data on KLCI index returns, and monthly data on geopolitical risk level proxied by geopolitical risk index (GPR), market interest rate measured by 3-month interbank interest rate (Int), foreign portfolio investment (FPI), and market sentiment (MS). The sample period is from January 1990 until January 2025, and is obtained from the Refinitive Workspace database, and Caldara & Iacoviello (2022) computed the GPR index. GPR index is defined as the frequency of specific keywords related to geopolitical tensions in major international newspapers. A higher GPR index is contributed by a higher frequency of keywords such as wars and military tensions, terrorists' threats, political instability, and threats of war in news coverage. The consumer sentiment index represents the series of surveys conducted on households in Peninsular Malaysia to gauge consumer spending trends and sentiments. A higher index value

indicates higher consumer confidence about the current and future state of the economy. The analysis of the data was conducted using E-views 12.

Volatility Patterns of Stock Returns: The monthly KLCI index closing price is used in this study. Figure 1 presents the monthly log returns for the sample period. These preliminary results show several spikes in volatility in multiple global events. The first spike in volatility during the sample period was observed during the 1997-1998 Asian Financial Crisis and the 1998-2000 dot-com bubble period. After these periods, the volatility started to decrease over time, before it went through another volatility increase in the year 2008-2009, corresponding to the Global Financial Crisis at that time. Subsequently, the Covid-19 pandemic in early 2000 exhibited a modest spike in volatility, but not as extreme as during the prior crises.

Figure 2: Monthly log returns of KLCI Index from Jan 1990 to Jan 2025



Descriptive Statistics: Table 1 displays the summary of the mean and distribution of monthly returns for the KLCI index from January 1990 to January 2025. The mean monthly return of 0.23%, with a general annual return of 2.88% indicates that the Malaysian stock market in general is showing a consistent long-term growth. The maximum and minimum returns of 29.44% and -28.46%, respectively, are consistent with the major important events related to financial crises and non-financial crises identified earlier. The Jarque-Bera test indicates that the log returns are not normally distributed, and this could be attributed to the high kurtosis value of 7.7987 with fat tails and a higher peak returns graph, which signifies more frequent extreme values. Given these findings, this study employs the GARCH-X model in modelling time-varying volatility in relation to the identified regressors.

Table 1: Mean and Distribution of Monthly Returns of the KLCI index

VARIABLE	Estimates
Mean	0.0023
Maximum	0.2944
Minimum	-0.2846
Standard deviation	0.0606
Skewness	-0.0202
Kurtosis	7.7987
Jarque-Bera	403.023
p-value	0.0000
Observations	420

Unit Root Tests: The Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller (1981) is used to assess the stationarity of the KLCI returns (Ri) and the regressors (GPR, Int, FPI, CSI). Table 2 reports the results. At the level, the ADF test results indicate that Ri, GPR, and CSI are stationary at level [*I* (0)] at the 5% significance level. On the other hand, Int and FPI are not stationary at the level but become stationary after first

differencing. This suggests that Int and FPI are integrated of order [*I* (1)]. In modelling the impact of identified exogenous variables on the volatility of stock returns in the Malaysian market, all variables are regressed at first difference.

Table 2: Augmented Dickey-Fuller (ADF) test Results

Variables	Level/First Difference	Test Statistic	P-values
Ri	Level	-11.9727***	0.0000
GPR	Level	-15.2306***	0.0000
Int	Level	-2.39612	0.1436
FPI	Level	-2.7755*	0.0634
CSI	Level	-3.0555**	0.0312
Ri	First difference	-13.6129***	0.0000
GPR	First difference	-21.4435***	0.0000
Int	First difference	-10.4656***	0.0000
FPI	First difference	11.0312***	0.0000
CSI	First difference	-14.0660***	0.0000

(***, **, and * indicate significance at 1%, 5% and 10% levels, respectively)

Error Correction Model (ECM): The Engle-Granger two-step method was used to estimate the ECM for the relationship between Ri, GPR, Int, FPI, and CSI. The first-stage long-run regression confirmed cointegration, as the residuals (μ_t) were found to be stationary using the Augmented Dickey-Fuller (ADF) test with a p-value less than 0.01. The second-stage ECM regression (as presented in Table 3) also yielded a significant negative coefficient on the lagged residual (-0.98, p-value<0.01), confirming the rapid adjustment toward the long-run equilibrium. In the short run, none of the variables, however, has a statistically significant effect on Ri. The estimated model satisfies certain diagnostics such as absence of serial correlation (LM test), absence of misspecification (RESET), and absence of heteroscedasticity. The Jarque-Bera test rejected the null hypothesis of normality of residuals (p-value<0.01). This is common in financial data, which often shows skewness and excess kurtosis. The ARCH LM test found no significant ARCH effects from lag 1 to 7 (p-value>0.05). However, a weak ARCH effect was detected at lag 8, indicating a mild delayed volatility clustering. Given the nature of financial return series, this study proceeds with GARCH (1,1) modeling to account for potential time-varying volatility.

Table 3: Estimated Error Correction Model for KLCI Returns (Ri)

Variable	Coefficient	t-Stat	Probability
d(GPR)	-0.004514	-0.135568	0.8844
d(Int)	-0.0016766	-0.869071	0.3858
d(FPI)	1.25E-13	0.176112	0.8604
d(CSI)	0.000384	1.349987	0.1784
μ_t	-0.981376***	-14.45868	0.0000
Diagnostic Test Results			
R^2	0.491651		
LM test	0.184686 (0.8315)		
RESET test	0.537404 (0.4643)		
Normality	47.85437 (0.0000)		
Heteroscedasticity	1.735875 (0.1276)		
ARCH (1)	1.149186 (0.2849)		
ARCH (8)	2.417801 (0.0162)		

a. ***, **, and * indicate significance at 1%, 5% and 10% levels, respectively
b. d(GPR), d(Int), d(FPI), and d(CSI) are the first differences of GPR, Int, FPI, and CSI variables, respectively.
c. For LM, RESET, Heteroscedasticity, and ARCH(p), results for F-stat (p-value) were reported.
d. Normality test results include the Jarque-Bera statistic and p-value in parentheses.

GARCH-X Model: The conditional mean equation of the GARCH-X model was specified as a function of past Ri and selected macroeconomic variables, and results are presented in Table 4. The AR(1) term was found to be statistically insignificant (p-value>0.05), suggesting weak evidence of return persistence. Among the independent variables, the consumer sentiment index (CSI) had a positive and significant impact on KLCI returns (0.000269, p-value<0.01), implying that improved consumer sentiment tends to increase stock market returns. Contrarily, the effects of geopolitical risk (GPR), market interest rate (Int), and foreign portfolio investment (FPI) were not statistically significant at the levels. These findings indicate that short-term changes in stock market returns in Malaysia are more sensitive to market confidence than to geopolitical or monetary influences during the study period. In addition, the use of the GPR index may not truly reflect the actual political risk index in Malaysia since the original GPR index used in this study is based on global newspapers, mostly U.S.-based sources such as the Wall Street Journal and Washington Post.

Table 4: Mean Equation Estimates from GARCH-X(1,1) Model

Variables	Coeff.	Std. error	Prob.
Constant	-0.008576	0.016135	0.5951
GPR	-0.006561	0.065396	0.9201
Int	-0.005044	0.003525	0.1524
FPI	$2.00X10^{-13}$	$3.36x10^{-13}$	0.5518
CSI	0.000269	0.000103	0.0089
AR(1)	-0.036937	0.069329	0.5942

(***, **, and * indicate significance at 1%, 5% and 10% levels, respectively)

The GARCH-X (1,1) model is identified, and the results are presented in Table 5. The ARCH term (α=0.372171, p-value<0.05) and GARCH term (β=0.770326, p-value<0.01) are statistically significant, confirming the existence of volatility clustering in the stock market return series.

Table 5: Variance Equation Estimates from GARCH-X(1,1) Model

Variables	Coeff.	Std. error	Prob.
Constant	0.000141***	0.00005	0.0064
ξ_{t-1}^{2}	0.372171***	0.12785	0.0036
h_{t-1}	0.770326***	0.07702	0.0000
ECM^{2}_{t-1}	-0.173474***	0.05740	0.0025

(***, **, and * indicate significance at 1%, 5% and 10% levels, respectively)

The coefficient of ξ_{t-1}^{2} captures how much recent shocks in stock market returns affect volatility, while the coefficient of h_{t-1} captures how much past volatility carries over into today. In terms of volatility persistence, for the GARCH-X model to be stationary, the coefficient of Constant must be greater than 0. This is to ensure that the variance is always positive. Besides, the sum of coefficients for ξ_{t-1}^{2} and h_{t-1} must be less than 1. In Table 5, it is shown that the sum of these parameters is slightly above 1 (0.372171+0.770326=1.142497), indicating a high level of volatility persistence. The model shows that market volatility tends to be persistent after a shock in stock returns or even grow over time. However, since the lagged error correction term (ECM^{2}_{t-1}) is significant, it contributes to long-run stability.

The short-run deviations are denoted by the ECM^{2}_{t-1}. If the coefficient (γ_1) is positive, this implies that stock market returns become more volatile and possibly less predictable as the deviation of stock prices from certain macroeconomic factors gets larger. This particularly happens because big shocks or uncertainties in the stock market can make investors panic, causing higher price volatility. Results obtained in this study show that the ECM^{2}_{t-1} carries a negative and significant coefficient (γ_1=-0.173474, p-value<0.01), suggesting that larger deviations from the long-run equilibrium are associated with reduced conditional volatility. This result also means that, when the market becomes more uncertain, the Malaysian stock prices become less volatile. Various reasons could contribute to this finding. The quick actions through various policy responses taken by the Bank Negara Malaysia may help to calm the market before things get too far off track, added to a resilient Malaysian financial market in absorbing shocks that arise in the market.

5. Conclusion and Policy Implications

This study investigated how volatile stock returns are in the Malaysian market. It also explores whether short-run changes in the relationship between stock market returns and important economic factors such as geopolitical risk level, market interest rates, foreign portfolio investment, and consumer sentiment might help to explain or cause the changes in stock market returns volatility. The empirical analysis used the methodology of the GARCH-X model. Short-run deviations were proxied by the EC term from the cointegration relationship between KLCI returns (Ri) with the GPR, Int, FPI, and CSI variables. The results from a GARCH-X (1,1) model reveal that short-run deviations (from long-run relationships between KLCI returns and macroeconomic variables) have a significant and negative impact on the volatility of stock returns. While volatility persistence ($\alpha+\beta$) is more than 1, suggesting that shocks will increase volatility even more in the future, causing it to grow. However, the inclusion of a significant lagged error correction term (ECM^2_{t-1}) in the variance equation contributes to stabilizing volatility in the long run. This suggests that short-run deviations from the long-run equilibrium between KLCI returns and macroeconomic variables are partially corrected over time, thereby offsetting the increased volatility following the shocks.

Since the volatility is highly persistent, early intervention is needed in order to restore balance in the stock market. Regulator bodies such as Bank Negara Malaysia (BNM) and the Securities Commission (SC) Malaysia should continue supporting sound monetary policy while enhancing real-time volatility monitoring systems. This includes monitoring global events and always being ready to deploy foreign exchange mechanisms and liquidity tools in mitigating sharp movements and maintaining orderly trading conditions in the Malaysian stock market. This could result in positive and stable market sentiment, which will subsequently lead to higher stock market returns.

Furthermore, there should be better access to data with structured, legal, and accessible data sharing, to enable the timely dissemination of economic, corporate, and policy information. This will allow investors to make better-informed decisions, lowering the possibility of mispricing and speculation in response to global shocks. Taking into account the significance of the consumer sentiment factor in determining the stock market returns, the government should pay close attention to catering to consumer confidence during fiscal and monetary policy planning, with suitable stimulus to help stabilize the economy and the financial market.

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Digital Dependency: Examining the Mental Health Effects of Excessive Social Media Use in University Students

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Abstract: Social media has transformed modern communication, particularly among university students. While beneficial in fostering connections and information sharing, excessive use has been linked to mental health concerns. University students, as one of the most active demographics on these platforms, often find themselves exposed to curated content, unrealistic standards, and social comparison, which can negatively influence their emotional well-being. This study examines the relationship between social media use, lifestyle factors, and mental health among Business and Management students at UiTM Puncak Alam. A quantitative survey involving 257 students was conducted to gather data on social media usage habits, lifestyle choices, and mental health indicators. The research explores not only the direct correlation between these factors but also the extent to which lifestyle habits amplify or mitigate the effects of social media use. Findings reveal that while both social media use and lifestyle factors relate to mental health outcomes, lifestyle factors exert a significantly greater influence. Students with healthier routines, including adequate sleep, regular physical activity, and effective stress management, reported better mental health outcomes, regardless of their social media usage levels. These results underscore the importance of promoting balanced lifestyles alongside digital literacy to support student mental well-being.

Keywords: *Social Media, Mental Health, Well-being, Lifestyle, Digital Dependency.*

1. Introduction and Background

Digital platforms such as Instagram, TikTok, and Facebook have become central to university students' daily routines. While these platforms offer entertainment and information, overuse can negatively affect mental health. Increased rates of anxiety, depression, and low self-esteem have been observed among young adults globally. University life itself involves significant challenges, academic expectations, social pressures, and transitioning to adulthood, all of which can be intensified by problematic social media engagement. While these platforms offer numerous benefits, including increased access to information, academic collaboration, and social networking, they also introduce new risks to mental health (Nazari et al., 2023; McLean Hospital, 2025). The psychological vulnerability of young adults makes them particularly susceptible to the emotional and cognitive effects of excessive social media use. Social comparison, cyberbullying, exposure to misinformation, and the constant need for validation can collectively affect mental health. Furthermore, the design of many social media platforms relies on algorithms intended to maximize user engagement, often fostering compulsive use that disrupts sleep patterns, reduces physical activity, and increases sedentary behavior.

In Malaysia, where internet penetration and social media use are among the highest in Southeast Asia, concerns over the mental well-being of university students have grown. Studies conducted across the country have highlighted rising incidences of stress, anxiety, and depression among students, with digital behavior emerging as a significant contributing factor. The present study specifically examines these issues within the context of UiTM Puncak Alam's Faculty of Business and Management. This faculty comprises students who are preparing for demanding careers in business, management, and entrepreneurship—fields that often require resilience, emotional intelligence, and mental stability. Understanding how social media use and lifestyle habits interact to influence these students' mental health is critical for academic institutions aiming to support their overall well-being and success.

2. Literature Review

Social Media

Research on the relationship between excessive social media use and mental health has produced extensive findings globally and within the Malaysian context. According to the World Health Organization (2023), mental health encompasses emotional, psychological, and social well-being, affecting individuals' ability to cope with stress, make decisions, and build relationships. Depression, anxiety, and low self-esteem have become increasingly prevalent among young adults, often linked to digital behavior (McLean Hospital, 2025). Excessive engagement with social media platforms such as Instagram, TikTok, Facebook, and Twitter can disrupt mental health by fostering constant exposure to idealized lifestyles and unrealistic standards. This exposure may lead to social comparison, feelings of inadequacy, and a distorted perception of reality. Previous studies by Nazari et al. (2023) and Robinson (2024) have highlighted that social comparison tendencies, driven by curated content on these platforms, can heighten anxiety, decrease self-esteem, and contribute to depressive symptoms.

H1: There is a significant relationship between excessive social media use and mental health among Business and Management students at UiTM Puncak Alam.

Lifestyle

Lifestyle factors also play a crucial role in determining mental health outcomes among university students. Poor lifestyle habits, including irregular sleep patterns, lack of physical activity, poor diet, and ineffective stress management, have been associated with increased susceptibility to mental health problems (Lim et al., 2024; Malaysian Mental Health Association, 2022). These unhealthy behaviors are often exacerbated by excessive screen time and digital engagement (Zsila & Reyes, 2023). A significant body of research emphasizes that the effects of social media on mental health are not isolated but intertwined with lifestyle choices. For instance, late-night social media browsing has been identified as a contributor to sleep disturbances, which can impair cognitive function and emotional regulation (Robinson & Smith, 2020). Sleep deprivation, in turn, has been linked to higher levels of depression and anxiety.

H2: There is a significant relationship between lifestyle factors and mental health among Business and Management students at UiTM Puncak Alam.

Combined Effects of Social Media and Lifestyle on Mental Health

Moreover, addictive use of social media driven by the dopamine-releasing mechanisms of notifications, likes, and shares fosters dependency and compulsive behaviors (Sutardja Center for Entrepreneurship & Technology, 2024). This addiction can interfere with academic performance, disrupt social relationships, and increase psychological distress. Social media-induced addiction may also encourage sedentary lifestyles, reducing physical activity, which is known to be a protective factor against mental health challenges (World Health Organization, 2022).

In the Malaysian context, several studies have reported a notable rise in mental health issues among university students, with social media overuse and lifestyle imbalances emerging as significant contributors. National data suggest that approximately 30% of university students experience symptoms of stress and anxiety, with depression also prevalent (Ministry of Health Malaysia, 2023). Given the popularity of social media among university students, especially within the Faculty of Business and Management, understanding the extent to which excessive use interacts with lifestyle factors to influence mental health is vital. This study seeks to fill the gap by examining both elements—social media usage patterns and lifestyle behaviors—as predictors of mental health.

H3: Lifestyle factors have a stronger influence on mental health than excessive social media use among Business and Management students at UiTM Puncak Alam.

3. Research Methodology

Research Design

This study utilized a quantitative research approach through a cross-sectional survey design, which is widely recommended for studies investigating relationships between behavioral factors and mental health outcomes (Nazari et al., 2023; Lim et al., 2019). The research was conducted among students enrolled in the Faculty of

Business and Management at Universiti Teknologi MARA (UiTM) Puncak Alam, focusing on the link between excessive social media use, lifestyle factors, and mental health.

Sampling Method

The sample consisted of 257 undergraduate students, selected using a convenience sampling method, which is practical for targeting accessible participants in academic settings (McLean Hospital, 2025). This method enabled researchers to capture relevant insights while acknowledging limitations in terms of generalizability. Data collection was carried out using a structured online questionnaire divided into four sections. The first section included demographic items such as age, gender, academic program, and semester. The second section assessed social media usage patterns using the Social Media Use Scale (SMUS-10), a validated tool commonly applied in studies examining excessive digital behavior (Sutardja Center for Entrepreneurship & Technology, 2024).

Instrumentation

The third section measured lifestyle behaviors using the Bergen Social Media Addiction Scale (BSMAS-6), which incorporates questions on sleep quality, physical activity, dietary habits, and time management—factors recognized in the literature as influencing mental health (World Health Organization, 2022). The final section applied the Depression, Anxiety, and Stress Scale (DASS-21) to assess mental health status, consistent with prior studies investigating psychological well-being among students (Malaysian Mental Health Association, 2022). Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics summarized participant characteristics, while reliability analysis ensured the internal consistency of measurement scales. Cronbach's Alpha values above 0.80 were achieved for all constructs, indicating strong reliability (Nazari et al., 2023).

Pearson correlation analysis examined the relationships between social media use, lifestyle factors, and mental health. Subsequently, multiple regression analysis determined the predictive strength of social media use and lifestyle behaviors on mental health outcomes. These methods align with established quantitative procedures for testing hypothesized relationships (Zsila & Reyes, 2023). This comprehensive methodology enabled an in-depth exploration of the interplay between excessive social media use, lifestyle factors, and mental health among UiTM Puncak Alam students, contributing valuable empirical insights to the field.

4. Results

This section presents detailed results from the statistical analysis conducted to explore the relationships between excessive social media use, lifestyle factors, and mental health among students from the Faculty of Business and Management at UiTM Puncak Alam. The data was gathered from a total of 257 respondents using a structured questionnaire and analyzed using SPSS Version 25. The analysis includes descriptive statistics, reliability testing, correlation analysis, and regression analysis.

Profile of Respondents: The demographic profile of the respondents provides essential insights into the characteristics of students participating in this study. A total of 257 students from the Faculty of Business and Management at UiTM Puncak Alam completed the survey.

The demographic profile indicates that a significant portion of the respondents (61.9%) were aged between 21 and 25 years, followed by 28.8% aged 18 to 20 years, and a minority above the age of 26. Female respondents made up the majority (65.4%), aligning with typical enrollment patterns within the faculty. Students came from various academic programs, with the highest representation from BA265/BA235 (23.3%). These demographic patterns are essential to understanding the context of social media use and mental health variations among the students.

Table 1: Demographic and Geographic Information About XXX

VARIABLE	FREQUENCY	PERCENTAGE (%)
AGE		
18-20	74	28.8
21-25	159	61.9
26-30	20	7.8
31 and above	4	1.6
Total	**257**	**100.0**
GENDER		
Male	89	34.6
Female	168	65.4
Total	**257**	**100.0**
Program		
BA262	26	10.1
BA263	19	7.4
BA264	27	10.5
BA265/BA235	60	23.3
BA266	14	5.4
BA270	18	7.0
BA271	17	6.6
BA272	13	5.1
BA273	13	5.1
BA274	6	2.3
BA275	11	4.3
BA276	7	2.7
BA277	7	2.7
BA278	5	1.9
BA279	6	2.3
BA280	8	3.1
Total	**257**	**100.0**
SEMESTER		
1	34	13.2
2	25	9.7
3	46	17.9
4	55	21.4
5	67	26.1
6	25	9.7
7	3	1.2
8	2	0.8
Total	**257**	**100.0**

Reliability Analysis: Cronbach's Alpha was calculated to assess the internal consistency of measurement instruments.

Table 2: Reliability Analysis

Variable	Number of Items	Cronbach's Alpha	Interpretation
Social Media Use	11	0.893	Excellent Reliability
Lifestyle Factors	6	0.851	High Reliability
Mental Health (DASS)	21	0.943	Excellent Reliability

The Cronbach's Alpha values exceeding 0.85 for all constructs indicate strong internal consistency, confirming that the measurement tools employed were reliable and suitable for the study (Lin et al., 2016; Andreassen et al., 2012; WHO, 2022)

Table 3: Mean and Standard Deviation

Variable	N	Mean	Standard Deviation
Social Media Use	257	3.33	0.81
Lifestyle Factors	257	2.81	0.85
Mental Health	257	1.99	0.62

The means for social media use indicate moderate engagement, with lifestyle factors showing room for improvement towards healthier behaviors. The mental health mean score suggests the presence of mild psychological distress within the student population.

Table 4: Correlation Analysis

Variables	Correlation Coefficient (r)	Significance (p-value)
Social Media Use & Mental Health	0.283	< 0.001 (Highly Significant)
Lifestyle Factors & Mental Health	0.412	< 0.001 (Highly Significant)

There is a statistically significant, positive correlation between social media use and mental health concerns (r = 0.283). Although the relationship is moderate, it indicates that increased social media use is associated with worsening mental health outcomes, such as stress, anxiety, or depressive symptoms. Lifestyle factors exhibit a stronger positive correlation with mental health (r = 0.412), suggesting that improvements in lifestyle behaviors, such as sleep patterns, stress management, and reducing addictive behaviors, correspond to better mental health among students. These results support the premise that both social media use and lifestyle habits are influential, with lifestyle exerting a comparatively stronger effect.

Table 5: Regression Analysis

Model Summary	Value
R (Correlation)	0.413
R^2 (Explained Variance)	0.170
Adjusted R^2	0.164
Standard Error of Estimate	0.565

The model explains 17% of the variance in mental health outcomes, highlighting that while social media and lifestyle are significant contributors, other external factors, for example, academic stress, peer influences, and family environment, also impact mental health.

Table 6: ANOVA Results

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	16.665	2	8.333	26.095	< 0.001
Residual	81.107	254	0.319		
Total	97.772	256			

The model is statistically significant (F = 26.095, p < 0.001), confirming that social media use and lifestyle collectively contribute to predicting mental health outcomes among students.

Table 7: Coefficients

Variable	Beta (B)	Std. Coefficients (Beta)	t-value	Sig.
Constant	1.109	-	7.269	< 0.001
Social Media Use	0.027	0.032	0.487	0.627
Lifestyle Factors	0.282	0.413	5.256	< 0.001

The coefficients indicate:
Social Media Use: Although a positive beta coefficient (0.027) is observed, the relationship is not statistically significant (p = 0.627). This suggests that when controlling for lifestyle, social media use alone does not significantly predict mental health outcomes.
Lifestyle Factors: A significant positive beta coefficient (0.282, p < 0.001) indicates that improvements in

lifestyle significantly enhance mental health, underscoring its stronger predictive power relative to social media use.

Discussion

The results of this study provide valuable insights into the effects of excessive social media use and lifestyle factors on the mental health of students in the Faculty of Business and Management at UiTM Puncak Alam. The statistical analyses revealed significant relationships between both independent variables, social media use and lifestyle, and the dependent variable, mental health. However, the strength and predictive power of these relationships differ, offering important implications for understanding the psychological well-being of university students in a digital era.

Relationship Between Social Media Use and Mental Health

The Pearson correlation analysis showed a statistically significant positive correlation ($r = 0.283$, $p < 0.001$) between excessive social media use and mental health concerns among students. This finding aligns with previous studies suggesting that excessive social media engagement is associated with heightened symptoms of anxiety, depression, and stress (Nazari et al., 2023; Saaiddin et al., 2021). Social media platforms such as Instagram, TikTok, and Facebook often expose users to curated and idealized portrayals of others' lives, leading to unfavorable social comparisons and feelings of inadequacy (Robinson, 2024). Despite the significant correlation, the regression analysis indicated that social media use was not a statistically significant predictor of mental health when controlling for lifestyle factors ($\beta = 0.027$, $p = 0.627$). This suggests that while excessive social media use is associated with mental health concerns, its direct impact may be overshadowed by other contributing variables, particularly those related to lifestyle.

It is important to note that the moderate relationship observed may reflect the complex, dual nature of social media. On the one hand, social media can provide social support, entertainment, and information; on the other hand, it can promote addiction-like behaviors, social isolation, and psychological distress (HelpGuide.org, 2023; Zsila & Reyes, 2023).

Relationship Between Lifestyle and Mental Health

The findings revealed a stronger, statistically significant correlation between lifestyle factors and mental health ($r = 0.412$, $p < 0.001$). Furthermore, regression analysis demonstrated that lifestyle significantly predicts mental health outcomes ($\beta = 0.282$, $p < 0.001$). These results confirm that lifestyle behaviors, including physical activity, sleep quality, stress management, and social habits, play a critical role in shaping students' mental well-being (Nutley et al., 2023).

This outcome is consistent with existing literature emphasizing the importance of healthy lifestyle choices as protective factors against mental health challenges (Seligman, 2021; McLean Hospital, 2025). University students often experience high levels of academic stress, peer pressure, and transitions to adulthood, which can negatively affect their lifestyle routines. Poor sleep quality, irregular eating habits, and lack of physical activity have been shown to exacerbate mental health issues (Nazari et al., 2023; WHO, 2022). In particular, the present study suggests that lifestyle factors mediate the relationship between social media use and mental health. Students who adopt healthier lifestyle practices may be better equipped to mitigate the potential psychological risks associated with excessive social media use.

Comparative Influence of Social Media and Lifestyle

The hypothesis that lifestyle exerts a stronger influence on mental health than social media use is supported by the results. The standardized beta coefficient for lifestyle ($\beta = 0.282$) was significantly higher than that for social media use ($\beta = 0.027$), which was not statistically significant. This finding underscores the importance of promoting healthy daily habits as a priority in mental health interventions for students, even in the context of widespread social media engagement. It is also important to consider the limitations of this model. The R^2 value of 0.170 indicates that approximately 17% of the variance in mental health outcomes can be explained by social media use and lifestyle combined, leaving a substantial portion of variance attributed to other factors not examined in this study, such as academic performance, socioeconomic status, family dynamics, or personality traits.

Contextual Interpretation

The results align with global trends highlighting increased mental health issues among university students in Malaysia, with approximately 30% experiencing symptoms of stress and anxiety (Ministry of Health Malaysia, 2023; Malaysian Mental Health Association, 2022). While excessive social media use contributes to these challenges, students' lifestyle choices appear to be a more direct and modifiable factor influencing their mental health.

Additionally, cultural and program-specific factors within UiTM Puncak Alam may play a role. The academic pressures, varying program demands, and unique social environments across faculties may affect both lifestyle behaviors and susceptibility to social media-related stress (Grech & Grech, 2020). These contextual elements should be considered in future research.

5. Managerial Implications and Recommendations

Managerial Implications

The findings of this study offer important managerial implications for educators, university administrators, and mental health practitioners, particularly within UiTM Puncak Alam. One of the key outcomes indicates that while excessive social media use is moderately associated with mental health concerns, lifestyle factors have a stronger and more direct influence on students' psychological well-being. This highlights the need for universities to prioritize initiatives that promote healthier lifestyle choices among students, especially in terms of stress management, sleep quality, and reducing compulsive digital behaviors (Nazari et al., 2023; Nutley et al., 2023).

Given that excessive use of social media has been linked to increased risks of depression, anxiety, low self-esteem, and loneliness due to constant exposure to idealized portrayals of success and appearance on platforms like Instagram, TikTok, and Facebook, universities should take proactive steps to mitigate these risks (Robinson, 2024; Abdullah et al., 2021). Awareness campaigns and educational programs should be designed to encourage students to engage in more mindful and intentional use of social media. Digital literacy workshops can help students critically evaluate the content they consume and reduce harmful social comparisons, which have been shown to negatively affect mental health (Robinson & Smith, 2020; The University of Queensland Library, 2023).

Moreover, the university environment itself can play a pivotal role in shaping healthier student habits. Managers and faculty members should promote initiatives that focus on lifestyle improvements, such as providing accessible mental health resources, organizing workshops on managing stress and anxiety, and encouraging physical activity and healthy sleep routines. Research shows that both sleep deprivation and poor lifestyle behaviors can exacerbate mental health issues among students, making it essential to address these concerns through structured programs (McLean Hospital, 202; Nutley et al., 2023).

The study also suggests that mental health interventions should not adopt a one-size-fits-all approach. As highlighted in the limitations section, different academic programs within the Faculty of Business and Management have diverse student demographics and academic pressures, which may influence both lifestyle behaviors and susceptibility to social media-related stress. For instance, Health Administration students, given their exposure to health-related education, may already have higher mental health awareness, whereas students from programs like Human Resource Management or Event Management may face unique lifestyle challenges (Malaysian Mental Health Association, 2022). Therefore, tailored mental health campaigns specific to different programs and student groups are recommended.

Additionally, fostering a campus culture that normalizes conversations around mental health and promotes resilience is crucial. Universities should integrate mental health literacy into academic curricula, collaborate with student associations to create peer-support systems, and reduce the stigma surrounding mental health issues (Seligman, 2021; WHO, 2022).

Recommendations

Finally, it is essential to recognize that social media is deeply integrated into students' daily lives and serves both positive and negative functions. Rather than attempting to eliminate social media use, universities should encourage students to adopt balanced usage patterns, focusing on building digital resilience and online self-awareness. By promoting digital well-being alongside lifestyle improvements, universities can better safeguard the mental health of their students, helping them navigate both academic life and the complexities of the digital world (Zsila & Reyes, 2023).

Conclusion

This study explored the effects of excessive social media use and lifestyle factors on the mental health of students in the Faculty of Business and Management at UiTM Puncak Alam. The findings revealed that while excessive social media use is moderately linked to anxiety, depression, and stress, lifestyle factors such as sleep quality, stress management, and daily routines exert a more significant impact on psychological well-being. Although the model accounted for only 17% of the variance in mental health, the results align with existing literature highlighting the risks of unhealthy digital behaviors and the protective role of positive lifestyle habits. These insights underscore the need for targeted interventions in university settings that encourage balanced digital engagement, promote mental health awareness, and support healthier routines.

In conclusion, this study contributes to the growing body of research on the relationship between social media, lifestyle, and mental health among university students. It underscores the importance of prioritizing lifestyle improvements and mindful technology use to safeguard students' well-being. As digital platforms continue to shape students' daily lives, universities must equip students with the skills, awareness, and support systems necessary to maintain their mental health in an increasingly connected world.

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Unveiling the Key Drivers of Warehouse Performance: A Case Study from Malaysia's Steel Stockist and Distribution Industry

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Abstract: Warehouse management performance is a critical component of operational efficiency, particularly in the steel stockist and distribution industry. This study aims to investigate the relationship between space utilization, inbound activities, outbound activities, human resource management and warehouse management performance. A quantitative research design was adopted, with data collected via a structured questionnaire from 97 employees selected through stratified and convenience sampling methods. The collected data were analyzed using Pearson correlation and multiple regression analysis. The findings reveal that all four independent variables show a positive correlation with warehouse performance; however, only outbound activities were found to have a statistically significant impact. This indicates that the outbound logistics performance which involves picking, packing and shipping, is a strong determinant of the warehouse overall efficiency. Thus, this research asserts that, while space planning, inward flow control, and workforce optimization are the basis to support, it is the performance outcomes that the implementation of the outbound activities generates that fundamentally dictate the success of the performance in the warehouse. These results have practical implications for warehouse and SCM managers and imply that the early life focus of the warehouse's operations should be placed on holistic yet mission-focused development, focusing on driving outbound excellence and then aligning other operational areas to support this. The contribution of this study to academia and industry is to identify operational drivers that could be used to enhance warehouse performance and to remain competitive in high-demand sectors.

Keywords: *Warehouse Management Performance, Space Utilization, Inbound Activities, Outbound Activities, Human Resource Management, Steel Industry*

1. Introduction and Background

Warehouses form the basis of supply chain infrastructure and are a critical factor that ensures that the movement of goods from a supplier to the end customer is a smooth one. Not just storage boxes, contemporary warehouses are living organisms that process change, from receiving and sorting, to storing, and picking and shipping. With the rising prevalence of Warehouse Management System (WMS), and Automated Storage and Retrieval System (AS/RS) warehouses, they have become strategic assets helping to facilitate on-time delivery, increasing inventory accuracy, reducing costs and improving the responsiveness of the entire supply chain (Faveto et al., 2024).

Warehouse performance has been increasingly identified as a critical factor to determine the competitive operation of the organization. As Andiyappillai (2020) observed, warehouses affect service quality as well as the cost of warehouse-related operations, whilst ineffective management can cause performance to deteriorate. Therefore, monitoring warehouse performance by key performance indicators (KPIs) including order fulfilment rate, inventory accuracy, storage efficiency, labour productivity, and cost containment has emerged as one of the best practices in logistics management (Vatumalae et al., 2020). Efficient warehouse operations allow businesses to set appropriate customer expectations, maintain lean inventory systems, and prevent unnecessary capital tie-up.

Nonetheless, the efficient functioning of a warehouse is contingent on its ability to adapt to variations in inbound and outbound activities, optimize space utilization, and manage human resources in alignment with operational demand. In practice, organizations often encounter challenges when there is a mismatch between inventory inflow and outflow, leading to underused or overburdened facilities, increased storage costs, and risks of product obsolescence. These operational inconsistencies, whether driven by poor inventory planning,

uneven distribution flows, or reactive labour deployment, can ultimately reduce customer satisfaction and affect bottom-line performance (Mabotja, 2024).

In the context of a large-scale commercial enterprise such as ABCH Company, these challenges are particularly salient. ABCH Company is facing warehouse inefficiencies involving limited storage space, delayed incoming shipment material, and an inaccurate picking process. The warehouse handles over 3,000 sizes of steel products, yet faces congestion and poor space allocation. Manual documentation and customs delays affect the inbound process, while stock misplacement and picking mistakes delay deliveries. Manpower shortage and limited training are making the situation even worse. These issues are evident as the turnover ratio slipped from 4.2 to 3.5, order cycle time increased from 3 to 5 days, customer satisfaction fell by 15%, and overtime costs increased by 15%. This study examines how these factors collectively impact warehouse performance.

From a knowledge perspective, existing research has explored various technical and process-based improvements in warehouse operations. Studies by Gu et al. (2010) and Richards (2017) Have examined optimization strategies in warehouse design and automation. However, limited empirical attention has been paid to the *integrated evaluation* of how fluctuations in activity levels, spatial dynamics, and workforce responsiveness collectively influence warehouse performance, particularly in emerging or resource-constrained environments (Chong et al., 2019; Narasimhan et al., 2021). Furthermore, while simulation and modeling approaches have advanced, practical diagnostic tools and decision-support frameworks that are tailored to firms managing distributed warehouse networks remain scarce in the literature (Baker P. & Canessa, 2009; Marchet et al., 2021).

Therefore, this study aims to address these gaps by examining the determinants of warehouse management performance at ABCH Company. Specifically, it focuses on four key areas—space utilization, inbound activities, outbound activities, and human resource management—as interrelated dimensions influencing operational efficiency. The overarching goal is to identify actionable insights that can inform more balanced and strategic warehouse operations across the firm's logistics network.

2. Literature Review

Warehouse performance

Warehouse performance has emerged as a pivotal construct within contemporary supply chain management, reflecting a firm's ability to handle inbound and outbound logistics, optimize space utilization, and synchronize activities across supply chain nodes. Warehousing plays an active and indispensable role in facilitating the seamless movement of goods across the supply network (Tubis & Rohman, 2023). In demand-driven supply chains, warehouses must efficiently manage both the storage and sorting of goods to ensure prompt service to external customers. It is this operational flexibility that is crucial to satisfy market demand with as little lead time as possible, while still ensuring high customer satisfaction and service performance (Byberg & Nylander, 2023). On the other hand, in a supply-driven environment, warehouses service their own operations, such as ensuring production is possible through sufficient capacity and enough inventory. No matter which models you use, efficient warehouse operations involve striking a balance between capacity and demand, without creating bottlenecks that could hinder response.

A highly performing warehouse tends to be characterised by some key performance aspects that include effective delivery execution, labour productivity, and the linkage to the overall organisational systems. As Michlowicz (2024) points out, top-performing warehouses reach a 99% delivery accuracy rate and operate with a very motivated team that ultimately affects service edge. Further, the smooth connection between the warehouse and the internal departments, e.g., logistics, procurement, marketing and human resources, works as a strategic direction in enhancing coordination and operational efficiency (Odeyinka & Omoegun, 2023). This convergence results in improved visibility to inventory, reduced cycle time for order fulfilment and enhanced flexibility for reacting to rapidly changing market conditions. In these situations, the warehouse isn't just a place but the "center" where decisions are aligned and orchestrated across the supply chain.

In addition, warehousing activities are integral to the overall supply chain measurements of the products, since they impact inventory flow, delivery accuracy and cost control. The capability of balancing inventory and lead times increases the ability of the organization to serve customers with reliability and efficiency. According to

Jermsittiparsert et al., (2019) operations in warehouses by orders and sorting, and dispatch operations, which should be done in a timely and quick manner, are essential to minimizing problems caused by errors in volumes being dispatched and delivery lead time, conditions to perform in a competitive environment of logistics. Such operations minimize inventory holding costs and at the same time ensure an easier production schedule, in addition to higher customer responsiveness which is crucial in organizations following just-in-time and lean logistics philosophies.

New technologies are also expanding the limits of warehouse performance management. The presence of smart warehousing systems, which include automation and Internet of Things (IoT) offerings, allows to conduct the real-time monitoring, predictive analytics and intelligent resource utilization effectively. These technologies add robustness to a system and enable more rapid operation. As highlighted by Khan et al. (2022), these advancements enable a higher degree of control in warehouse operations and support quicker, more well-informed decision-making. Complementing this, Amosu et al. (2024) contend that technology-based warehouses, in the presence of standardised processes and coherent information systems, could serve as strategic levers in obtaining competitive advantage. Warehouse performance as known today is essentially a complex entity which is influenced by not only the physical operations and technology-based infrastructure, but also by the alignment of an organization, and is therefore considered to be an important domain of research and practice in supply chain.

Space Utilization

Space utilization is the use of space within a warehouse in an efficient manner to enable a material to flow through the warehouse with minimized cost. It's a critical system that optimizes storage space while still providing an open, safe and accessible warehouse environment without impeding on customer service levels. According to Sadeghi et al. (2024) space-use efficiency is not only a space issue but also a cost factor as storage costs accumulate on a monthly basis with or without inventory movements. This means that space can be one of the most scarce and costliest commodities in the warehouse. Awashreh et al. (2024) mentioned that affects space utilization is how warehouse is designed and that must be in proportion to operational needs and flow of material, so it will decrease movement cost and increase productivity. A well-optimized footprint means that each square inch of the warehouse is contributing to the throughput of the building.

Warehouses with effective space utilization see smoother inbound and outbound operations; improved inventory visibility; and less congestion in storage and retrieval zones. Rejeb et al. (2019) argue that a proper storage system, i.e., vertical racking and dynamic slotting can increase the facility's adjustability to handle variation in volume. This flexibility is essential as it enables companies that have seasonal demand or cannot expand physically. Moreover, Tien et al. (2021) suggests that good space management supports short-term response to customer orders and external storage rental can be kept at a minimum level. With systematic storage of goods according to turnover, travel times when picking are minimized, leading to an increase in order quality and speed (Georgise et al., 2020). Therefore, the space-optimization does not just achieve higher storage density, but directly impacts the performance in the warehouse, such as lead time or the operating costs.

According to Lawrence & Gabriel (2024), diligent space management saves on unnecessary capital investment to expand premises and results in better use of space. In line with this, Falari et al. (2024) and Mohamud et al. (2023) who have shown that good storage organisation can lead to the reduction in damage, better access to stock and increased accuracy of stock holdings. These benefits together improve the warehouse's capability to act as a flexible and cost-efficient node in the supply chain. So, optimization of space utilization is not just a matter of facility management; it is a strategic enabler for superior warehouse organization.

H1: There is a significant relationship between space utilization and warehouse management performance.

Inbound Activities

Receiving functions incoming activities are those warehouse operations that involve receiving, checking and storing goods. Their fundamental procedures represent the initial phase of all movement, serving as the basis for all ensuing logistics endeavours. Kalaiarasan et al. (2023) effectively carry out inbound logistics turnover of materials fast, correctly, inspected, stored without mixing, protecting the product but there is no operation stagnation. This involves providing arrival notifications, unloading, quailing and check-in of goods as per the

process. If such activities are properly handled, less disturbance and reduced inventory imbalances are created along the chain, as materials move more efficiently through the supply chain.

Integration of technology is also changing the nature of inbound activity. Technology such as WMS, bar coding and Radio-Frequency Identification (RFID) contribute to the enhancement of openness to the reliability and timeliness of receiving and documenting (Minner, 2019). These advances enable data entry to be done in real time, increase visibility and reduce manual errors. As noted by Nurhasan et al. (2023) adequate receiving phase processing will avoid stock discrepancies and delays, and accurate inventory tracking will assist in implementing improved planning and replenishment strategies. In addition, good inbound logistics further develops best practices for storage, so products are directly targeted at their proper location, hence, improving space productivity and quick execution of goods when required.

Properly performed inbound activities have a significant impact on the performance of warehouses, as they support the elimination of unproductive operations, lower the error rate and improve stock accuracy. Well-handled procurement and handling of goods prevents bottlenecks, can expedite order fulfilment, and can minimize overstock. According to Charoenmetta (2023), by maintaining accurate receiving, online inventory visibility is more accurate enabling more efficient picking, replenishment, and order fillings. This reduces cycle time, which means expensive bottleneck-creating disruptions are minimised. Hu & Weisel (2020) also contend that effective inbound logistics improves the warehouse's responsiveness, which thereby makes it more accessible for surrounding businesses, and consequently provides a quicker response to the demand, and improves the level of customer satisfaction. As such, the maximisation of inbound activities drives warehouse performance, impacting operational KPIs such as speed, accuracy and cost.
H2: There is a significant relationship between inbound activities and warehouse management performance.

Outbound Activities
Outbound operations are a key to efficient warehouse management because they impact order fulfilment, customer service and overall supply chain performance. These operations comprise a sequence of tasks such as order picking, checking, packing, palletizing and then shipping products to customers (Shimels, 2019). According to Mostafa & Eldebaiky (2023), outbound logistics also include strategic decisions regarding the transportation mode, consolidation of shipments, and effective location of distribution centers. These are lead-time reductions and higher delivery reliability, and both are absolute musts in today's competitive, fast-paced market. Outbound operations are the last mile of the fulfilment process and the direct correlation between being successful at outbound operations means that the service you provide to your end customer is of the highest quality.

Outbound activities' efficiency is related to physical handling as well as to information systems and technological support. According to Audi & Raage (2020), outbound logistics are required to have accurate pick and pack procedures as well as real-time inventory control in order to satisfy customers. Advanced systems integration lets warehouses keep better order tracking and greatly reduces errors with easier tracking of shipments. In addition, Ruthramathi & Sivakumar (2023) point out that software solutions like route optimization and dispatch management are very important for outbound productivity as well. The real-time apps and analytics will help in scheduling, reduce delivery costs and facilitate proactive decision-making. Using these systems, warehouses can optimize processes, reduce delays and ensure that customers receive their orders correctly and on time.

Effective outbound operations have a real impact on the performance of the warehouse, with order cycle times, service levels and costs all falling by the wayside. Warehouses are more successful when outbound operations are automated and strategically picked, and when quality control is rigorous, leading to faster and more accurate order fulfilment (Helm et al., 2023; Jaghbeer et al., 2020). This also maximizes accuracy, minimizes shipment errors, and ultimately makes the delivery experience more dependable. As Zennaro et al. (2022) note that fast and error-free delivery is a competitive imperative in such high-demand domains as e-commerce. In addition, Sharma & Dave (2024) argue that efficient outbound logistics help improve warehouse reputation and overall costs over time, thereby improving the overall performance of the warehouse.
H3: There is a significant relationship between outbound activities and warehouse management performance.

Human Resource Management

Warehouse operations are increasingly acknowledging Human Resource Management (HRM) as a strategic driver that affects two key drivers of performance namely efficiency and safety as well as workforce stability. In the warehouse environment, HRM covers a wide variety of functions that include but are not limited to recruitment, training, performance management, safety management and employee involvement (Alshurideh et al., 2022). Good recruitment will ensure that the right people are recruited, for example, for the roles of forklift operators, inventory specialists and warehouse coordinators (Batool et al., 2023; Cen, 2023). Nagamani & Nikhitha (2023) highlight the selection through assessments and job-specific evaluations would maximize the job fit and minimize early attrition. After being recruited employees need to be trained systematically and continually in the various operating tasks, safety requirements and the use of new technologies such as WMS (Kramarz, 2023). With the increasing automation, HRM ensures that employees are trained to deal with new tools and robots and in this way also the warehouse's flexibility is maintained (Li, 2022).

It's not just about hiring and onboarding, performance management is also another important dimension to HRM that contributes to warehouse operational excellence. Establishing fair performance targets, like order accuracy, also makes it easy to score performance, so team members can regularly monitor their own performance and get feedback on how to make it better (Almulaiki, 2023; Nasereddin, 2024). Safety management is just as important as the work is very physical. Wang et al. (2023) Report that HR driven safety measures and training programs along with the use of ergonomic database equipment contribute effectively to the minimization of workplace accidents and adherence to health standards. Additionally, employee relations and workplace culture are built upon by HR via tools like maintaining an effective communication channel, complaint redressal policies and employee-friendly policies in the organization (Rakhimova, 2024). These techniques foster a sense of a great place to work, minimize disputes and stimulate collaboration between warehouse teams.

The association of effective HRM and warehouse performance was observed not only in this study, but also in other works in logistics and supply chains. SHRM raises labour productivity as well as lowers employee turnover, an important issue in warehousing where high employee turnover can trigger labour instability (Kanike, 2023). Education schemes designed to fit the functions of warehouses increase the accuracy of inventory control and order execution (Sharma, 2024), while fair and competitive systems of remuneration support motivation and retention (Prakhova & Chaplynska, 2022). That is, technology-integrated warehouses depend on skilled workers who can operate sophisticated systems like ASRS and ERP applications (Kellermayr-Scheucher et al., 2023; Özbek, 2023). Judijanto & Iswanto (2024) mentioned HRM's contribution in mediating this technological alignment is important to keep warehouse capabilities responsive and provide quality service. At the end of the day, HRM forms an indispensable infrastructure to high-performing warehousing.

H4: There is a significant relationship between human resource management and warehouse management performance.

Underpinning Theory

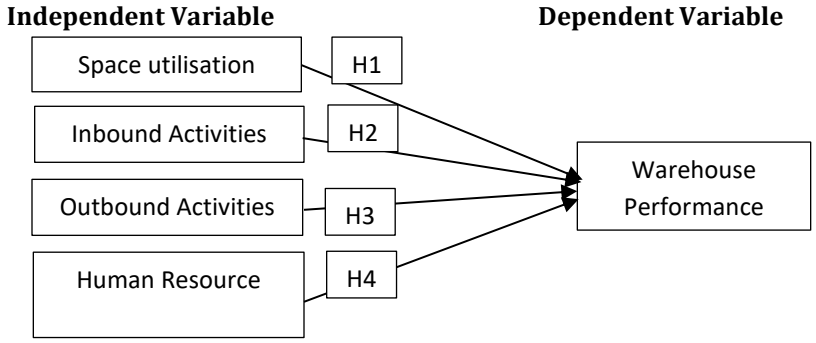
Lean Management Theory provides an operational model for what makes a warehouse high-performance. In the study, the approach of Lean reveals that factors such as inefficient use of space, limited integration of incoming and outgoing activities, and an underused workforce can reduce the level of productivity in a warehouse. By concentrating on the reduction of waste and the simplification of tasks, lean contributes to the improvement of critical aspects such as cycle time, order accuracy, and response time (Baker, P. & Canessa, 2009; Ramaa et al., 2012).

The core four parameters studied in this work are human resources, inbound and outbound activity, and space utilization, which are directly related to Lean principles. For example, an experienced and well-organized employee can minimize hanging around and wasted effort, handling both incoming and outgoing goods in a smooth-flowing fashion keeps the momentum going, and efficient use of space means things can be located more swiftly and errors are minimized. In summary, Lean Management Theory not only provides us with a tool to analyse these operational components but also acts as a valuable practical tool to advance warehouse performance, particularly in the steel industry (Womack & Jones, 1997).

Conceptual Framework

The model presented in Figure 1 is the theoretical model for η, the detected species. It consists of four exogenous variables: space utilization, inbound activity, outbound activity, and human resource management, which are expected to have a strong correlation with the dependent variable in the study of warehouse performance.

Figure 1: The Conceptual Framework of the Study



3. Research Methodology

A research design of a quantitative nature was adopted for the purpose of determining the effects of space utilisation, inbound activities, outbound activities and human resource management on warehouse management performance. A pre-tested structured questionnaire containing closed-ended questions was used to collect primary data with a view to ensuring uniformity and avoiding bias in the responses (Fischer, 2021). The questionnaire was sent out by e-mail and WhatsApp as a Google Forms link to increase participation and allow easier access.

A mixed sampling technique was used; a combination of stratified and convenience sampling (Althubaiti, 2023). Stratified sampling was used to select relevant departments across participating organizations, including top management, human resources, sales and marketing, inventory and administration, logistics, purchasing, and warehouse operations. These departments were chosen due to their direct engagement with the independent variables under investigation. For instance, logistics and warehouse departments were closely associated with space optimization and goods movement, while human resources contributed to workforce efficiency across all operational functions. Within each stratum, convenience sampling was applied to identify respondents who were both available and knowledgeable in the specific operational domains addressed in the study.

The sample size was determined using the Krejcie and Morgan (1970) sample size determination table, with a final valid response count of 97 respondents, which satisfies the required minimum for generalizability. The unit of analysis in this study was the individual employee involved in warehouse and supply chain operations. The questionnaire was organized into three parts: demographic details, independent variables (space utilization, inbound activities, outbound activities, human resource management), and the dependent variable (warehouse performance). All items were rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Before the main data collection, content validity was assessed by expert review, and a pilot test was conducted to examine the instrument's reliability, ensuring that Cronbach's Alpha values exceeded the acceptable threshold of 0.7. Data analysis was performed using IBM SPSS Version 29, employing descriptive statistics, correlation analysis, and multiple regression analysis to test the hypothesized relationships among the study variables (Gamel et al., 2024).

Profile of the respondents:

A total of 97 valid responses were collected for this study, with the sample size determined using Krejcie and Morgan's (1970) sample size table. The demographic breakdown reveals that the majority of respondents were male (64.3%), with most participants aged between 26 and 35 years (34.5%). In terms of educational qualifications, a significant portion (51.2%) no respondents reported holding a PhD or professional

qualification. Regarding tenure, 33.3% had served more than 10 years in their current organization, followed by 31% with 5 to 10 years of service. The majority of respondents were from the warehouse management department (48.8%), which aligns with the core focus of this study, followed by sales and marketing (15.5%), and other departments, including logistics, HR, and administration. In terms of job positions, most respondents were either executives (28.6%) or supervisors (17.9%), ensuring practical familiarity with warehouse operations.

Table 1: Respondents' Profile

	Item	Frequency Rate	Percent
Gender	Male	54	64.30%
	Female	30	35.70%
Age	18 to 25	8	9.50%
	26 to 35	29	34.50%
	36 to 45	22	26.20%
	46 to 55	18	21.40%
	55 above	7	8.30%
Education Background	Below Diploma	43	51.20%
	Diploma	13	15.50%
	Bachelor's Degree	22	22.00%
	Master's Degree	5	6.00%
	Doctor of Philosophy	Nil	Nil
	Professional Qualification	Nil	Nil
Length of Service in current company	Less than 2 years	12	14.30%
	2 to 3 years	10	11.90%
	3 to 5 years	8	9.50%
	5 to 10 years	26	31.00%
	More than 10 years	28	33.30%
Position	CEO / Managing Director / Director	7	8.30%
	General Manager / Deputy General Manager	7	8.30%
	Senior Manager / Manager / Assistant Manager	11	13.10%
	Senior Executive / Executive / Junior Executive	24	28.60%
	Supervisor / Assistant Supervisor	15	17.90%
	Others	20	23.80%
Department	Top Management	7	8.30%
	Human Resource Management	6	7.10%
	Sales and Marketing	13	15.50%
	Inventory and Administration	6	7.10%
	Logistic	6	7.10%
	Purchasing	5	6.00%
	Warehouse Management	41	48.80%

4. Results and Discussion

Descriptive Statistics: The descriptive analysis in this study presents an overview of the central tendency and dispersion for both the dependent and independent variables. Table 2 shows the mean and standard deviation scores, categorized into high, average, and low based on thresholds set by Hadiyanto et al. (2013). All variables scored within the high category, indicating a strong positive perception by respondents.

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Deviation	Category
Dependent Variable:				
Ware-house Management Performance	97	3.9619	.43958	High
Independent Variables:				
Space Utilization	97	3.9333	.49899	High
Inbound Activities	97	3.9905	.41293	High
Outbound Activities	97	3.8405	.47367	High
Human Resource Management	97	3.8905	.47023	High
Valid N (listwise)	97			

Inbound activities recorded the highest mean score (M = 3.9905), suggesting strong agreement regarding the efficiency of inbound processes such as receiving, inspection, and stocking of goods. This was followed by space utilization (M = 3.9333), indicating that warehouse layout and storage strategies are viewed positively. Outbound activities (M = 3.8405) and human resource management (M = 3.8905) also reflected favorable perceptions. The dependent variable, warehouse management performance, recorded a mean of 3.9619, reinforcing the overall strong operational performance observed by respondents.

Correlation Analysis: The Pearson correlation analysis was conducted to examine the strength and direction of relationships between independent variables and warehouse management performance (Table 3). All variables showed **statistically significant** positive correlations at $p < 0.01$.

Table 3: Pearson Correlation Between Variables

		Warehouse Management Performance	Space Utilization	Inbound Activities	Outbound Activities	Human Resource Management
Warehouse Management Performance	Pearson Correlation	1	.494**	.383**	.531**	.383**
	Sig. (2-tailed)		<.001	<.001	<.001	<.001
	N	84	84	84	84	84

**. Correlation is significant at the 0.01 level (2-tailed)

Outbound activities demonstrated the strongest correlation with warehouse performance (r = 0.531), reinforcing their critical role in accurate and timely deliveries. Space utilization followed closely (r = 0.494), highlighting the importance of efficient layout and storage systems. Inbound activities and human resource management shared equal strength (r = 0.383), signifying their supportive but less dominant impact.

Multiple Regression Analysis: A multiple regression analysis was employed to determine the influence of each independent variable on warehouse management performance. The model yielded an R value of 0.550 and $R^2 = 0.302$, indicating that 30.2% of the variance in warehouse performance is explained by the four predictors.

Table 4: Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.550*	.302	.267	3.7638

* Predictors: (Constant), Human Resource Management, Space Utilization, Inbound Activities, Outbound Activities

Model		Unstandardized B	Coefficients Std. Error.	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.972	.416		4.475	<.001
	Space Utilization	.205	.142	.233	1.445	.153
	Inbound Activities	-.008	.157	-.007	-.051	.960
	Outbound	.371	.151	.400	2.453	.016

Activities					
Human Resource Management	-.054	.140	-.058	-.386	.700

* Dependent Variable: Warehouse Management Performance, Independent Variables: Human Resource Management, Space Utilization, Inbound Activities, Outbound Activities

The regression analysis reveals that among the four independent variables, only outbound activities show a positive and statistically significant effect on warehouse management performance (B = 0.371, p = 0.016), indicating that improvements in outbound processes contribute meaningfully to operational efficiency. While space utilization has a positive coefficient (B = 0.205), its effect is not statistically significant (p = 0.153), suggesting that its influence on performance is present but not strong enough to be conclusive. Inbound activities exhibit a negative and non-significant relationship (B = -0.008, p = 0.960), indicating no measurable effect on warehouse performance. Similarly, human resource management also shows a negative and insignificant impact (B = -0.054, p = 0.700), suggesting that its influence may be indirect or mediated through other variables.

In summary, the correlation analysis indicates that all four independent variables, space utilization, inbound activities, outbound activities, and human resource management, were found to have significant positive correlations with warehouse management performance. However, based on the regression analysis, only Hypothesis 3 (H3), which posits a significant relationship between outbound activities and warehouse performance, was supported. The remaining hypotheses (H1, H2, and H4) were not supported, as their effects were not statistically significant in the regression model, despite showing positive correlations (refer to the following table). This highlights the pivotal role of outbound activities as the most influential factor in enhancing warehouse management performance.

Hypothesis	Pearson Analysis	P-Value
H1: There is a significant positive relationship between space utilization and warehouse management performance	Yes (r = 0.494, p < .001)	No (p = 0.153)
H2: There is a significant positive relationship between inbound activities and warehouse management performance	Yes (r = 0.383, p < .001)	No (p = 0.960)
H3: There is a significant positive relationship between outbound activities and warehouse management performance	Yes (r = 0.531, p < .001)	Yes (p = 0.016)
H4: There is a significant positive relationship between human resource management and warehouse management performance	Yes (r = 0.383, p < .001)	No (p = 0.700)

Discussion: The correlation analysis demonstrates that all four independent variables, space utilization, inbound activities, outbound activities, and human resource management, have significant positive relationships with warehouse management performance. Among them, outbound activities showed the strongest correlation (r = 0.531, p < .001), indicating that efficient order picking, packing, and shipping substantially enhance overall warehouse efficiency. This supports the idea that streamlined outbound logistics not only reduces lead times and shipping errors but also directly improves customer satisfaction and operational success (Rasing, 2024; Vaka, 2024). Space utilization also exhibited a moderate positive correlation (r = 0.494, p < .001), affirming that maximizing available space through better layout, vertical shelving, and space tracking systems contributes meaningfully to warehouse performance (Manaviriyaphap, 2024). These findings reinforce that physical optimization and outbound process effectiveness are key drivers of warehouse excellence.

The results also indicate that inbound actions (r = 0.383, p <. 001) and HR management (r = 0.383, p <. 001) are significantly associated with warehouse management effectiveness. Timely receiving, correct inspection, and efficient storage in inbound operations all support that by reducing latencies and ensuring that downstream flow is smooth (Ellithy et al., 2024; Nurhasan et al., 2023). Concurrently, evidence that HRM practices such as tailored training, staff motivation and clear performance management form a skilled and committed workforce, can maintain the high level of operations required (Batista et al., 2024; Sun & Jung, 2024). These findings suggest that although physical and operational capabilities are crucial, the human element is a key component in maintaining the performance of the warehouse. Overall, the strong correlation

between the factors indicates that factors are related and need to be managed in a consolidated way with respect to warehouse performance wherein infrastructure, process, and the people are aligned.

The multiple analysis can clarify how each independent factor space utilization, inbound activities, outbound activities and human resource management contributes to the performance of warehouse management when simultaneously analysed. Of which, the outbound activities had a statistically significant and positive effect (B =0.371, p = 0.016) and were the most significant factor in determining warehouse efficiency. This highlights that successful outbound operations, including picking accuracy, packing timeliness, and dispatch efficiency, have implications on customer satisfaction and resulting overall supply chain responsiveness. These results are consistent with those of Helm et al. (2023) and Zennaro et al. (2022), who highlighted the role of outbound logistics in operational performance. Statistical significance of outbound activities also validates its practical relevance for order fulfilment and delay reduction as well as highlights that the area requires ongoing investment and improvement.

On the other hand, the use of space, inbounds and HR were not found to make statistically significant contributions to `Warehouse' in the regression model, despite positively correlating in initial analyses. This may indicate that although these variables are perceived as operationally relevant on their own, they may have nuanced individual or interactional effects, or they may be more context-specific in their effects. For example, the space is already efficiently used in the surveyed companies, which makes only a little difference in the performance. Furthermore, HR practices, no matter how essential, might not automatically convert into performance results, unless coupled with operational measures that could easily be quantified. It appears that outbound operations are the supreme point of value delivery of the warehouse process and the operations greatly influence the overall performance outcomes. These findings highlight the strategic significance of the outbound logistics for the warehouse efficiency and indicate the requirement for additional studies focusing on interaction effects, contextual variabilities, and long-term performance contributions of the internal warehouse operations.

5. Managerial Implications and Recommendations

The results of this paper offer significant managerial implications for ABCH Company and the steel stockist and distribution industry. Outgoing activities – order picking, packing, and shipping, in particular – have become the main operational factor in warehouse management performance. This highlights the critical importance of managers to focus investment also on the outbound process which clearly impacts customer satisfaction and service reliability. Managers need to think of warehouse functions together rather than in isolation and implement interdependent operational strategies where the proper utilisation of space, inbound operations and human resources round out and support efficient outbound operations. For example, the optimal arrangement of heavy products near the dispatch areas and reliance on real-time tracking to expedite outbound operations can reduce handling inefficiencies.

The study further contributes to the literature by advocating a conceptual framework that sheds light on the complementarities in support tasks, space utilization and HRM, which support activities themselves are individually not significant but reinforce the outbound tasks and add value if implemented strategically in combination with outbound tasks. Building managers are encouraged to improve the arrangement planning of the warehouse, to deploy modern storage techniques and systems and to increase workforce training efforts. An efficient warehouse, well manned and powered by an integrated operational strategy enhances smooth workflow, minimizes downtimes, improves warehouse productivity. These observations drive for a comprehensive and coordinated operation that would enforce the performance amplification through improvement levels in all dimensions of logistics.

Recommendations

According to empirical results, strategic attention should be paid by ABCH Company to improving the outbound activity, which provides more direct and greater effects on the warehouse's performance. High levels of accuracy in order picking, short lead times and timely delivery need to be safeguarded with enabling technologies such as barcode systems, RFID tracking, and warehouse mechanization. These investments will not only improve customer satisfaction but also drive increased freight volumes. Inbound actions and space

use also must be constantly refined to maintain outbound efficiency, for instance, through simplified receiving operations and the reconfiguration of storage zones for improved accessibility. The business also needs to weave through the DNA continuous workforce development initiatives to deploy in terms of digital transformation, safety compliance and operational agility.

Conclusion

This research aimed to examine the operating factors of warehouse management performance in a business entity in the steel stockist and distribution industrial sector of Malaysia, ABCH Company. The analysis investigated the function of four of the most significant variables in the control of space utilization, inbound and outbound activities, and human resources regarding their influence on the general efficiency system of the warehouse. Positioned in a quantitative method used and with the help of the correlation and regression analysis, the results validated that outbound activities have been the most significant determinant of warehouse performance.

It was found that although space utilization, inbound activities, and HRM showed a significantly positive relationship, in the regression model, the results were not significant. This suggests that their influence, interesting though it must be, is likely to be more indirect and dependent on coordination with other parts of the organisation. That is what ABCH Company could learn from and emphasize the need to optimise other operational facets excluding silos. Outbound Logistics are optimally efficient if a supply chain is backed by an effectively planned space utilization and easy and convenient inbound operations.

Finally, the importance of human resource management ends is not directly performance-related; however, it is crucial in developing a workforce that is skilled, safe and motivated and therefore can enable sustainable operational excellence long-term. The across-the-board improvement plan–which will focus on outbound logistics but leverage capacity, inbound, and HR muscle–will leave ABCH Company well positioned to operate a competitive warehouse, pay competitive wages, and withstand changes in the steel distribution industry.

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The Impact of Autonomy, Workload and Work Life Balance on Job Performance of Support Staff

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Abstract: Job performance is crucial for a company's success, especially for support staff, who are the core of government entities. The effectiveness and efficiency of government services are often underestimated and underappreciated. The relationship between autonomy, workload, and work-life balance is complex, with excessive labor leading to stress and pressure. However, a balance between autonomy, workload, and work-life can lead to engaged and productive staff, enhancing job performance. A decrease in job performance among support personnel is a significant concern that must be addressed to ensure employee work-life balance. Employers must recognize the value of their support staff and take action to improve their performance. Organizations can ensure their support personnel are motivated, productive, and performing well by lowering their workload and providing opportunities for recognition and training. This study aims to find the effect of autonomy, workload, and work-life balance on job performance among support staff at a selected organization in Negeri Sembilan. A quantitative approach was used, collecting data through structured questionnaires. The results showed a significant, positive, and moderate relationship between autonomy and job performance, with a p-value of more than 0.01. There was no significant, negative, or very weak relationship between workload and job performance, and a significant, positive, and strong relationship between work-life balance and job performance.

Keywords: *Autonomy, workload, work-life balance, job performance*

1. Introduction

Job performance is a crucial aspect of any profession, determining an individual's performance and advancement within an organization. Organizations are responsible for creating an environment that promotes job performance through effective communication, recognition, awards, and opportunities for advancement (Ugboro & Obeng, 2000). Regular feedback and performance reviews help employees identify their strengths and weaknesses and seek to improve their job performance (Murphy, 2020). A high degree of job performance is required for a company to fulfill its goals and remain competitive in the marketplace. Job performance has an impact on all aspects of the firm, including productivity, profitability, employee satisfaction, and growth (Kessler et al., 2020). Firms need to have a system in place to assess and evaluate job performance. Regular performance assessments and feedback sessions can help identify areas for development and offer employees the support and tools they need to succeed in their roles (Atmaja et al., 2023). A drop in job performance can hurt the overall success of a company, such as missed deadlines, low-quality work, and decreased customer satisfaction (Yıldız, 2023).

Autonomy is one of the five job characteristics that influence the level of motivation experienced by individuals in a job (Khoshnaw & Alavi, 2020). It fosters a crucial psychological state characterized by a sense of "experienced.

Responsibility for work outcomes that result in improved work efficiency and heightened internal job drive. This component is believed to lead to greater drive and efficiency in a profession. Autonomy and work performance are two critical components that determine the success of any firm (Ali & Anwar, 2021). Employee performance is directly tied to their bosses' leadership styles. A good leader can motivate and inspire their team to perform to their full potential, while a weak leader can have a negative impact on team performance (Hogan et al., 2021). Good management has a large impact on job performance, as it provides clear direction, creates realistic goals, assigns work, offers required resources, and recognizes and rewards team members'

achievements (Clack, 2021). This fosters a sense of accountability and responsibility among employees, resulting in enhanced productivity and job satisfaction.

Support staff are an essential component of any firm, providing critical support services in autonomy, allowing the core staff to concentrate on their primary duties (Lee, 2021). Their hard work and dedication make a substantial contribution to a company's success. Employees in today's fast-paced and demanding work environment frequently report feeling overwhelmed by their workloads, which can have a direct impact on their job performance and the organization's support staff. The link between workload and job performance is complex, but a manageable workload can boost job performance by keeping people interested and motivated. To promote a healthy and productive work-life balance and work environment, both employers and employees must successfully manage their workloads (Cvenkel, 2021). Organizations should detect indicators of overwhelming workload and take appropriate steps to alleviate its effects. Encouraging a good work-life balance and offering assistance to employees can increase job performance and employee well-being.

Job performance is crucial for the development of an organization's workforce, as it encourages continuous learning and skill improvement, leading to growth and success. It also plays a significant role in employee engagement, as it is directly linked to the success of an organization's goals and objectives. When employees perform well, they align their efforts with the organization's goals, achieving them efficiently. This leads to overall success and growth. Job performance leads to increased productivity, quality work, employee retention, satisfaction, workforce development, employee engagement, and the achievement of organizational goals (Abdelwahed & Doghan, 2023). Therefore, organizations must prioritize and invest in improving job performance to reap these benefits and stay ahead in today's competitive business world. The lessons learned will be valuable to employees, as job performance significantly impacts employee engagement. When employees perform well, they are more invested in their work, leading to a positive work environment and a sense of ownership and commitment towards the organization's goals. Engaged employees are more likely to go above and beyond their job responsibilities, resulting in increased innovation and creativity within the organization (Rahmadani et al., 2020).

Problem Statement

The organization has been grappling with increasing support staff, leading to inefficiency and excessive spending (Kruse et al., 2020). In response, the company administration announced a restructuring that focused on reducing the number of support staff. Critics argue that this may negatively impact support staff job performance, as the strain on remaining employees may increase, leading to burnout and decreased productivity (Hyatt, 2022). Restructuring is a common practice in today's corporate climate, altering an organization's structure, procedures, and job descriptions to boost productivity, profitability, and efficiency (Mavlutova et al., 2021). However, it can also be detrimental to workers, particularly support staff. The main challenge faced by support staff following a reorganization is the correlation between autonomy, workload, and job performance. The organization's modifications may result in a significant increase in the burden for support workers, potentially lowering their job performance.

The increase in support staff workload is another issue, as they are already managing communications, administrative duties, and daily activities. This increased workload can lead to stress, burnout, and lower job performance. Work-life balance is crucial for government employees' health and job performance, as remote work and technology advancements have blurred the line between professional and personal life (Mikołajczyk et al., 2023). A lack of balance can lead to burnout and reduced efficiency, resulting in increased absenteeism. To address these issues during an organization's reorganization, organizations should provide necessary tools, training, and communication to support the transition and maintain the productivity and well-being of their support personnel.

Thus, this study aims to investigate the effect of autonomy, workload, and work-life balance on job performance among support staff after restructuring, specifically in a selected organization.

2. Related works

Job performance is a crucial aspect of industrial, work, and organizational psychology, as well as Human Resource Management. It is defined as the total expected value of an individual's discrete behavioral events

over a given time period and is connected to both employee and organizational outcomes. Employee job performance is defined as scalable actions, behavior, and outcomes that contribute to organizational goals (Unsworth et al., 2021). Job performance can be used for various strategies and interventions in industrial and organizational psychology to improve human performance in work organizations.

There are several approaches to evaluating job performance, including performance appraisals, which are organized processes where supervisors or managers evaluate an employee's performance and provide feedback (Al-Jedaia & Mehrez, 2020). Performance evaluations can be conducted annually, semi-annually, or quarterly, depending on the organization's policies. The primary goal of analyzing job performance is to determine an employee's strengths and weaknesses, enabling the firm to provide necessary training and development opportunities to enhance their performance (Stofkova & Sukalova, 2020). It also helps identify high-performing individuals who may be considered for promotions or other career growth opportunities. In summary, job performance is an essential activity for any firm to ensure the efficient functioning of its staff. It allows employees to receive feedback, set goals, and improve their performance, while also identifying high-performing staff and resolving performance issues.

Workload refers to the number of tasks an individual or team is expected to complete within a certain period, and it can be influenced by various factors such as job nature, organization size, and individual position (Jermsittiparsert et al., 2021). It is a major stressor and can lead to higher turnover rates, weaker commitment, poor psychological health, and increased tension.

Work-life balance is the concept that one's personal and professional lives are mutually reinforcing in their pursuit of excellence. It is defined as the degree to which an individual is invested in and equally content with their professional and personal responsibilities (Brough et al., 2020). Employers can derive numerous advantages from employees who successfully maintain a work-life balance, including increased motivation, productivity, reduced stress, increased efficiency, decreased absenteeism, and lower turnover rate. Prospective employees will gravitate towards organizations that adopt the work-life balance philosophy, and these organizations will cultivate an esteemed reputation as an employer of choice (Leonard, 2022).

The concept of work-life balance has gained considerable attention in recent years, particularly in relation to the job performance of government employees. Achieving a harmonious equilibrium between work and personal life is essential for the overall welfare of employees and the ultimate prosperity of the firm (Vyas-Doorgapersad, 2023). Government organizations can cultivate a favorable work environment and enhance employee productivity and satisfaction by giving importance to work-life balance and implementing supportive measures (Licudan-Credo & Naparota, 2022). In conclusion, achieving a harmonious balance between work and personal life is crucial for the overall welfare of employees and the ultimate prosperity of the firm. By prioritizing work-life balance and implementing supportive measures, government organizations can create a positive work environment and enhance employee productivity and satisfaction.

Autonomy and job performance are crucial factors that significantly impact an individual's professional advancement and contentment in their workplace. Autonomy refers to an employee's self-governance and liberty in decision-making and task execution, while work performance denotes their capacity to meet and surpass the anticipated requirements of their job position (Dagan & Gergen, 2024). Autonomy directly affects job performance, as employees who are given the freedom to make their own judgments and complete their tasks are more likely to be innovative, come up with unique solutions to challenges, increase confidence and self-esteem, resulting in greater job satisfaction and motivation (Cho et al., 2021).

However, job autonomy has some drawbacks, such as achieving the proper balance of autonomy and control (Sonko et al., 2024). Too much liberty can cause chaos and a lack of direction, while too much control can inhibit creativity.

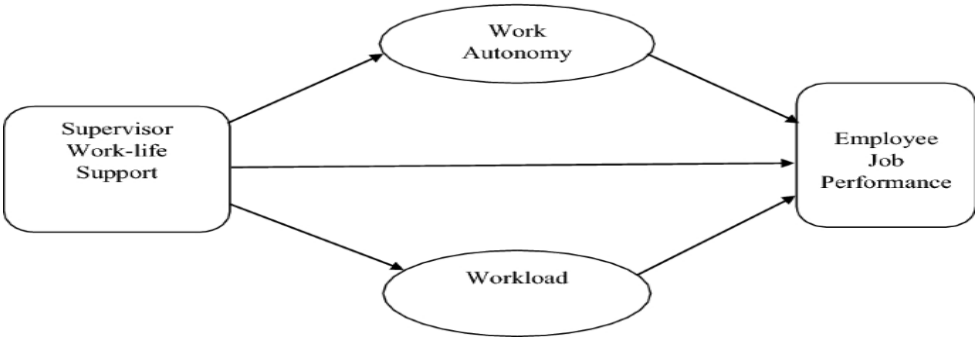
And innovation. Employers must strike the appropriate balance between providing direction and assistance while also allowing employees to make their own decisions and take responsibility for their jobs (Organization, 2021). The correlation between workload and job performance is not easy, as many elements influence this dynamic, including an individual's employment function, talents, abilities, organizational culture and work

environment, and their personal life. An individual's workload is heavily influenced by their employment role and duties, such as being a manager or team leader, or in a specialized or technical profession (Jamal et al., 2021). Organizational culture and work environment can have a substantial impact on an individual's workload, with some firms requiring long hours and multiple tasks, resulting in a heavy burden.

A positive work culture can also help improve job performance by promoting employee well-being and motivation (Sarwar et al., 2020). Organizations must understand the influence of workload on employee job performance and implement strategies to maintain a manageable workload, such as distributing tasks appropriately, providing sufficient tools and assistance, and encouraging a healthy work-life balance. Employers must also communicate effectively with their employees and listen to their complaints about workload to make the required changes (Wu & Chen, 2020).

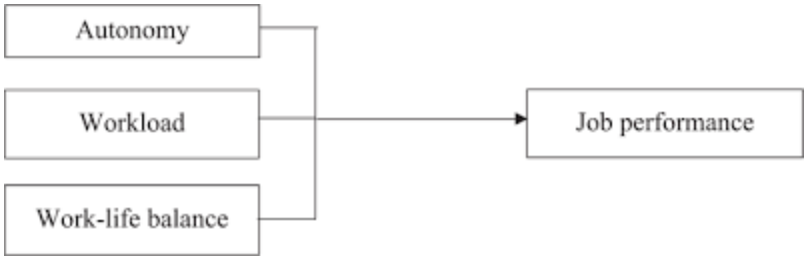
Theoretical Framework

Previous research has demonstrated that workload, autonomy, and work-life balance are crucial indicators of job performance, aligning with the assumptions of Border and Boundary Theories (Leonard, 2022). Border theory is a cognitive theory that examines how individuals control their environment and how they attach meanings to home and work. It focuses on the cognitive, physical, and behavioral boundaries between an individual's job and family roles (Park et al., 2020). Achieving work-life balance requires similarities between work and family domains and strong boundaries between them. This study, based on Border and Boundary Theories, aims to investigate the impact of autonomy, workload, and work-life balance on support staff at the selected organization. The independent factors include autonomy, workload, and work-life balance, while the dependent variable is job performance. The theoretical framework serves as a guide for researchers, as the same research topic can be approached differently within different theoretical frameworks.



Adapted: Msuya and Kumar Future Business Journal 2022, 8(1):26

Conceptual Framework



(Adapted from Johanim Johari, Fee Yean Tan, Zati Iwani Tjik@Zulkarnain, Source: (Johanim et al., 2013)

The study focuses on the relationship between autonomy, workload, work-life balance, and job performance among teachers in Peninsular Malaysia Schools. The researcher adapted a model from Johari's 2013 research to investigate the intention of autonomy, workload, work-life balance, and job performance. The variables included autonomy, workload, and work-life balance, while the dependent variable was job performance. The aim is to determine the relationship between these variables and their influence on each other. The proposed conceptual framework illustrates the framework's application in this research.

3. Methodology

This research study aims to examine the relationship between autonomy, workload, and work-life balance, which influence job performance among support staff at the selected organization. The research design serves as the fundamental plan or structure that directs the entire research procedure, encompassing the development of research questions, data gathering, and analysis of data. The study employs correlation research, which aims to establish connections between two or more variables within a single population or between the same variables in two different populations. Quantitative methods prioritize the collection of vast quantities of data from diverse sources, eliminating the need for direct involvement of researchers.

The sampling frame for this study is the support staff at selected organizations, with 52 respondents. The population is the entire group of individuals, events, or objects that the researcher intends to investigate. The convenience sampling technique is used due to its ease of accessibility and availability. The unit of analysis is the support staff at the selected organization, who will be given time to answer and complete the questionnaire. The study uses a set of questionnaires and employs the subscale approach in the survey questionnaire. The questionnaire was distributed electronically through a Google form and comprises items about both independent variables and dependent variables. The questionnaire is divided into four sections, namely section A, section B, section C, and section D, and produced in bilingual format. Section A pertains to demographic information, while sections B, C, and D focus on the independent variables of autonomy, workload, and work-life balance, and section E pertains to the dependent variable of job performance.

The instrument design for this research study is adapted from one study to measure the theoretical model of this study. Respondents are given questionnaires to gather their responses, including their gender, age, marital status, degree of employment, and work experience. The study employs a Five-Point Likert Scale to measure the relationship between autonomy, workload, and work-life balance. The reliability of the instrument was assessed using the Statistical Package for Social Sciences (SPSS) version 28.0, with Cronbach's Alpha used to measure its reliability. The reliability coefficient, which measures the positive association between items, increases as the coefficient approaches 1.0. Cronbach's alpha for three variables was in the range of 0.912. The initial stage of data analysis involves setting the parameters of the data gathered during the investigation. The SPSS program was used to conduct efficient and effective data analysis, including examining frequencies, descriptive statistics, reliability analysis, correlation, multiple regression, and variable correlation. The software also provides visual aids such as histograms, tables, graphs, and charts to aid in the analysis.

4. Results

This study aimed to analyze the demographic profile of support staff at the selected organization by distributing 52 questionnaires. Out of these, 52 were returned with 100% accuracy due to the central agency's recruitment warrant for 52 individuals.

Demographic Profile

The demographic profile of respondents includes age, gender, marital status, and length of service. As shown in Table 1, the majority of respondents (61.5%) are aged between 26-35 years, with most of the respondents (78.8%) being female, with 44 people married (84.6%) and 8 single (15.4%).

The length of service at the office is also analyzed. Most respondents have served more than 8 years, with 69.2% serving more than 8 years, and 30.7% serving less than 8 years. This indicates that most respondents have work.

Experience over 8 years. In conclusion, the demographic profile of support staff at the selected organization is diverse, with a high percentage of male and female staff. The majority of respondents have worked more than 8 years, indicating a strong focus on their work experience and career development.

Table 1: Demographic profiling of the respondents

Demographic	Value	Frequency	Percent
Gender	Male	11	21.2
	Female	41	78.8
Age	20 – 25 years old	8	15.4
	26 – 35 years old	32	61.5
	36 – 45 years old	10	19.2
	46 – 55 years old	2	3.8
Marital status	Single	8	15.4
	Married	44	84.6
Length of service	Less than two years	4	7.7
	3 – 5 years	10	19.2
	6- 8 years	2	3.8
	More than 8 years	36	69.2

Descriptive Analysis

As shown in Table 2, based on 52 respondents for this study, the highest mean score and standard deviation are employee performance, which were (M=4.1368, SD=0.58116). The lower mean score and standard deviation are workload, which were (M=3.0641, SD=0.78609).

Table 2: Descriptive Statistics

Variables	Mean Statistic	Std. Deviation Statistic
Autonomy	3.7524	.47129
Workload	3.0641	.78609
Work Life Balance	3.5673	.46683
job performance	4.1368	.58116

Correlation Analysis

Table 3: Correlation Coefficient

		Job performance	Autonomy	Workload	Work Life Balance
Job performance	Pearson Correlation	1	.431**	-.199	.692**
	Sig. (2-tailed)		.001	.158	.000
	N	52	52	52	52
Autonomy	Pearson Correlation	.431**	1	.116	.468**
	Sig. (2-tailed)	.001		.414	.000
	N	52	52	52	52
Workload	Pearson Correlation	-.199	.116	1	-.277*
	Sig. (2-tailed)	.158	.414		.047
	N	52	52	52	52
Work Life Balance	Pearson Correlation	.692**	.468**	-.277*	1
	Sig. (2-tailed)	.000	.000	.047	
	N	52	52	52	52

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The study used Pearson Correlation Coefficient data analysis to examine the relationship between autonomy, workload, and work-life balance among support staff at selected organizations. The results showed a significant, positive, and moderate relationship between autonomy and job performance, with a p-value of more than 0.01, as shown in Table 3. However, there was no significant, negative, and very weak relationship between workload and job performance, with a p-value of less than 0.01. Despite these findings, the study found a significant, positive, and strong relationship between work-life balance and job performance.

Regression Analysis

Table 4: The results of regression analysis

Independent Variable	Standardized Coefficients Beta	t	Sig	Statistics
(Constant)	0.843	1.353	0.182	
Autonomy	0.623	1.258	0.214	1.397
Workload	0.149	-0.432	0.667	1.1.82
Work-life balance	0.82	4.850	0.000	1.493
R Square	0.496			
Adjusted Square	0.464			
F	15.731			
Sig of F value	<0.001			

Dependent variable: Job Performance

This section focuses on hypothesis testing to examine the relationship between autonomy, workload, and work-life balance on job performance among support staff at the selected organization. The results shown in Table 4 summarize that the autonomy, workload, and work-life balance explain 46.4% of the variance in job performance, while another 54.4% of the variance is not explained by these variables. The study aims to determine if there is a positive or negative connection between each independent variable and the dependent variable.

5. Conclusion and Recommendations

The study focuses on the relationship between autonomy, workload, and work-life balance among support staff at a selected organization. The majority of respondents were female, aged 26-35 years old, married, and had more than 8 years of work experience. The findings indicate that autonomy and work-life balance have significant value and influence job performance.

Regression analysis showed a significant relationship between autonomy and job performance among support staff. Work-life balance involves negotiating and sharing role-related expectations with partners in both work and family life. Implementing workplace rules and support for work-life balance plans can improve employee well-being, organizational commitment, and job satisfaction. Workers who struggle to reconcile work and personal life may have personal conflicts.

There was no significant link between workload and job performance among support personnel, indicating that H1 was not supported in this study. However, a high workload can develop when great performers take on additional tasks and responsibilities and are encouraged to execute them well. Workload is viewed as a challenging stressor that has a positive, rather than negative, relationship with performance. Managers must handle workload with care due to its equivocal impact on job performance.

Work-life balance was found to be a significant relationship between autonomy, workload, and job performance among support staff. Future research should focus on increasing the sample size and involving support staff from various regions to ensure accurate conclusions. Additionally, future research should include additional variables such as job stress, work-family conflict, and productivity to further understand the relationship between workload and job performance among support staff.

The study contributes further empirical evidence to the existing body of research on job performance, showing a direct correlation between increasing autonomy, workload, work-life balance, and improved time management. An increase in workload leads to an elevation in work-related stress, while a reduction in workload leads to a drop in work-related stress. Conversely, an increase in work stress enhances employee performance, and effective time management can indirectly enhance performance.

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Integrating Trust in Agents into the Theory of Planned Behavior: A Conceptual Framework for Family Takaful Demand in Malaysia

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Abstract: This conceptual study explores the factors influencing family takaful demand in Malaysia, emphasizing the integration of trust in agents into the Theory of Planned Behavior (TPB). While attitude and subjective norm remain central to the TPB framework, this study introduces trust as a moderating factor, alongside demographic and contextual control variables such as gender, income, education and digital readiness. The study responds to recent developments in Malaysia's takaful landscape, where participant rates continue to grow but overall penetration remains modest at approximately 20% despite over 6.6 million active certificates recorded in 2024. Empirical findings from Bank Negara Malaysia and the Malaysian Takaful Association highlight the rising importance of digital adoption and agent networks in driving new business contributions. By recognizing the agent-customer relationship as a cornerstone of trust, this study positions trust not only as an interpersonal construct but also as a mechanism for reducing uncertainty in financial decision-making. Post-pandemic shifts in consumer awareness, particularly among the younger demographics, further reinforce the relevance of integrating digital competence and health consciousness into takaful participation models. The proposed framework offers a theoretically robust and practically relevant foundation for future empirical testing, employing quantitative approaches such as PLS-SEM to assess moderating effects. This study contributes to both academic discourse and industry practice by extending TPB, providing actionable insights for policymakers, takaful operators and agents seeking to enhance market penetration. Thus, it emphasizes the need for holistic strategies that combine behavioral, relational and technological factors to strengthen Malaysia's position as a global leader in family takaful.

Keywords: *Penetration, Trust, Attitude, Agents, Takaful*

1. Introduction

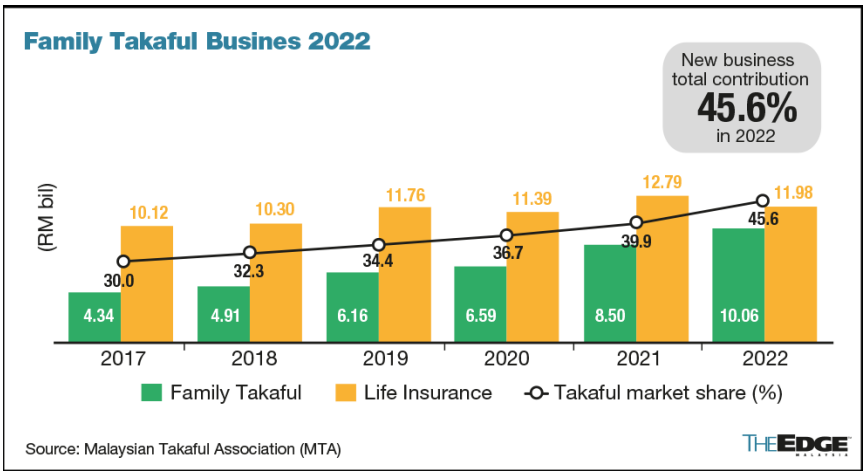
In the early 1980s, Malaysia's takaful sector grew out of the Muslim community's desire for an Islamic insurance as a substitute for conventional insurance. Despite that, the existence of Islamic insurance is to assist the operations of Malaysia's Islamic financial services industry particularly the Islamic banking. At that particular time, the government of Malaysia under the Malaysian National Fatwa Committee had issued, determination that life insurance in its current form is a void contract with the presence of the elements of Gharar (uncertainty), Riba (usury) and Maysir (gambling). Consequently, in 1982, the government formed a Special Task Force to investigate the feasibility of establishing an Islamic insurance firm. According to the suggestion made by the Task Force, an Act, known as the Takaful Act, was passed and implemented in 1984, and the first takaful operator was established in Malaysia in November 1984. Islamic insurance, or known as Takaful, is a shariah-compliant insurance that suits the demands of the Muslim community in Malaysia. The companies that work in accordance with the current insurance business necessitate the adoption of unique Islamic insurance legislation. Based on the success of Islamic insurance companies in other countries, the committee decided that establishing Islamic insurance companies in Malaysia would be a profitable endeavor (Takaful Annual Report, 1986).

Over 20 years ago, Malaysia's takaful business has seen to have a fast growth and transformation. It has evolved from one Takaful operator with restricted basic items to a sustainable industry that has been integrated into the mainstream banking system. This was accomplished through the collaborative efforts of the Central Bank of Malaysia, known as the Bank Negara Malaysia. Takaful operators are to create a dynamic, resilient, and efficient takaful business. (MTA, 2004). Referring to the Bank Negara Malaysia annual report for 2024, from the insurance and takaful sector, Malaysia remains a global leader in family takaful with over 6.69 million active certificates and RM52.3 billion in managed assets. Despite the penetration rate that is still around 20%, it eventually shows an enormous untapped potential market. Malaysia's takaful industry has shown a robust and growing market; however, it still faces the challenges of limited market penetration. According to the Malaysian

Takaful Association 2024, data shows that only 20% of the Malaysian population is covered by family takaful products.

Referring to Figure 1, from the Takaful Industry 2022 report, the Malaysian Takaful Association (MTA) has indicated that Malaysia's Family Takaful performance is at a positive level in Malaysia's takaful business in 2022. This has shown the rising demand for Islamic financing products. Thus, the adoption of takaful products is preferred as protection plans. From RM8.5 billion in the previous year, the family takaful new business industry increased by 18.3% to RM10.06 billion in gross contributions in 2022. Based on the number of certificates in force against the entire Malaysian population, the segment attained a penetration rate of 20.1% in 2022, up from 18.6% the previous year, an increase of 6.63 million compared with 6.07 million in 2021.

Figure 1: Performance of Family Takaful Business 2022



According to the chairman of MTA, Mr Elmie Aman Najas, The Edge Market reported that Takaful products are in high demand as more Malaysians appreciate the necessity of safeguarding themselves and their family from financial hazards. In addition, the increasing number of agents has contributed to the increased number of new businesses registered under family takaful. This scenario has helped the takaful industry to achieve a better penetration rate in the year 2022. The research objective and research question are as follows:-

RO1: To examine the relationship between attitude and the demand for family takaful.
RO2: To examine the relationship between subjective norm and the demand for family takaful.
RO3: To analyse the effect moderating factor on the perceived trust of the agent on the demand for family takaful.

- Does attitude have a positive relationship with the demand for family takaful?
- Does subjective norm have a positive relationship with the demand for family takaful?
- Does trust in the agent affect the demand for family takaful?

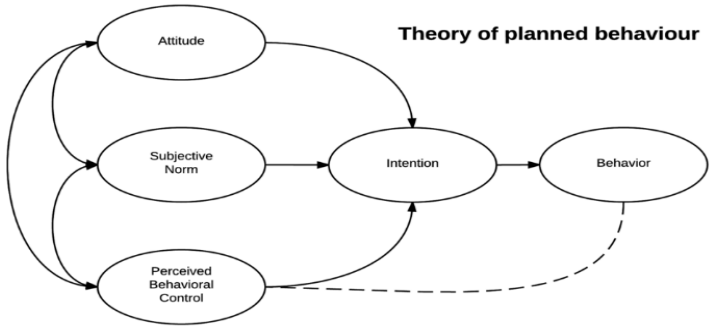
The results of this study can strengthen and provide insight for MTA to optimize the role of the takaful industry in its performance growth of the industry thus, will enabling the association to nourish the takaful industry not only in Malaysia but in the region. The prospect of Malaysia as the main player of takaful in our region, as well as in the world besides Arab countries, is recognized. On the other hand, for the government, the discussion and output of the research can be the catalyst for local governments in determining policies, directions, and strategies for the performance and development of the takaful industry. As for the academician, it will provide a broad understanding of takaful industry performance and can be referenced for future research.

The main research limitation in this study is the other variables that can contribute towards determining factors in the demand for family takaful among Malaysians. The other variables, such as technology and the readiness of customers to adapt to the technology, can be tested.

2. Literature Review

Underpinning theories are referred to by Gregor (2006) as theories for understanding social context in Information Systems studies. The theories are intended to explain "how" and "why" things happen in the way that they do. In understanding the behavioural intention that led to family takaful participation, this study adopts the Theory of Planned Behaviour (TPB) as its foundation framework.

Figure 2: Theory of Planned Behaviour; Ajzen, 2011



According to the Theory of Planned Behaviour (Ajzen, 2011), as illustrated in Figure 2, some behaviours can be begun more easily than others. Perceived behavioural control, which includes the ease (or difficulty) of engaging in these behaviours, experiences relevant to a specific scenario, attitudes, and subjective norm, was critical in determining behaviour change. On the other hand, the intention influences behaviour, which is driven by attitude, subjective norms and perceived behavioural control.

The dependent variable depends on other factors that are measured. The central focus of this study is the demand for family takaful in which refers to the intention and behaviour of individuals in subscribing to Shariah-compliant protection plans. These variables are expected to change because of an experimental manipulation of the independent variable or variables. It is the presumed effect. (Cramer, Duncan, Dennis Howitt, 2004).

Recent studies showed that people are more likely to consider family takaful with their beliefs in ethical compliance, security and religious adherence. Zuki et al (2025) highlighted that after the pandemic, younger individuals have improved their perceptions of protection; thus, this has positively influenced their view of takaful. Arifin et al. (2014) found that religious commitment, reputation and image are the most important elements that influence a person's demand for family takaful products. However, in a broader perspective study by Akhter et al. (2017), who have analysed data from 14 nations from 2005 – 2014, displaying findings of regression modelling in assessing demand for takaful and insurance in ASEAN and Middle Eastern countries. The study findings revealed that income, urbanisation, and the financial industry have a substantial beneficial impact on demand for takaful products. Nevertheless, education has a negative and insignificant impact on the demand for takaful policy. This condition appears to be related to a lack of public knowledge and awareness of takaful products. Gustina and Abdullah (2012) found that GDP per capita, education, savings and religion all had a substantial impact on family takaful demand. However, the consumer pricing index and the banking industry have a detrimental impact on the demand for family takaful.

In relation to independent variables, this study examines the two key independent variables of TPB, which are attitudes and subjective norm. Attitude reflects an individual's positive or negative evaluation of engaging in family takaful, whilst subjective norm looks into the perceived influence of important focus groups. Both factors are shaping the intention towards takaful participation.

Ajzen and Fishbein (1980) defined attitude as an individual's favourable or negative evaluation of a specific behaviour. The Theory of Reasoned Action and the Theory of Planned Behaviour have consistently shown that attitude is a good predictor of both behavioural intentions and actual behaviours (Golnaz et al., 2010).

Meanwhile, Huda et al. (2012) discovered that attitude has a significant and favourable influence on the intention to pay alms. Similarly, research by Syed and Nazura (2011) showed that people's perceptions towards halal cuisine have a direct impact on their inclination to buy such products. Based on these findings, it is possible to conclude that an individual's attitude towards participation in a family takaful program may have a similar impact on their intention to do so. Zuki, Abdullah and Latiff (2025) found that post-COVID-19 health awareness significantly enhanced attitudes among younger consumers, leading to increased interest in family takaful. The findings support attitude as a primary element of takaful demand.

According to Ajzen (1991) and Ajzen and Fishbein (1980), subjective norms refer to the social pressures an individual perceives to either engage in or refrain from a specific behaviour. A subjective norm is when a person's belief about what others will think about the specific behaviour. Significant others might include anyone related and close to the person, such as family members, friends, peers and supervisors. Previous studies have shown that the impact of subjective norms plays an important role in shaping behavioural intentions (Pedersen, 2005; Golnaz et al., 2010; Hanudin and Rosita, 2011; Echchabi and Olaniyi, 2012). Echchabi and Olaniyi (2012) demonstrated through a study involving 168 participants that subjective norms have a significant influence on determining the intention to adopt Islamic banking services. Similarly, Hanudin and Rosita (2011) found that subjective norms had a direct, positive relationship between subjective norms and the intention to use an Islamic pawnshop.

Although the main constructs of the Theory of Planned Behaviour explain much of the intention of takaful participation, and the trust in agents is introduced as a moderating variable, recognising the interpersonal dynamics between consumers and takaful operators. This is to strengthen or weaken the influence of attitude and subjective norm on an individual's intention to participate in family takaful.

Trust is widely recognised as one of the key factors influencing the quality of relationships, customer loyalty and the longevity of buyer-seller interactions. According to Zainordin, Nor and Rahman (2023), trust in takaful agents enhances adoption intentions. In the family takaful context, the agents not only served as product promoters but also as a trusted advisor who reduces uncertainty and carries the ethical credibility of the takaful system.

Trust can be defined as the belief that a service provider will act with integrity, fulfil promises and not take advantage of the customer's vulnerability (Poan et al., 2022)

Latest research continuously emphasizes the critical role of trust in driving the essential marketing outcomes, particularly in the services industry such as Takaful. Trust is significantly influenced by brand loyalty, purchase intention, commitment and repurchase behavior (Poan et al.,2022; Qazi and Md Husin, 2024). Trust has also contributed to positive word-of-mouth communication and greater acceptance of financial products such as family Takaful (Aziz and Md Husin, 2023; Springer, 2023). In the case of family Takaful, trust acts as the foundation element that determines an individual's willingness to engage with the Takaful providers (Zainordin et al., 2023). This is supported by Aziz and Md Husin (2023), from the context of family takaful, which reflects consumers' confidence in the ethical conduct and reliability of takaful operators and their agents. This belief system influences not only trust intentions but also shapes overall perceptions of provider trustworthiness (Qazi and Md Husin, 2024).

Thus, guided by Ajzen's (2002) theory of planned behavior, this study positions trust within a structured framework that includes a clear target, action, context and time. The target is family takaful, the action is the purchase decision, the context involves the agent-customer interaction and the time frame refers to the moment of decision making. Trust, within this framework emerges as a key determinant of whether individuals move from intention to actual behavior.

In addition to the TPB constructs, several control variables are included as the external influence on family takaful demand. It includes demographic factors such as gender, income, education and digital readiness in which have become increasingly relevant in the post-pandemic and technology-driven environment. Previous research findings between gender and the demand for takaful or insurance have yielded inconsistent and sometimes conflicting results (Husin and Ab Rahman, 2013; Eling, Pradhan and Schmit, 2014; Soualhi and Al

Shammari, 2015; Luciano, Outreville and Rossi, 2016; Bageant and Barrett, 2017). Husin and Ab Rahman (2013) found that gender significantly influences the behavioural intention that leads to individual decisions. This aligns with Soualhi and Al Shammari (2015), who observed that women in Kuwait demonstrate greater awareness of takaful plans as compared to men, although men also express intentions to engage in Shariah-compliant insurance at similar rates. However, Luciano, Outreville and Rossi (2016) reported that women are less likely to be insured than men. Conversely, Bageant and Barrett (2017) suggested that gender differentiated demand is positively correlated with the likelihood of purchasing insurance.

The demand for life insurance, as a long-term financial decision, tends to be positively correlated with income levels. As an individual's income increases, life insurance products become more affordable and the need for such products intensifies, especially in protecting dependents against the loss of expected future income due to premature death or permanent disability of the wage earner (Yaari, 1965; Hakansson, 1969; Fortune, 1973; Fischer, 1973; Lewis, 1989). However, in higher-income countries, the elasticity of insurance consumption with respect to income growth is less as compared to that of income per capita (Hussels et al. 2005).

The level of education plays an important role in determining insurance demand. As it influences an individual's awareness of available insurance options (Browne and Kim, 2015; Li et al., 2007; Dragos, 2014). Several studies have shown a positive relationship between education and insurance demand (Beck and Webb, 2003; Huber, 2012). In particular, Sherif and Shaairi (2013) found that education is positively correlated with the demand for family takaful. Dragos (2014) had used panel data to indicate that education positively influences the demand for non-life insurance, but it was not significant for the life insurance sector.

The research literature that explores the connection between financial literacy and the demand for takaful or insurance is still limited. Cole et al. (2010) conducted large household surveys in India and Indonesia, and they discovered a strong relationship between financial behaviour and financial literacy. Which, in turn, influences the demand for financial services in emerging markets. Lin et al. (2017) explored the effects of financial literacy on life insurance demand in Taiwan, using a logistic regression model and found that individuals with higher financial literacy are more likely to purchase a life insurance policy. Similarly, Awel and Azomahou (2015) used cross-sectional household data from Ethiopia and showed that people with high financial literacy are more inclined to seek insurance, emphasising the importance of strengthening financial literacy programmes. Lin, Liao and Li (2023) further emphasised the role of financial literacy in influencing insurance penetration in emerging markets, making the control variable relevant.

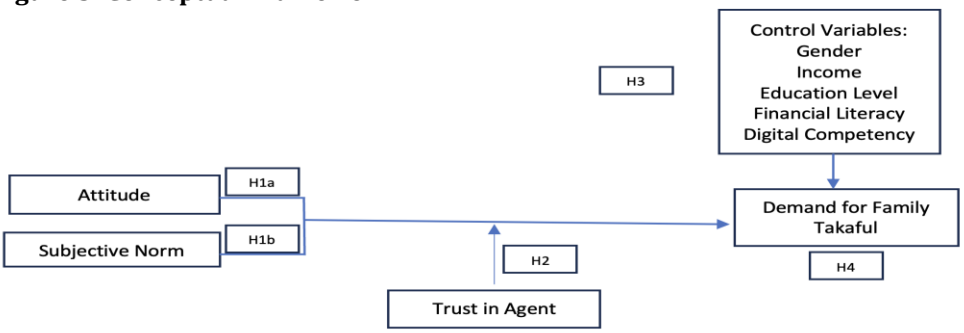
Digitalisation is the process of converting information from analogue to digital form. According to Rafidah (2024), the utilisation of digital technologies has made business operations more efficient and created more opportunities. Muradova (2024) stated that the impact of digital financial technologies on Islamic insurance through blockchain, AI and big data; however, it is more important that the consumer's digital literacy and shariah digital readiness critically affect the operational efficiency, together with the customer experience and the regulatory compliance within the Islamic financial institutions, including the takaful sector.

Conceptual Framework

The conceptual framework aims to enhance the understanding of factors influencing family takaful demand in Malaysia. Based on the Theory of Planned Behaviour (TPB), the framework integrates the key constructs of attitude and subjective norm with the addition of trust in agents as the moderating variable. This extension reflects the growing recognition in post-pandemic literature that trust plays an important role in consumer decision-making of financial services. This is supported by empirical findings from Zuki et al. (2025) and Zainordin et al. (2023), mentioning that awareness and relevance of agent trust in shaping takaful participation. Moreover, the adoption of digital platforms and the need for digital literacy (Muradova, 2024; Rafidah, 2024) served as essential control variables within the framework.

The proposed model presents a theoretically robust and practically relevant framework for examining behavioural intentions toward family takaful participation in Malaysia. Thus, contributes to both theoretical expansion and practical insights for policymakers and industry stakeholders within the Malaysian context in aiming to enhance the takaful market penetration.

Figure 3: Conceptual Framework



Independent Variables	Moderating Variable	Dependent Variable
Attitude	Perceived Trust in Agent	Demand for Family Takaful
Subjective Norm		

3. Research Methodology

As this is a conceptual study, this section briefly outlines the theoretical constructs and potential methodological direction. The proposed framework leverages the Theory of Planned Behavior (Ajzen, 1991) and incorporates trust in agents as a moderating variable along with control variables on income, gender, education and digital competency. These inclusions are grounded in recent findings by Zuki et al (2025) and Lin et al. (2023), which suggested that agent trust and digital readiness significantly influence takaful adoption behavior.

This future empirical study may adopt a quantitative approach using survey-based research with cross-sectional data collection from potential takaful customers and takaful agents. Partial Least Squares or PLS-SEM may be used to test the hypotheses' relationships, particularly in testing the moderating role of trust in agents and the role of control variables that will support the recommendations of the findings.

4. Conclusion

An increase in takaful participation has a significant impact on the overall development of the takaful industry. As more individuals engage with takaful products, it will not only foster the growth of the sector but also contribute to the expansion of the takaful market share. However, before strategies can be effectively implemented to encourage further participation, stakeholders must understand the underlying factors that drive individuals' decisions. The application of the Theory of Planned Behaviour (TPB) in the context of takaful participation offers valuable insights into these factors. By utilising TPB, researchers and industry professionals can gain a deeper understanding of the attitudes, subjective norms and perceived behavioural controls that influence individuals' intentions that engage with takaful. Thus, understanding can lead to the development of policies and initiatives that support increased participation, thereby enhancing the overall performance and sustainability of the takaful sector.

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Fear of Missing Out (FoMO) and Online Subjective Well-Being (OSWB): Examining the Mediating Role of Social Media Overload (SMO)

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Abstract: Social media has become essential in today's hyperconnected digital environment. Due to its widespread use and users' excessive dependence, the use of social media has raised concerns about its psychological impacts. One of the key factors that drives excessive social media engagement is Fear of missing out (FoMO). FoMo has been linked to negative outcomes, both at psychological and behavioral levels. However, the mechanisms through which FoMO contributes to social media overload through information and communication surplus, and how it affects online subjective well-being (OSWB), require further investigation. Hence, a comprehensive literature review was conducted to examine the connections between FoMO, social media overload, and online subjective well-being. Based on the research synthesis, a conceptual framework is proposed, which would advance theoretical understanding of the digital environment and well-being. It also serves as a foundation for future empirical research. Based on the framework, it offers practical insights for designing interventions to mitigate the psychological risks of social media use.

Keywords: *Fear of missing out, online subjective well-being, social media, social media platforms, social media overload, information overload, communication overload.*

1. Introduction and Background

The dream of the democratization of mind, ideas, and information flows is fueled by the digitally networked world. Massive networks underpin the dream. Facebook boasts 3 billion users, Twitter has a quarter-billion, and Instagram has 1.3 billion users as of 2023 (Statista, 2024). Given that Facebook was founded in 2004, Twitter in 2006, and Instagram in 2010, the era of social media is still in its infancy. Surprisingly, in 2022, it was reported that Facebook saw a percentage decline in the number of Malaysian users from 91.7% in 2020 to 87.5% (MCMC, 2024). Furthermore, the chart also reveals that TikTok's performance climbed in 2022 with 49.7%, achieving growth that outperformed Twitter (rebranded to 'X') users, likened to Twitter users of only 40.9%. There is not much talk about the mistakes made and what, overall, has not changed. Concerns regarding the potential of the internet to alter the established dynamics of access and inequality surrounding news and information have been growing for a while.

Few people realise how empowering social media has been, but knowledge truly is power. Social media provides an unfettered flow of information that empowers anyone online to expand their knowledge base. There is no denying that social media has a significant influence on our culture, economy, and worldview in the modern period. Social media is a brand-new platform that allows individuals to connect, relate to, and mobilise for a cause, share ideas, ask for and provide advice, and more. Academics are investigating the possible consequences Facebook may have on users' mental health and general wellbeing in light of the amount of time people spend on the social media platform, its variety of activities, and the psychological significance it has gained in people's lives (Braghieri, Levy & Makarin, 2022; Kross, et al., 2021; Ryan et al., 2016).

Social media has broken down communication barriers, established decentralized channels for communication, and allowed everyone, even those living in oppressive nations, to engage democratically and have a voice, but a long attachment to it is able to create problems. Problematic social media use (PSMU) is linked to mental health issues like anxiety and depression symptoms (Marino et al., 2018; Hussain & Starcevic, 2020). Millions of people now use social media regularly, and this increased engagement has sparked worries about the possible drawbacks of excessive social networking site (SNS) use. FoMO is consistently associated with negative psychological outcomes, including reduced emotional well-being and personal relationship well-being (Stead and Bibby, 2017). It leads to sleep deprivation, loss of focus, and declined productivity (Hayran and Anik, 2021). While some revealed negative associations between social media use and well-being, others

revealed positive links or results that were moderated by individual differences (e.g., online social network size, depressive symptoms, gender, loneliness), Kross et. al (2021).

Social media is eroding the trust and comfort that were found in personal relationships, replacing the human connection, physical presence, and emotional support that people used to rely on with virtual interactions. It undermines self-control and the ability to think independently, making individuals more susceptible to joining groups that promote distorted or harmful messages—messages that cater to superficial desires and amuse the senses—without considering the potential consequences. The urge to constantly be aware of what other people are doing is what defines FOMO (Przybylski et al., 2013). A brief literature review on FoMO, thus, reveals two critical research gaps that limit the current understanding of FoMO:

- Insufficient evidentiary knowledge of FoMO manifestation and possible variations in user behavior and well-being in the context of Instagram and Snapchat (Tandon et al., 2021a) and
- limited knowledge of the underlying complex associations between FOMO and the emerging adverse consequences of social media platform (SMP) use, such as overload, fatigue, and compulsive social media use (Tandon et al., 2021c; Wang, 2021).

Therefore, the study aims to explore the relationship between FoMo and social media overload, and how the overload affects online subjective well-being.

2. Literature Review

Fear of missing out (FoMO)

FoMO represents social media users' continuous apprehension that others may be enjoying more fulfilling experiences when they are not connected with them in the online space (Przybylski et al., 2013). FoMO thus drives users to remain continuously connected to online platforms, leading to excessive use (Cao and Sun, 2018; Rosen et al., 2018) and associated adverse behaviors (Stead and Bibby, 2017). Notably, prior research has equated FoMO with a form of "technological anxiety," representing the unease that users feel when they are unable to engage with technological devices (Rosen et al., 2018). FoMO can be understood as an expression of an individual's need to seek relatedness and connection, which has been intrinsically associated with the use of SMPs and allied networking platforms (Przybylski et al., 2013). Furthermore, relatively few studies have investigated FoMO as a factor predicting individuals' experience of the dark side of social media phenomena, including fatigue, although recognized less than a decade ago (Tandon et al., 2021).

Information overload

Information overload represents a person's ability to comprehend the large volume of information he or she receives through various forms of media (Karr-Wisniewski and Lu, 2010). Scholars have suggested that social media users constantly experience overload because they are constantly bombarded by new information (Cao and Sun, 2018; Gezgin et al., 2017). For instance, Cao and Yu (2019) showed that excessive social and hedonic use of social media in a work environment increases technology–work conflict. The authors claim that this conflict arises from the overload that workers endure as a result of using social media for social, hedonistic, and cognitive tasks connected to their jobs. Examining the effects of technology overload on well-being is crucial since SMPs and IT are becoming essential parts of people's personal and professional lives.

Communication overload

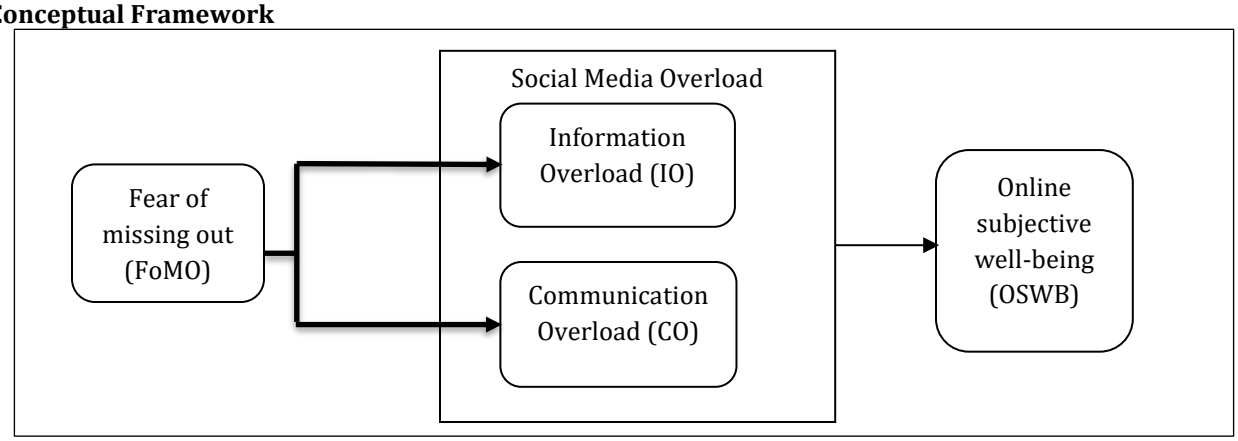
Communication overload refers to the constantly connected environment that technology creates, which produces situations where individuals can be overwhelmed by the communication demands they face (Cao and Sun, 2018). System-feature overload, which does not fall within the boundaries of our investigation, represents an individual's ability to cope with the number of features a system offers users to execute various tasks (Karr-Wisniewski and Lu, 2010). This form is excluded from the study following Islam et al. (2018), who conceptualized social media overload only in the forms of information and communication overload. Most young adults' proficiency in SMP usage in their daily lives should sufficiently familiarize them with the platforms' features and thus negate the possibility of them experiencing system-feature overload.

Online subjective well-being (OSWB)

Subjective well-being represents an individual's affirmative or adverse self-evaluation of his or her mental state

or condition (OECD, 2013, p. 29). SWB is a broad multidimensional concept, which has been well studied in the context of offline space, i.e., real-life (Diener et al., 2015; Verduyn et al., 2017). However, scholars have only recently begun examining various aspects of online SWB (OSWB), which is considered a vital issue among online social media users (Jung et al., 2017; Kaur et al., 2021; Nisar and Shafiq, 2019; Verduyn et al., 2017). OSWB refers to an individual's self-evaluation (positive or negative) of his or her own online social media life. For instance, if a person's online social media life is close to ideal and the person has gained something of importance from it, the person will evaluate his or her OSWB as excellent and satisfying (Kaur et al., 2021). Given that scholars have devoted attention to the relationship between FoMO and various well-being measures, such as life satisfaction (Przybylski et al., 2013; Ayyıldız and Sahin, 2022), anxiety (Dempsey et al., 2019), depression, and stress (Beyens et al., 2016; Kartol and Gündogan, 2020), it may be beneficial to examine the potential associations between OSWB and FoMO-driven SMP usage and thus develop a more nuanced understanding of the complexities of SMP users' psychology and expected benefits.

3. Conceptual Framework



Adapted from Hattingh et. al (2022) & Fu et. al (2020)

4. Discussion and Conclusion

Theoretical implications

This study's findings offer novel insights into the role of SMO in the relationship between FoMO and OSWB in the context of social media. This study makes two key theoretical contributions. First, this study expands the current knowledge on the consequences of FoMO by determining its association with the relatively under-explored variables of information overload and communication overload. Because scholars have primarily investigated FoMO as an indirect influencer (Tandon et al., 2021), this study significantly advances understanding of FoMO's direct adverse behavioral and psychological consequences. At the same time, this study contributes to the OSWB literature by investigating its antecedents, including two more recently recognized and empirically investigated antecedents—IO and CO. Thus, the results advance knowledge regarding the dark side of social media in general and FoMO and OSWB in particular.

Secondly, this study contributes to FoMO towards online subjective well-being research with regard to the composition of information and communication overload and the empirical validation of their relationships. Specifically, this study conceptualized and empirically demonstrated how the two types of overloads are interconnected through social media overload. This insight is important because it extends FoMO literature with the relationships between the overload constructs that affect individuals' well-being (i.e., strain) through their individual and shared effects. Such a composition demonstrates the multifaceted nature of overload and its implications on social media use.

Practical implications

The study's findings offer two significant practical implications for social media administrators, developers, users, users' parents and guardians, and policymakers. First and foremost, young people who use social media, as well as their parents and guardians, should educate themselves and become more conscious of the possible negative effects of utilizing sites like Instagram and TikTok. Parents and guardians must comprehend the potentially detrimental consequences of platform-specific features that could lead their children (or wards) to

engage in risky activities. Parents and guardians may be able to take preventative action by monitoring their children's social media usage patterns or restricting their use of specific platforms as a result of this education and awareness. In order to urge the young people under their supervision to speak candidly if and when they encounter any negative consequences from their use of social media, parents and guardians should also encourage open communication with them.

Second, the findings can help social media producers and managers understand the effects of communication overload, information overload, and FOMO, which can lead to young users experiencing negative OSWB and quitting social media (Fu and Li, 2020). To lessen the negative effects that social media use may have, administrators and service developers must implement responsive design principles. For instance, they can provide reminders for users' digital well-being that ask them to stop using social media after a certain amount of time. In the near term, such measures could seem counterintuitive from a business standpoint, but we think they would be quite advantageous in the long run since social media users will trust the developers to safeguard their welfare.

Conclusion

A useful theoretical foundation for further research in this field has been effectively constructed in this paper. Overall, by illuminating the direct impacts of FOMO and its intricate interactions with communication and information overload, this work advances the theoretical landscape by providing a novel viewpoint on how these factors collectively affect online subjective well-being. The research contributes to the body of knowledge on the psychological effects of social media by providing empirical validation for these links. Practically speaking, the results highlight how critical it is to educate young people, parents, and other stakeholders about the dangers of excessive social media use. Additionally, the study promotes user-centred features and careful platform design to encourage better digital habits. Together, these contributions show how urgently more sustainable and wellbeing-oriented methods of social media interaction are needed.

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From Likes to Learning: The Educational Benefits of Social Media for Students

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Abstract: This research reviews the educational benefits of social media for students, focusing on two key aspects: providing user-generated content and improving academic performance. A review of recent literature reveals that platforms like YouTube, TikTok, and Facebook offer diverse learning opportunities across subjects and support various learning styles through multimedia content, enhancing engagement and knowledge retention. Social media facilitates collaborative learning, enabling peer-to-peer interactions and fostering critical thinking skills. Studies show improved academic performance when social media is integrated into learning. The interactive nature of these platforms allows students to recognize context and memorize content for longer periods. The limitation of this research is further highlighted in the paper. This research recommends further empirical studies to validate the benefits outlined and explore additional factors influencing social media's educational impact. The integration of social media into education represents a significant shift in learning approaches, offering innovative ways to present educational content aligned with digital natives' preferences. While challenges exist, the strategic implementation of social media in educational settings holds promise for substantial improvements in academic outcomes. The integration of TikTok and YouTube into online learning environments offers significant benefits for students across diverse subjects. Educators should incorporate these platforms into their curricula to create more engaging and interactive learning experiences, particularly in science, technology, and engineering fields. Ongoing research and refinement are crucial to leveraging these tools effectively, ensuring they enhance rather than detract from the learning experience.

Keywords: *Online Learning, Social Media, Students, Academic Performance, Learning Content.*

1. Introduction

Social media has now become a natural part of both elementary and higher education students' daily lives, and its use is more of a norm than an exception (Ramzan et al., 2023). Research has highlighted multiple ways in which students rely on social media (both in elementary and higher education). For example, it supports health-related information seeking (Qi & Omar, 2020) and academic tasks outside of the classroom, especially for peer-to-peer interactions. Students also use these platforms to communicate with teachers about schoolwork, engage in discussions (Wang et al., 2023), share educational content (Al-Maaroof et al., 2021), and boost their academic performance (Alsabti et al., 2017; Tran et al., 2023). Due to the convenience and accessibility of social media, it has become a valuable tool for both students and teachers. As a result, it has been shown to improve learning experiences and positively impact students' academic performance (Lien et al., 2017). Besides, it strengthens cooperation and sharing among peers (Al-Sabti et al., 2017) and increases academic performance (Liu et al., 2017).

For example, in countries such as Tanzania, the use of social media is believed to provide an exciting learning platform where students are able to learn syllabi in the form of audio-visual materials, enhancing their learning experience (Kessy & Pessa, 2022). In Nigeria, Ngelale (2019) stressed that the use of social media in Nigeria improved academic performance among private school students. In Malaysia, online learning was first implemented during the COVID-19 pandemic. Students from the age of seven years old who were enrolled in primary school, till those who were 30 years old and above (postgraduate in a higher learning institution) had no other options but to learn online. Online learning and online education are viewed as a must and not an option for students in Malaysia (Malaysian Investment Development Authority, 2021). Noteworthy, the pandemic has forced educational institutions in Malaysia to begin the initiatives of adopting e-learning approaches through the utilization of various online platforms, including social media. Hence, the use of social media as an online learning tool has become a new norm among students in Malaysia. For example, in Malaysia, the use of TikTok makes learning science subjects fun and improves memorization (Shaafi et al., 2023), while

learning a language using YouTube increases understanding in literacy-based subjects such as the English language (Yunus et al., 2019), resulting in improved students' academic performance.

Surprisingly, in developed countries such as Japan, technological capabilities in each region differ. Differences exist in the level of technological capabilities between elementary and higher education. Elementary education in Japan, comprising elementary school, relies on the use of paper learning medium compared to higher education levels (Isha & Wibawarta, 2023). It stresses the importance of using traditional classrooms to enhance students' academic performance, with the use of social media serving as supportive teaching materials (Karapolat et al., 2024).

Past studies have focused on the impact of social media on children (Kessy & Pessa, 2022) and students in higher education institutions (Nurcahyo et al., 2017; Samad et al., 2019). Unfortunately, the importance of research on the benefits of social media on the academic performance of elementary and higher education students, which this study appraises, has been overlooked. Due to the shortage of articles, this paper attempts to review past studies related to the benefits of social media among elementary and higher education students, specifically focusing on the benefits of user-generated content and its impact on improving students' academic performance. At the end of this paper, limitations, recommendations for researchers, and implications for practitioners in the education field are provided.

2. Students' benefits of using social media

Social media is a necessity for students today. Among the benefits of using social media for students are providing user-generated content and improving academic performance. This section will examine these benefits in detail, specifically from students' perspectives.

Provide user-generated content

The rise of user-generated content on social media platforms has transformed the way students experience online learning. Platforms like YouTube, TikTok, and Facebook have reshaped how educational information is shared and consumed, each offering distinct benefits that cater to different learning styles and preferences.

YouTube, for instance, has become a powerful learning tool, giving students access to a vast collection of detailed and specialized knowledge. Its long-form videos allow for in-depth exploration of complex topics, making it especially valuable for subjects that require detailed explanations or visual demonstrations. TikTok, on the other hand, traditionally viewed as an entertainment platform, is increasingly being recognized for its educational potential. While some argue that TikTok primarily serves leisure purposes rather than serious learning (Al-Maarof et al., 2021), more recent studies challenge this perspective. Lan et al. (2024) point out that TikTok's casual and authentic style of communication resonates with learners, especially those who find traditional teaching approaches less engaging.

Research also supports TikTok's ability to boost student engagement and knowledge acquisition. Rajan and Ismail (2022) found that user-generated educational content on TikTok fosters creativity and encourages a student-centered learning experience, making subjects like literature more enjoyable and easier to grasp. The short-form, creative video style of TikTok can simplify complex concepts, while Ardiana and Ananda (2022) emphasize that it increases student activity and improves learning outcomes. Their findings reveal that students who used TikTok for educational purposes became more interested and involved in learning, ultimately achieving better academic results than peers who did not use the platform. This highlights how TikTok's interactive and entertaining nature can drive motivation and participation in education.

Beyond general knowledge sharing, social media has also been tailored for subject-specific education. For example, Mulenga and Marbán (2020) highlight how platforms like TikTok, YouTube, and Facebook have been used to create customized mathematics content, addressing the unique challenges faced by school students. This personalized approach enhances the effectiveness of math education by aligning lessons with students' varying learning needs and abilities. Despite these benefits, concerns remain about the quality and reliability of user-generated educational content. Because anyone can create and share content, both educators and students need to critically evaluate the accuracy and credibility of the information to ensure it supports sound

academic learning. This scrutiny is vital to safeguard the integrity of education.

Additionally, the influence of social media on students' attention spans, critical thinking, and overall academic performance cannot be overlooked. While TikTok's short videos make learning more accessible and fun, they may also reduce students' capacity to engage deeply with long-form academic material. Ongoing research is therefore necessary to understand the long-term impact of these platforms on cognitive and academic development.

Overall, integrating user-generated content into education brings both opportunities and challenges. On the positive side, it can make learning more engaging, accessible, and adaptable to individual needs. On the other hand, it demands careful curation and guidance to ensure that content meets academic standards. As social media continues to evolve, its role in education will likely expand, potentially leading to new platform features, tools, and teaching strategies designed specifically to harness the strengths of user-generated content.

Improve academic performance

The use of social media in online learning has also been proven to improve students' academic performance due to several factors, such as supporting diverse learning styles, recognizing the context and memorizing it longer, and collaborative learning.

Supporting diverse learning styles

Learning styles play a crucial role in how individuals perceive and process information in educational settings. These styles can be broadly categorized into three main types: visual, auditory, and kinesthetic (Gilakjani, 2012). Understanding and catering to these diverse learning styles is essential for educators to maximize their students' potential and enhance the learning experience. The ability of teachers to match students' learning styles with their teaching style and approach by using the most effective social media platform will enable them to develop best-fit learning styles according to their students' needs (Balfaqeeh, 2017), resulting in optimization of learning outcomes and increased knowledge acquisition within short periods (Soetan et al., 2020).

Noting the importance of matching teaching styles with students' learning styles, the use of social media platforms such as TikTok has gained momentum in education. TikTok offers unique and advanced means to accommodate different learning styles simultaneously. TikTok, in particular, has been embraced in both language learning and general education. Research shows that students respond positively to TikTok as a teaching aid, especially in English language classrooms (Yang, 2020). Beyond classroom walls, learners also view it as a helpful strategy for studying English independently. What makes TikTok appealing in this context is its ability to combine education with entertainment, which helps reduce boredom and sustain motivation (Salsabila et al., 2021).

Visual learners, for example, primarily rely on visual cues to absorb information effectively. They tend to excel when presented with diagrams, charts, images, and written text. For these learners, the content of TikTok in the short-form video format allows for the presentation of information in a visually engaging manner, incorporating graphics, text overlays, and dynamic visuals that appeal to this learning style.

On the other hand, auditory learners absorb information most effectively through listening and verbal interaction. They excel in settings where knowledge is shared orally, such as lectures, discussions, or audio-based materials. Noting that, for these learners, the audio elements of TikTok—spoken explanations, background music, and sound effects—offer an added layer of support, enhancing comprehension and memory retention.

Kinesthetic learners, by contrast, prefer hands-on experiences and physical involvement. They learn best through movement, touch, and practical application of concepts. TikTok interactive tools, such as content creation and participation in challenges, provide opportunities for active engagement, making the learning process more dynamic.

Besides, TikTok also supports skill development, particularly in language learning. Its short, accessible content exposes learners to authentic English usage, aiding in the improvement of speaking and pronunciation skills in a more natural way (Salsabila et al., 2021). This is especially beneficial for both visual and auditory learners, who can observe and listen to native speakers for accurate pronunciation and intonation. The platform's effectiveness is not limited to language education; studies also report positive outcomes in other disciplines, such as Civics in vocational schools (Hermanto & Nursafitri, 2024). Furthermore, there is evidence linking TikTok use with overall improvements in learning achievement (Manurung et al., 2023). These findings highlight the platform's potential to support student performance across a variety of subjects when integrated purposefully.

In sum, one of TikTok's greatest strengths lies in its ability to simultaneously address multiple learning styles. Visual learners benefit from its imagery and effects, auditory learners from its spoken and musical components, while language learners can strengthen pronunciation by observing and listening to authentic speech (Paz-Domínguez et al., 2023). The platform's combination of visuals, narration, and sound effects creates a multisensory learning experience that reinforces understanding and retention (Lan et al., 2024). Even kinesthetic learners can find opportunities for engagement, as TikTok encourages interaction through movement, participation in challenges, and content creation—offering a digital form of hands-on learning (Alzubi, 2023).

Recognizing the context and memorizing it longer

The intensive use of Facebook and YouTube among students improves their academic performance, especially their working memory, spelling, and verbal skills, due to the mutual cognitive influence and increased active participation in the learning process (Astatke et al., 2021). The short contents, funny photos, and videos on social media enable students to recognize the context and memorize it longer (Al-Sabti et al., 2017; Pham Manh et al., 2023).

For example, in the Philippines, the use of YouTube enables young students (aged three to six years old) to learn the English language in a more fun and engaging way Kilag et al., 2023). According to the study, YouTube educational videos taught the students the English language at different levels, ranging from basic vocabulary lessons to more complex grammar and sentence structure lessons with songs and nursery rhymes. The integration of auditory and visual enhances these students' English language skills, enabling improvements in vocabulary, grammar, and pronunciation skills. In Bangladesh, Tahmina (2023) revealed that although YouTube videos are capable of assisting students in learning the English language, the materials provided on YouTube are unable to help these students complete their English language writing assignments.

In the same vein, in Malaysia, the use of YouTube, WhatsApp, and Instagram was also able to assist Malaysian elementary school students in learning the English language (Yunus et al., 2019) and improve their academic performance. Besides literacy-based subjects, the use of social media, such as TikTok, has proven to create fun in learning science-based subjects such as chemistry, making it easy to comprehend and increase the memorization of the chemistry syllabus among Malaysian students (Shaafi et al., 2023).

Collaborative learning

Teaching students in the 21st century poses numerous challenges, especially with the need for these teachers to keep abreast with the latest technology, such as social media, and incorporate it into their classes. Nonetheless, the benefits of integrating social media into the classroom environment outweigh its drawbacks. The integration of social media platforms in online learning promotes collaborative learning between teachers and students and between students and students. With the existence of collaborative learning, learning difficulties can be solved swiftly (Misman et al., 2019). For example, the use of WhatsApp and Telegram among students learning physics increases their participation in class discussions, resulting in an improvement in students' academic performance (Yusoff & Abdul Hamid, 2022).

In the same vein, peer-assisted learning inculcates the development of critical thinking and knowledge integration processes, enabling students to think, synthesize different perspectives from their peers, and achieve shared knowledge for solving mathematical problems (Cardino & Cruz, 2020), resulting in improved students' academic performance (Wang et al., 2023; Aba & Makinde, 2023).

Besides, students joining groups created on Facebook for educational purposes perform better academically compared to those who do not join such groups. The improved performance is due to the ability of Facebook to facilitate a sense of community, which encourages students' active engagement and deepens students' learning. The spontaneous peer teaching and learning through Facebook has been able to facilitate students' learning process in an impromptu manner, without the need for their teacher's presence (Kasperski & Blau, 2023).

3. Limitations and Recommendations

This paper primarily examines the advantages of incorporating social media into online learning environments, with a specific emphasis on two key aspects: the provision of specialized content and the enhancement of academic performance among elementary and higher education students. However, the scope of this research is limited, and future studies should expand their focus to encompass additional factors that may benefit students when utilizing social media platforms in their educational pursuits. These factors could include enhanced communication channels between students and instructors, improved access to a wide array of educational resources, and opportunities for global networking, all of which may prove advantageous to students engaging with social media in their online learning experiences.

Moreover, the current study is confined to a review of existing literature pertaining to the benefits of social media integration in online learning. To further advance this field of research, future researchers should consider conducting both qualitative and quantitative studies to explore and empirically validate the benefits outlined in this paper. Such research could involve surveys, interviews, or experimental designs to gather primary data on students' experiences and outcomes when using social media for educational purposes. Additionally, longitudinal studies could be implemented to assess the long-term impact of social media use on academic performance and skill development. By employing diverse research methodologies, scholars can contribute to a more comprehensive understanding of the role of social media in online learning and its potential to enhance educational outcomes across various disciplines and student populations.

4. Implications to Practitioners

The integration of social media platforms into online learning environments has emerged as a significant trend in contemporary education, offering substantial benefits to a wide range of students. This innovative approach to learning has garnered attention from researchers and educators alike, who have identified various social media platforms as valuable tools for enhancing the educational experience across diverse subjects.

Science, technology, engineering, and mathematics (STEM) subjects in school have gained prominence in the realm of science and technology education is TikTok. This short-form video-sharing application has proven particularly effective in engaging students with complex scientific concepts, especially in chemistry. The platform's format allows for concise, visually appealing explanations of chemical processes, reactions, and theories, making these often-challenging topics more accessible and engaging for learners. The benefits of social media integration extend beyond physical sciences to other STEM fields. Cardino and Cruz (2020) highlight the positive impact of social media use on mathematics education, further reinforcing the argument for a more comprehensive adoption of these platforms across various disciplines.

For engineering students grappling with science and technology-based subjects such as physics, mathematics, and chemistry, the incorporation of social media platforms like TikTok and YouTube into their study routines can significantly enhance their understanding and retention of complex concepts. These platforms offer diverse perspectives, visual demonstrations, and real-world applications of theoretical principles, complementing traditional textbook learning. By leveraging these multimedia resources, students can gain a more comprehensive and nuanced understanding of their subjects, often finding explanations that resonate with their individual learning styles.

Similarly, language-based subjects have recognized YouTube as a powerful resource. The platform's vast repository of educational content, ranging from grammar tutorials to pronunciation guides and literature analyses, provides students with a wealth of supplementary materials to support their language learning

journey. The ability to pause, rewind, and revisit content at their own pace allows for a more personalized and effective learning experience.

Recognizing the potential of these platforms, it is incumbent upon academicians, including teachers and lecturers specializing in language, engineering, and science and technology-based subjects, to incorporate learning materials from YouTube and TikTok into their curricula. This approach can foster a more engaging and interactive learning environment, particularly appealing to the digital-native generation of students. By integrating these familiar platforms into their teaching methodologies, educators can create a more dynamic and enjoyable learning experience, potentially increasing student engagement and motivation.

Moreover, the importance of exposing science teachers to a variety of social media platforms cannot be overstated. As Danso and Mushayikwa (2017) assert, implementing diverse social media tools in physical science classrooms can accommodate students with different learning style preferences, ultimately enhancing learners' achievement in physical science. This finding underscores the necessity for educators to be well-versed in various social media platforms and their potential applications in educational settings.

5. Conclusion

In conclusion, the evolution of social media from a novel concept to an integral component of students' educational experiences represents a significant shift in the educational landscape. The multifaceted applications of social media platforms for delivering specialized content and enhancing academic performance have been extensively documented across diverse educational contexts. Numerous studies have highlighted the substantial benefits of social media integration in education, including improvements in academic performance, promotion of collaborative learning environments, and facilitation of meaningful interactions between peers and educators.

Notably, popular platforms such as TikTok and YouTube have demonstrated tangible improvements in students' comprehension and retention of complex subjects, particularly in science and language learning. These platforms offer innovative ways to present educational content, catering to various learning styles and preferences. The visual and interactive nature of these media aligns well with the learning habits of contemporary students, who are often characterized as digital natives.

Despite the wealth of research examining social media's impact on students in higher education settings, there remains a significant gap in understanding its potential benefits for students. This paper has sought to address this gap by conducting a comprehensive review of existing literature and emphasizing the advantages of social media in providing specialized, targeted content and boosting students' academic performance across different age groups and educational levels.

The strategic implementation of social media in educational settings holds promise for substantial improvements in academic outcomes. However, it is crucial to recognize that the effective integration of these tools requires ongoing research and refinement. Educators and policymakers must continue to explore optimal ways to leverage social media platforms, ensuring that their use aligns with pedagogical goals and enhances, rather than detracts from, the learning experience.

Future research should focus on developing best practices for social media integration across various educational contexts, considering factors such as age-appropriate content, privacy concerns, and the balance between online and traditional learning methods. Additionally, longitudinal studies examining the long-term effects of social media use in education would provide valuable insights into its sustained impact on academic achievement and skill development.

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A Conceptual Framework for Understanding Work Readiness among Undergraduate Students

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Abstract: The purpose of this study is to identify the determinants of work readiness among undergraduate business students at the Faculty of Business and Management, UiTM Selangor Campus. This research seeks to identify whether self-efficacy, salary expectations, people qualities, and individual experiences are vital to business and management students when entering the working environment in the future. A simple random technique will be conducted, and a total of 331 respondents will participate in this study. The multiple regression analysis will be employed using the Statistical Package for Social Sciences (SPSS). Some limitations will be observed, in which the number of responses is rather moderate, and it might not be able to capture and generalize in this context. In addition, the work readiness factors only focus on self-efficacy, salary expectations, people's qualities, and individual experiences. By exploring these factors, the study seeks to provide actionable insights for curriculum enhancement, career counseling, and policy development, ultimately contributing to improved graduate outcomes. Furthermore, the findings of this study are expected to offer valuable perspectives for academia and industry in fostering a collaborative approach to address marketability challenges in Malaysia.

Keywords: *Work Readiness, Self-Efficacy, Salary Expectations, Experience, Undergraduate Students.*

1. Introduction and Background

Graduate employability has become a focal point in higher education, particularly in nations aiming to position themselves as regional hubs for talent development. In Malaysia, the Ministry of Higher Education's Graduate Tracer Study reported a Graduate Employability (GE) rate of 89.8% in 2023. Further, the employment status breakdown shows that 67.5% of graduates are employed, 18.9% are pursuing further studies, 1.9% are improving their skills, and 3.5% are waiting for job placement. On top of that, graduates from certain disciplines, particularly in education (7.3%), humanities (5.7%), and social sciences (8.6%), face greater challenges in securing employment compared to those in technical fields like engineering (11.2%) and information technology (7.0%) Furthermore, Malaysian graduates exhibit lack of work readiness and deficiency in essential skills (Abdullah, Al-Dubai, & Ateik, 2023; Mohd Salleh, Mapjabil, Legino, 2019). For instance, graduates were reported to make up 23% of the youth unemployment rate. One key factor contributing to this issue is the inadequacy of the Malaysian tertiary education curriculum in equipping students with the necessary skills, attributes, and professional qualities sought by employers (Ibrahim, Ali, Fangling, Ahmed, Abdullahi, Ali, 2018). Therefore, it shows a warning sign in ensuring that graduates possess the work readiness skills demanded by an increasingly dynamic and competitive labor market. This gap highlights the urgency for educational institutions to align academic programs with industry expectations.

At Universiti Teknologi MARA (UiTM), initiatives aimed at enhancing work readiness among students have gained momentum, particularly in programs within the Faculty of Business & Management. Talentbank announced that UiTM is one of the Employers' Preferred Universities in the 2023 National Graduate Employability Index. Furthermore, the business management program received a 6-star rating. As one of Malaysia's largest public universities, UiTM's commitment to fostering employability is evident through its robust curriculum, industry partnerships, and focus on experiential learning.

Work readiness refers to a state in which an individual possesses the skills, knowledge, attitudes, and both physical and mental well-being necessary to perform tasks effectively (Putri & Violinda, 2024). Student work-readiness also refers to the ability of graduates to enter the workforce immediately after graduation. University-level student organizations serve as a valuable platform for developing both soft skills and work readiness (Kristiana et al., 2025). The development of work readiness is influenced by both internal and external factors. Internal factors include self-efficacy and students' skills; meanwhile, the external factors are

salary expectations and work experience. In this context, universities play a pivotal role in bridging the gap between academic preparation and real-world application, ensuring students are well-equipped for the challenges ahead.

Self-efficacy, or the belief in one's ability to execute tasks effectively, has emerged as a key determinant of work readiness (Lusyiana and Wolor, 2023). Unfortunately, Makki, Feng, Waqar and Adhikari (2023) found that self-efficacy among graduates contributes to a shortage of competent workers and a higher unemployment rate in Malaysia." Students with higher self-efficacy are more likely to approach job challenges confidently and demonstrate resilience in professional settings (Tentama et al., 2019). Similarly, salary expectations shape graduates' perceptions of job opportunities, influencing their willingness to accept roles and their overall career satisfaction (Brown & Souto-Otero, 2020). Nevertheless, salary expectations have contributed little to youth unemployment rates (Jamil & Zakaria, 2019).

Previous studies highlighted that the value of practical experiences and gaining working experience during students' academic programs significantly enhances their readiness to enter the workforce (Neesya & Hadi, 2025; Hidayatulloh et al., 2024). According to Kristiana, Syamsuddin, Giovanni, and Meitiana (2025) mentioned that 70 percent lack essential skills and experience, indicating a significant gap in students' preparedness for employment. In addition, Wong and Beh (2024) mentioned that a major concern is the mismatch between the skills graduates possess and those required by employers, which further intensifies employability challenges.

Work readiness has been extensively studied in various global contexts and across different academic disciplines (Kristiana et al., 2025; Neesya & Hadi, 2025; Putri & Violinda, 2024). However, research on the determinants of work readiness has received little attention (Li, Huang, Fong, Chen & Song, 2022), particularly among undergraduate business students (Orr et al., 2023). Therefore, this study aims to understand the students' preferences for work readiness among the undergraduate students in the Faculty of Business and Management, UiTM, Selangor Campus.

2. Literature Review

Work Readiness: Work readiness is a multidimensional concept involving technical skills, soft skills, and personal attributes that collectively prepare individuals for effective workplace performance. Herbert et al. (2020) describe work readiness as encompassing not only technical proficiency but also interpersonal and problem-solving skills, making it a critical determinant of employability. They argue that integrating these components into the educational curriculum can improve graduates' ability to meet industry demands.

Alam and Parvin (2021) extend this perspective by highlighting the increasing importance of adaptability and digital competence due to rapid technological advancements and challenges such as the COVID-19 pandemic. They emphasize that work readiness should also address resilience and emotional intelligence to prepare graduates for evolving work environments. This underscores the need for a holistic approach in higher education. Further, Phan, Yapa, and Nguyen (2020) note that many educational institutions are actively incorporating internships and practical experiences into their programs to enhance work readiness. Such initiatives allow students to apply theoretical knowledge in real-world settings, thereby bridging the gap between academia and industry. This practical exposure is crucial in developing job-specific and transferable skills that improve career outcomes.

Self-Efficacy: Self-efficacy, as defined by Bandura (2023), refers to an individual's belief in their ability to execute tasks successfully. Fitriyana et al. (2021) assert that self-efficacy significantly influences students' confidence and preparedness for the workforce, making it a vital predictor of work readiness. In addition, Putri and Violinda (2024) mentioned that students who believe in their abilities are more confident and prepared to enter the workforce. Tentama et al. (2019) examine the development of self-efficacy through educational experiences, emphasizing the vital role of supportive learning environments. They argue that mentorship and hands-on opportunities like internships and project-based work can strengthen self-efficacy, ultimately improving students' readiness for the workforce.

Lusyiana and Wolor (2023) investigate the cyclical relationship between self-efficacy and professional success.

They contend that as students accumulate experience and achieve small successes through internships or part-time work, their self-efficacy grows, which in turn boosts their employability. This positive feedback loop indicates that offering students opportunities for incremental achievements can lead to continuous enhancement of their work readiness. Therefore, the first hypothesis was developed:
H1: There is a significant relationship between self-efficacy and work readiness.

Salary Expectations: Salary expectations significantly impact graduates' job search behavior and early career decisions. Hirschi (2020) notes that realistic salary expectations align graduates' aspirations with labor market conditions, leading to more effective job placement and satisfaction. Conversely, unrealistic expectations often result in prolonged job searches and dissatisfaction, which can hinder career progression. Dudley et al. (2020) emphasize that salary expectations are influenced by factors such as educational background, industry standards, and individual self-perception. They suggest that career counseling services should incorporate market trend analyses to help students develop realistic expectations. This alignment can enhance work readiness by preparing graduates for negotiations and professional interactions.

Additionally, Bubou and Job (2022) argue that salary expectations reflect graduates' perceived value in the job market. Their research highlights the importance of transparent communication between educational institutions and students regarding salary benchmarks. This transparency helps students set achievable goals and fosters a pragmatic approach to career planning. Thus, the second hypothesis was formulated:
H2: There is a significant relationship between salary expectations and work readiness.

People Qualities and Skills: People's qualities and soft skills are increasingly recognized as critical for employability in modern workplaces. People's qualities and skills refer to the interpersonal and soft skills that enable effective interaction, communication, and collaboration with others in a professional setting (Febriantina et al., 2024). According to Ahmad, Salamuddin, and Surat (2021), employers are looking for graduates who have added value, where strong skills and qualities are in line with the market demand. Suroto et al. (2024) studied that individual factors, including soft skills and interpersonal skills, are influencing factors in shaping students' career readiness. Fatima et al. (2020) highlight communication, teamwork, and adaptability as essential qualities valued by employers. They suggest that these skills help graduates transition smoothly into the workplace and play a meaningful role in achieving team goals.

Moreover, Sudarsono et al. (2024) support experiential learning as an effective approach to cultivating personal attributes and skills. They highlighted that through involvement in group projects and case studies, students acquire hands-on experience in understanding and managing workplace dynamics. This practical approach not only strengthens their soft skills but also increases their confidence and prepares them to face professional challenges effectively. In a nutshell, students' qualities and skills are essential for preparing them to thrive in a dynamic and evolving job market. Therefore, the third hypothesis was developed for this study:
H3: There is a significant relationship between people's qualities and skills towards work readiness.

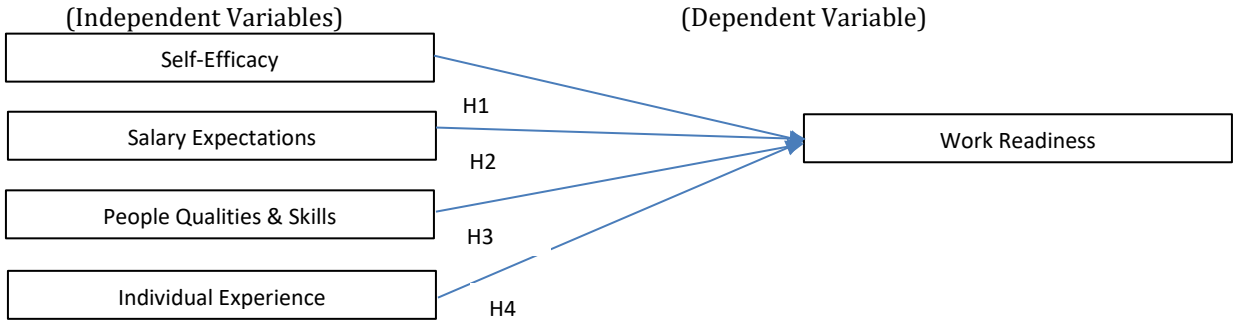
Individual Experience: Practical experience is a cornerstone of work readiness, providing students with insights into workplace dynamics and expectations. Individual experience encompasses the practical knowledge, skills, and insights gained through participation in work-related activities, internships, or part-time jobs during the course of one's education (Hidayatulloh et al., 2024). According to Neesya and Hadi (2025), by undertaking work experience during their studies, students are better equipped to face future professional demands. Herbert et al. (2020) emphasize that internships and part-time jobs offer students opportunities to apply theoretical knowledge in real-world settings, bridging the gap between academia and industry. Dudley et al. (2020) highlight the competitive advantage gained through relevant work experience, noting that employers often prefer candidates who require minimal on-the-job training. They argue that practical experience not only improves technical skills but also fosters essential soft skills like time management and communication.

Adnan et al. (2021) explore the broader implications of experiential learning, suggesting that it shapes career aspirations and professional identity. Kristiana et al. (2025) added that extensive organizational experience tends to exhibit greater confidence in completing academic tasks and facing professional challenges. In conclusion, universities should offer platforms that enable students to engage in diverse work experiences,

better preparing them to make informed career decisions, enhance their work readiness, and improve long-term employability. Thus, the fourth hypothesis was formulated for this study:
H4: There is a significant relationship between individual experience and work readiness.

Conceptual Framework
The conceptual framework for this study is presented in Figure 1. It illustrates the proposed relationships between the independent variables (self-efficacy, salary expectations, people qualities & skills, and individual experience) and the dependent variable (work readiness). The framework serves as a visual representation of the hypothesized relationships and guides the research design and analysis.

Figure 1: Conceptual Framework [Source: (Allysya et al., 2024), (Hirschi, 2020)]



3. Research Methodology

This study aims to investigate the factors of work readiness among final-year students in the Faculty of Business and Management, UiTM Selangor. The study specifically examines self-efficacy, salary expectations, people's qualities, and individual experience as predictors of work readiness.

This study will be conducted quantitatively using a questionnaire survey. A total of 331 final year students will be selected using simple random sampling, as it allows investigation of the different perceptions of UiTM Selangor business and management students. The instruments will be adopted from validated instruments in previous studies. For instance, the self-efficacy scale is adapted from Bandura (1997), while the salary expectation and people's qualities scales are adapted from Hirschi (2020) and Fatima et al. (2020), respectively. Moreover, the individual experience will be adapted from Kamaruddin et al. (2021). Respondents will evaluate their level of agreement based on a 5-point Likert scale, ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

A pilot test will be conducted to ensure reliability; meanwhile, an expert from industry will be identified to validate the instrument. Necessary adjustments will be addressed before distribution. The collected data will be analyzed and interpreted using the Statistical Package for the Social Sciences (SPSS).

4. Conclusion

In essence, this study proposes a framework for understanding the students' preferences for work readiness among final-year business students at UiTM Selangor. The findings of this study may contribute to improving the alignment between educational programs and industry needs by highlighting the importance of self-efficacy, salary expectations, interpersonal skills, and personal experiences. By focusing on these elements, universities can more effectively prepare students for their careers, enhancing employability and long-term success.

One limitation of this study is that the framework is designed to examine the relationship between self-efficacy, salary expectations, interpersonal qualities and skills, and individual experience in relation to work readiness. Additionally, the study will be conducted exclusively with undergraduate students at the UiTM Selangor

Campus. It is recommended that future studies expand the sample size to a wider population by having business and management students from other UiTM campuses in Malaysia. Notably, the Faculty of Business and Management is the biggest in UiTM, hence the future studies can generalize the results. Additionally, future research could investigate other factors, such as digital readiness. Mkhize and Reddy (2025) emphasize that the shift brought about by Industry 4.0 demands that individuals develop digital skills and competencies to adapt and succeed in the evolving workplace.

Ultimately, such initiatives can help close the gap between academic learning and employment, ensuring that graduates are better prepared to succeed in a rapidly changing job market. These insights can serve as valuable guidance for policymakers, including the Ministry of Higher Education (MOHE) and the Ministry of Human Resources (MOHR), in developing well-informed educational strategies, curriculum design, and employment policies. Furthermore, this research may provide a strong foundation for addressing graduates' skill deficiencies and enhancing their prospects for future employment.

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Enforcement Efforts in Fighting Tax Evasion: A Systematic Literature Review Approach

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Abstract: Globalization and technology advancements have created new opportunities exploited by income taxpayers to evade tax, thereby undermining the credibility of tax authorities worldwide. This systematic review investigates the enforcement efforts used by tax authorities in combating and curbing tax evasion. Relevant articles were selected using two main databases: Scopus and Web of Science. Guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, 45 relevant articles published between 2018 and 2025 were identified. Through thematic analysis, eight main themes have been developed for the enforcement strategies employed by tax authorities across jurisdictions. The findings indicate that the tax audit is the most used strategy employed to curb tax evasion among income taxpayers, followed by deterrence messages, fines and penalties. Moreover, the tax audit is the most effective enforcement effort that shows its effectiveness as a strong deterrent against tax evasion. A key information gap was identified where only 11 studies out of 45 studies carried out comparative evaluations on different enforcement efforts, highlighting the need for more cross-contextual research in the future. This study provides valuable insights for researchers by highlighting underexplored enforcement strategies and for tax authorities in enhancing and refining their enforcement approaches to effectively address tax evasion.

Keywords: *Enforcement, Tax Evasion, Tax Fraud, Tax Noncompliance, Systematic Literature Review*

1. Introduction

Tax revenue serves as one main financial source for country development, particularly in supporting economic and social sectors. However, technological advancement and globalization have created new opportunities for taxpayers to escape paying taxes, leading to a global rise in the number of tax evasion (Alstadsaeter et al., 2024). According to Alm (2021) tax evasion refers to the failure of taxpayers to pay their tax obligation promptly. Slemrod (2007) pointed out that tax evasion is a criminal activity involving willful tax noncompliance. This crime is becoming increasingly prevalent within domestic settings, particularly among high-net-worth individuals. Alstadsaeter et al., (2024), thereby potentially threatening the credibility of the tax system. The consequences are significant, as tax evasion might deprive the government of revenue and increase economic inequality (Tax Justice Network, 2024). The report further estimates that global revenue losses from cross-border tax abuse amount to approximately US$492 billion annually due to multinational corporations and wealthy individuals shifting profits to tax havens.

Government and tax authorities have recognized the importance of addressing tax evasion schemes. There are two main approaches commonly employed to ensure taxpayers fulfil their tax obligations. The first one is a deterrence-based approach, which relies on enforcement tools and measures, while the second approach is a behavioral approach, which seeks to encourage the taxpayers to pay taxes voluntarily. However, not all taxpayers are compliant, as some may tend to evade taxes. In certain conditions, both approaches are needed, whereas sometimes if one approach is not sound functional, a strong alternative becomes necessary (Doran, 2009). While both enforcement and behavioral approaches are necessary to enhance tax compliance, enforcement that creates a deterrent effect plays a more important role, specifically in curbing deliberate and large-scale tax evasion (Slemrod, 2007). A deterrence approach clearly influences the tax compliance decisions of income taxpayers (Kogler et al., 2022).

This enforcement approach adopts the economic model of Allingham and Sandmo (1972) to examine the issue of tax noncompliance. The model predicts that taxpayers will not pay tax unless there is a risk of non-

compliance being detected and punished by the tax authority. According to this model, enforcement tools, specifically tax audits, tax rates, and fines, had an influence on tax compliance. Enforcement undoubtedly plays a role in enhancing compliance, as it affects the monetary considerations of individual taxpayers (Chan et al., 2023). Moreover, tax enforcement has strengthened the taxpayers' tax morale and reduced tax evasion (Filippin et al., 2013; Kumi & Kwasi Bannor, 2023).

Scholars have shown interest in how tax authorities implement enforcement tools in fighting tax evasion (Bazart et al., 2020; Clemente et al., 2021; Dare, 2020). Although many studies focused on enforcement measures in combating tax noncompliance, there was still an insufficient number of studies that conducted systematic reviews of existing research. Dularif and Rustiarini (2022) conducted a systematic literature review (SLR) that exclusively examines non-deterrence approaches in the context of tax compliance. Much of the existing literature consists of empirical analyses that focus on specific countries or tools in isolation (Ramírez-Álvarez, 2023; Zamiruddin et al., 2024). As a result, policymakers and tax administrations lack a comprehensive understanding of how enforcement tools are applied globally. Hence, there is a clear need for a systematic literature review that synthesizes the diverse findings on deterrence-based tax enforcement strategies across jurisdictions. Accordingly, the present study uses the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to carry out an SLR in examining deterrence-based approaches. This review is guided by the following research question: What enforcement efforts have been implemented by tax authorities to combat tax evasion? Specifically, this study aimed to investigate the enforcement strategies, such as tax audit, fines and penalties undertaken by tax authorities across jurisdictions in addressing tax evasion.

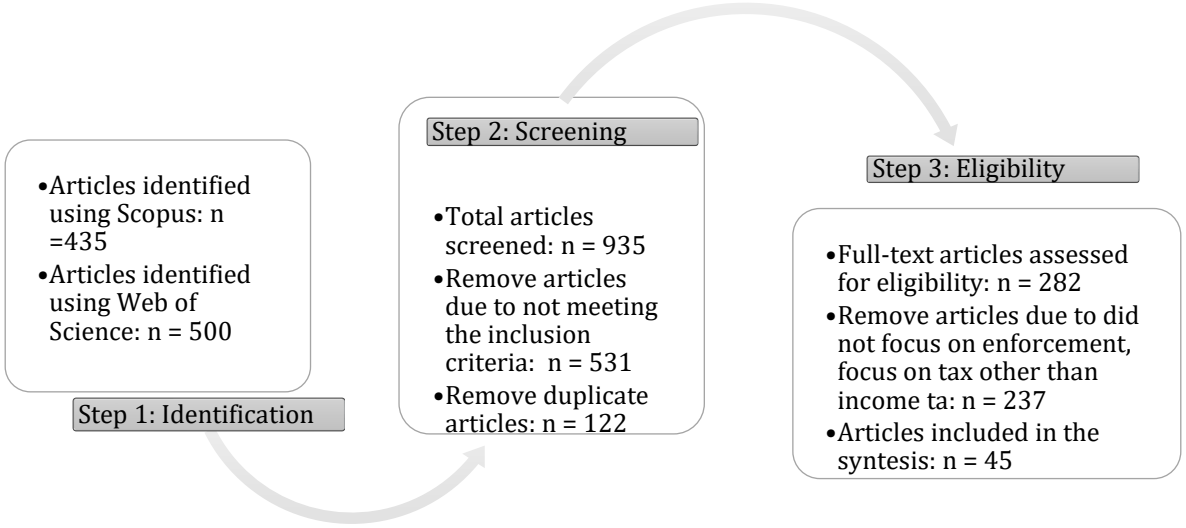
This study has the potential to offer several significant contributions to both practical application and the existing body of knowledge. The study emphasizes the critical role of the tax authorities in designing and planning effective tax enforcement strategies, which can ultimately enhance tax collection capacity. Specifically for researchers, the study provides insights into key areas and topics that should be focused on by future research.

The remainder of this study is organized as follows. Section 2 discusses the methodology, and the results of the review are shown in Section 3. Section 4 presents a discussion of the review, followed by suggestions for future research and conclusions in Sections 5 and 6, respectively.

2. Methodology

A SLR is a method used to collect relevant information on a specific theme, ensuring that it meets the pre-determined eligibility criteria and effectively answers the research questions (Mengist et al., 2020). The PRISMA model has been used in this study to guide the reporting of systematic reviews. As illustrated in Figure 1, this study conducted three major search steps of systematic review as in the PRISMA model, namely identification, screening, and eligibility. A literature search was conducted using two leading databases, Scopus and Web of Science. These databases are considered sufficient and reliable for conducting SLR, as they possess advanced searching functions in identifying the relevant articles (Gusenbauer & Haddaway, 2020).

Figure 1: Main Systematic Search Steps Used in the SLR Study



Source: Adapted from Mohamed Shaffril et al. (2020)

The identification step involves identifying the keywords to be utilized in the search process. This study relies on prior studies and an online thesaurus to identify relevant keywords that relate to enforcement and tax evasion. Accordingly, search strings were developed as per Table 1 in both databases. Through this search process conducted in August 2025, the study successfully identified 935 articles, which include 435 articles from Scopus and 500 articles from Web of Science.

Table 1: The Search String used for the Systematic Review Process

Databases	Keywords Used
Scopus	TITLE-ABS-KEY enforcement AND ("tax evasion" OR "tax fraud" OR "tax crime" OR "tax noncompliance")
Web of Science	(TS=(enforcement)) AND TS=("tax evasion" OR "tax fraud" OR "tax crime" OR "tax noncompliance")

The second step involves screening the articles by applying selection criteria, which was conducted automatically using the sorting function available in the databases. This step aims to include relevant articles based on inclusion criteria or exclude those that meet the exclusion criteria, as set by the author in Table 2. The inclusion and exclusion criteria are categorized into five aspects: publication timeline, types of documents, language, publication stage, and types of sources. During this step, a total of 531 articles were excluded for not meeting the inclusion criteria, and 122 duplicate articles were removed. The remaining 282 articles proceeded to the third step of the review process.

Table 2: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication timeline	2018-2025	2017 and before
Types of documents	Article	Book chapter, conference paper, review article and book
Language	English	Non-English
Publication stage	Final	Article in press
Types of sources	Journal	Book, conference proceedings and book series

The third step is the eligibility stage, where the remaining 282 articles were re-examined by manually reviewing the titles and abstracts to ensure alignment with the research objectives as well as the inclusion and exclusion criteria. In this step, 237 articles were excluded for the following reasons: the text was not accessible in full; the focus was on the other type of taxes such as value-added tax (VAT), sales tax, petroleum tax, Goods and Services Tax (GST), diesel tax, and import duties instead of income tax; the articles were literature review

but not empirical studies; the focus was primarily on economic issues and tax law rather than enforcement. As a result, only 45 articles that met the inclusion criteria and were relevant to the research objective were selected for the study. These articles were further analyzed and discussed based on the study's objective, and relevant themes were extracted from them.

3. Results

Using the PRISMA approach, this review successfully identified 45 relevant articles focused on enforcement efforts to combat tax evasion. The findings confirmed that these articles concentrated on various strategies employed by tax authorities to enhance tax compliance and reduce tax evasion. Table 3 shows the SLR results based on year, country and the enforcement efforts. In terms of publication trends, most of the selected articles were published in recent years. Specifically, nine were published in 2018, one in 2019, ten in 2020, six in 2021, seven in 2022, seven in 2023, three in 2024, and two in 2025. Geographically, the United States leads with five studies in terms of contributions to the literature on tax enforcement, followed by Germany with four studies. France, Italy, Ecuador, and Norway each contributed three studies on the topic.

From the analysis, the enforcement efforts by tax authorities were classified into eight main themes: 1) tax audit; 2) deterrence messages; 3) fines and penalties; 4) voluntary disclosure; 5) whistleblower programs; 6) tax rates; 7) third-party reporting; and 8) other enforcement-related measures. The most used enforcement efforts were highlighted for tax audit with 19 articles, followed by the deterrence messages (n=11), and fines and penalties (n=9).

Table 3: SLR Results on the Enforcement Efforts Used by Tax Authorities in Fighting Tax Evasion

Authors	Year	Country	Enforcement Efforts							
			TA	DM	FP	VD	WB	TR	TPR	O
Alstadsæter & Jacob	2018	Sweden						NE		
Carfora et al.	2018	Italy	√							
Debacker et al.	2018	United States	√							
D'Agosto et al.	2018	Italy	√							
Garz & Pagels	2018	Germany				√				
Meiselman	2018	United States		√						
Russo	2018	Italy					√			
Swanepoel & Meiring	2018	South Africa			√		NE			
Waseem	2018	Pakistan						NE		
Chong et al.	2019	Malaysia	√		√					
Ahrens & Bothner	2020	52 countries								√
Appelgren	2020	Sweden	√							
Bazart et al.	2020	France	NE				√			
Bott et al.	2020	Norway		√						
Dare	2020	South Africa	√		√					
Gould & Rablen	2020	United Kingdom			√	√				
Ortega & Scartascini	2020	Colombia		√						
Rashid	2020	Bangladesh	√		√					
Robbins & Kiser	2020	United States	√		√			NE		
Waseem	2020	Pakistan						NE		
Bagchi & Dušek	2021	United States							√	
Berger et al.	2021	Germany	√							
Bjørneby et al.	2021	Norway	√						NE	
Clemente et al.	2021	Brazil	√		NE					
Irawan & Utama	2021	47 countries	NE							
Mogollon et al.	2021	Columbia		√						
Alstadsæter et al.	2022	Norway				√				

Bayer	2022	Australia	√					
Castro et al.	2022	Peru		√				
Jin et al.	2022	China	√		√		NE	
Organ et al.	2022	United States						√
Romaniuc et al.	2022	Moldova and France				√		
Sánchez	2022	Ecuador		√				
Carrillo et al.	2023	Ecuador		√				
Chan et al.	2023	Australia	√					
Holz et al.	2023	Dominican Republic		√				
Kasper & Rablen	2023	Austria	√					
López-Laborda et al.	2023	Spain		√				
Ramírez-Álvarez	2023	Ecuador		√				
Okafor	2023	Canada		√				√
Beer & de Mooij	2024	Germany			√			
Koch & Müller	2024	Germany			√			
Zamiruddin et al.	2024	Malaysia			√			
Harju et al.	2025	Finland	√					
Pavel et al.	2025	France	√					

TA = Tax Audit
DM = Deterrence Messages
FP = Fines & Penalties
VD = Voluntary Disclosure
WB = Whistleblower Programs
TR = Tax Rates
TPR = Third-party Reporting
O = Other Enforcement Efforts
NE = Not effective effort
√ = Effective effort

Tax Audit

Tax audit represents the most enforcement efforts being observed in this review, with nineteen (19) studies. The review found that seventeen (17) out of nineteen (19) studies in this review demonstrated that greater enforcement through frequent tax audits significantly increases tax compliance and even reduces tax evasion (Appelgren, 2020; Bayer, 2022; Berger et al., 2021; Bjørneby et al., 2021; Clemente et al., 2021a; D'Agosto et al., 2018; Dare, 2020; Rashid, 2020). Taxpayers who perceive a higher probability of detection or face actual audits are more likely to disclose both cash payments (Robbins & Kiser, 2020) and income (Carfora et al., 2018; Chan et al., 2023; Debacker et al., 2018) compared to those who perceive lower detection risks. Focusing on small to medium-sized firms in Finland, a study by Harju et al. (2025) found that these firms persistently increased their profit disclosure following risk-based tax audits, suggesting that tax compliance improved among the audited firms. Pavel et al. (2025) reported that extending the statute of limitations for retroactive tax audits can enhance tax compliance. This is attributed to taxpayers' increased income disclosure, driven by the fear of facing stricter penalties for tax evasion within a longer audit timeframe.

Field studies and experiments conducted by Kasper and Rablen (2023) and Chong et al. (2019) revealed that taxpayers, particularly employees (Chong et al., 2019) tend to be more compliant after an audit if they believe there is a higher chance of future audits. In China, Jin et al. (2022) found that strict audit procedures and high penalty rates ensure high tax compliance among top live streamers due to strong deterrence rather than peer influence. Dare (2020) also observed that higher audit levels increased tax compliance among both employed and self-employed taxpayers. However, this finding stands in contrast to Chong et al. (2019) who reported that self-employed individuals are less responsive to enforcement disclosures because of their greater ability to manipulate income reporting in a flexible environment.

Although two (2) out of seventeen (17) studies acknowledged that tax audits can mitigate tax evasion, they also highlighted that excessive auditing may have adverse effects. High audit costs, especially in Latin American countries with complex tax systems and heavy tax burdens, can increase tax evasion compared to European

countries with lower audit costs (Clemente et al., 2021). Berger et al. (2021) argued that while audits are essential, if taxpayers believe the likelihood of follow-up audits is low, increased auditing may only result in a temporary boost in tax compliance.

Several studies also examined the types of tax audits that are most effective in reducing tax evasion. D'Agosto et al. (2018) found that combining soft and deep audits significantly improves compliance, where soft audits promote tax compliance through on-site access and engagement, while deep audits are more effective in recovering unpaid taxes. Chan et al. (2023) emphasized the effectiveness of endogenous audits in reducing tax evasion in cash transactions, which rely on information provided in tax returns, rather than random selection. In contrast, Berger et al. (2021) suggested that random audits may be preferable to targeted ones, as taxpayers who feel specifically targeted may only improve compliance temporarily. Bjørneby et al. (2021) demonstrated that simple on-site audits increased wage reporting among small firms by verifying employee registrations and imposing fines for non-compliance. Appelgren (2020) discovered the combination of segmentation and pre-announced audit that can optimize outcomes through its focus on high-risk areas, which allows taxpayers to adjust their behavior in advance, thereby reducing enforcement costs. In addition, Bayer (2022) recommended the use of the smooth relative rule over the jump rule to reduce tax evasion. While the jump rule effectively detects undeclared income, it is less practical due to its complexity. In contrast, the relative rule is easier to implement and can adjust detection probabilities based on variations in tax declarations.

However, two (2) out of nineteen (19) studies in the review demonstrated that tax audits are less effective in curbing tax evasion (Bazart et al., 2020; Irawan & Utama, 2021). Bazart et al. (2020) discovered that audit strategies are less effective compared to whistleblower programs in identifying tax offenders. Although both strategies yielded similar tax revenue, whistleblower programs resulted in higher post-enforcement compliance and were cost-effective. Irawan and Utama (2021) added that audits tend to be less effective when taxpayers perceive a low probability of being inspected, often due to infrequent contact with tax authorities, and have limited resources for conducting comprehensive audits.

Deterrence Messages

Eleven (11) studies in this review examined the effectiveness of enforcement tools like emails and letters used by tax authorities to deliver deterrence messages aimed at reducing tax evasion. In most cases, these messages were sent shortly before the tax filing deadline to influence taxpayer behavior (Bott et al., 2020; Holz et al., 2023).

Carrillo et al. (2023), Holz et al. (2023) and Sánchez (2022) found that email messages significantly improved tax compliance, especially among firms owned by high-income individuals (Carrillo et al., 2023). In particular, messages warning about potential prison sentences, combined with public disclosure strategies, produced a strong deterrent effect and led to a notable increase in compliance (Holz et al., 2023). Ramírez-Álvarez (2023) further showed that deterrence messages sent not only to taxpayers but also to their accountants, particularly those managing microenterprises in Ecuador, resulted in a significant increase in income tax declarations. Interestingly, Sánchez (2022) observed that even non-threatening messages about penalties, such as those merely stating the underreported tax amount, could substantially increase reported taxes. However, these messages also heightened the likelihood of overreporting, as taxpayers sought to avoid future audits.

Several studies, including Castro et al. (2022), Bott et al. (2020) and Meiselman (2018), used letters as the communication medium in field experiments. These letters send various message types, such as deterrence, social norm, and civic pride appeals. Among these, messages emphasizing the likelihood of being caught (Castro et al., 2022), or highlighting potential penalties (Meiselman, 2018), they were the most effective in encouraging long-term tax compliance. In contrast, messages based on altruism or civic pride were found to be ineffective and even associated with a decrease in compliance level.

In four (4) of the eleven (11) studies, deterrence messages were delivered using tools other than emails or letters. López-Laborda et al. (2023) demonstrated the effectiveness of pop-up alerts on tax filing websites in increasing the number of declared incomes and filers, particularly in reducing the rental tax evasion. Okafor (2023) found that conviction notices, combining messages about penalties, social norms, and incentives, improved tax compliance. Mogollon et al. (2021) used professional phone calls to remind taxpayers of their

debts and potential sanctions, coupled with invitations to meet with tax officers. These calls significantly improved compliance, especially when there was personal engagement, although they were less effective for corporate taxpayers due to decision-making complexities. Ortega and Scartascini (2020) conducted a field experiment in Colombia using various communication methods like emails, personal visits, and letters to deliver both deterrence and moral suasion messages. Their findings revealed personal visits as the most effective, followed by emails, while letters were the least effective. However, the effectiveness of personal visits came with higher costs, especially when repeated.

Fines and Penalties

This review identified eight (8) studies that examined the effectiveness of fines and penalties as enforcement tools to mitigate tax evasion. Interestingly, only one (1) study conducted in the United Kingdom found that instead of using high fines, offshore tax evasion was effectively reduced by imposing lower penalties in combination with voluntary disclosure programs (Gould & Rablen, 2020). On the other hand, six (6) studies concluded that higher fines and penalties act as effective deterrents, aiding tax authorities in combating tax evasion (Chong et al., 2019; Dare, 2020; Jin et al., 2022; Rashid, 2020; Robbins & Kiser, 2020; Swanepoel & Meiring, 2018). These studies generally found that taxpayers subjected to higher penalties are more likely to report and disclose their income than those facing lower or less certain penalties. (Dare, 2020; Robbins & Kiser, 2020). In particular, Chong et al. (2019) showed that more than half of the sample of employed participants in Malaysia stopped minimizing their tax obligations when informed about the probability of audits and associated penalties in a synergistic environment.

Swanepoel and Meiring (2018) discovered that fines are more effective than imprisonment in deterring tax offenses, as tax offenders set their priority in protecting their illicit financial gains. However, they also suggested that combining fines with imprisonment could further enhance deterrence, especially in cases where fines cannot be increased beyond a certain threshold. Jin et al. (2022) and Rashid (2020) reported that the combination of high fines with tax audits created a powerful deterrent effect, significantly reducing tax evasion. The need to balance fine levels with audit activity was emphasized by Dare (2020) to avoid excessive enforcement that may lead to reduced compliance and unintended economic consequences.

Although fines were generally found to be effective, several limitations and contextual challenges were highlighted. Dare (2020) observed that combining increased audit rates with higher penalties could sometimes result in decreased compliance, potentially due to taxpayers feeling overburdened or fearful. Similarly, Chong et al. (2019) Found that business owners, unlike salaried employees, were largely unresponsive to enforcement disclosures, even when penalties reached 100% of the underreported tax due to their greater ability to manipulate reported income. Among the eight (8) studies, one (1) expressed uncertainty regarding the effectiveness of fines. Clemente et al. (2021) argued that in Latin American countries, the impact of fines on tax compliance remains unclear due to overly complex regulations and the proliferation of overlapping penalties, which create difficulties in enforcement and monitoring.

Voluntary Disclosure

Four (4) studies in this review demonstrated that voluntary disclosure or tax amnesty programs can be effective tools in preventing tax evasion. According to Zamiruddin et al. (2024) taxpayers in Malaysia are generally inclined to participate in the Special Voluntary Disclosure Programs (SVDP). They do so by voluntarily correcting their past tax returns in exchange for a reduced penalty rate. Alstadsaeter et al. (2022) found that when voluntary income declarations were limited to income not derived from illegal activities, the program successfully encouraged many wealthy individuals to disclose their previously hidden offshore wealth. This subsequently led to an increase in reported net income and corresponding tax obligations.

In addition to improving compliance, Gould and Rablen (2020) reported that voluntary disclosure schemes not only raised expected net tax revenue but also reduced illegal offshore investment and shifted more capital toward onshore investment. Similarly, Garz and Pagels (2018) observed that increased media coverage of high-profile celebrity tax trials in Germany prompted greater participation in tax amnesty programs, with many non-compliant taxpayers coming forward to disclose their actual income.

However, two (2) studies in this review found that the effectiveness of voluntary disclosure programs has a

limitation. Koch and Müller (2024), who investigated a permanent or anticipated program paired with stringent enforcement, found that it can actually reduce tax compliance. This is particularly true when taxpayers have sufficient and clear information about audit probabilities, which suggests that such programs can increase tax evasion activities. This finding is similar to that of Beer and de Mooij (2024), who discovered that a program is most effective when introduced unexpectedly with minimal or zero penalties. This element of surprise allows governments to offer the program as a one-time event, preventing taxpayers from expecting future repetitions. However, if the program is anticipated, it loses its effectiveness and may even encourage otherwise compliant taxpayers to engage in tax evasion.

Whistleblower Programs

Of the four (4) studies that examined the effectiveness of whistleblowers in reducing tax evasion, three reported positive outcomes, while one found limited effectiveness. Bazart et al. (2020) concluded that a whistleblowing-based audit scheme is both efficient and effective in identifying tax evaders, resulting in decreased amounts of tax evasion and increased tax collections. Similarly, Russo (2018) discovered that online platforms allowing individuals to report tax evasion contributed to enforcement efforts, especially in environments with high tax morale.

Romaniuc et al. (2022) investigated peer reporting as whistleblowing, considered a form of whistleblowing through tax evasion games conducted in Moldova and France. While whistleblowing was viewed as less socially acceptable in Moldova, this did not lead to lower levels of tax compliance, as similar compliance rates were observed in both countries. Interestingly, participants in both countries were willing to incur personal costs to report tax evaders. The study also emphasized that whistleblowing acts as a deterrent in Moldova, where historical sensitivity to being reported is rooted in Soviet-era experiences, making individuals more cautious and less likely to engage in tax evasion.

However, Swanepoel and Meiring (2018) reported a different outcome in South Africa, where whistleblowing was less effective. Individuals were generally reluctant to report tax evasion due to fear of victimization, lack of institutional support from senior management, and uncertainty about the outcomes of their actions. Furthermore, widespread distrust in the criminal justice system, fueled by perceptions of inequality and impunity for powerful individuals, contributed to a lack of confidence in whistleblower protections.

Tax Rates

Based on this systematic literature review, five (5) studies were identified exploring the role of tax rates in curbing tax evasion. Robbins and Kiser (2020) found no significant relationship between tax rates and tax compliance. However, their study emphasized that tax audits, combined with fines and penalties, are effective enforcement measures in combating tax evasion.

Conversely, the remaining four (4) studies revealed that changes in tax rates, whether increases or decreases, do not necessarily lead to improved compliance, and in some cases, may even encourage tax evasion. Waseem (2020) reported that in Pakistan, a substantial portion of business income and a smaller portion of employment income among low-and middle-income taxpayers remained unreported. This indicates that lowering tax rates alone is insufficient to deter evasion behavior.

Alstadsaeter and Jacob (2018) and Waseem (2018) in their studies observed a rise in tax evasion as tax rates increased. Alstadsaeter and Jacob (2018) Found that a higher increment of marginal tax rates was associated with overstatement of self-reported dividend allowances, thereby reducing the tax liabilities of shareholders. Similarly, Waseem (2018) demonstrated that the higher tax rates led firms in Pakistan to underreport their earnings as a way to mitigate increased tax burdens, ultimately resulting in significant revenue losses for the country.

Jin et al. (2022) further contributed to this discussion by identifying loopholes in China's individual income tax system, where varying tax rates across different types of income, such as salaries, business income, and dividends, created an opportunity for strategic tax evasion. These findings highlight that inconsistent or complex tax structures may inadvertently incentivize non-compliant behavior, regardless of the absolute level of tax rates.

Third-party Reporting

Third-party reporting allows tax authorities to verify employees' tax returns using information submitted by their employers, while withholding enables authorities to collect the tax revenue directly from the income source instead of its recipient (Bagchi & Dusek, 2021). Based on the review, two (2) studies were identified examining the effectiveness of these mechanisms with mixed findings.

Bagchi and Dusek (2021) reported that the implementation of third-party reporting and withholding taxes in the United States led to an immediate and permanent increase in income tax revenue. Their findings also indicated a significant reduction in non-filing rates, suggesting that withholding mechanisms enhance compliance by removing the discretion of taxpayers in reporting their income. However, Bjørneby et al. (2021) discovered that third-party reporting is not entirely self-enforcing in the context of Norway. They observed that employers and employees in small firms often colluded to underreport wages, thereby undermining the effectiveness of the third-party reporting system. This highlights the limitations of such enforcement tools in environments where cooperation between reporting parties facilitates non-compliant behavior.

Other Enforcement Tools

In addition to traditional enforcement tools, this review identified three (3) other efforts employed to curb tax evasion: naming and shaming, international tax agreements, and collateral sanctions. Okafor (2023) found that the Canada Revenue Agency employs a naming and shaming strategy by publicly disclosing the names and penalties of tax evaders. These efforts serve as a deterrent by influencing other taxpayers to comply with tax regulations to avoid similar reputational implications.

Ahrens and Bothner (2020) examined the impact of international tax agreements, focusing specifically on the automatic exchange of financial information between countries. Their findings show that such agreements significantly reduce hidden household assets in tax havens, thereby limiting opportunities for offshore tax evasion. The existence of these agreements lowers the incentive to conceal wealth abroad due to the increased likelihood of detection.

Organ et al. (2022) investigated the use of collateral sanctions, such as restricting access to passports for individuals with substantial tax debts. Their experimental evidence suggests that although the impact is modest, these sanctions positively influence tax compliance among the targeted taxpayers. These findings indicate that non-monetary enforcement strategies can effectively complement conventional measures in promoting voluntary compliance.

4. Discussion

The primary objective of this study was to conduct a systematic literature review to investigate the enforcement efforts employed by tax authorities and other relevant stakeholders in combating tax evasion. The main goal of understanding these efforts is to contribute to the prevention of tax evasion activities through effective enforcement mechanisms from different jurisdictions.

The findings of this review strongly support the economic deterrence theory, which emphasizes the role of tax audits as a dominant deterrent against tax evasion. Tax audits were shown to increase perceived detection risk among taxpayers, encouraging greater compliance. However, while audits were widely acknowledged as effective, the review also noted that tax audits are less effective if the taxpayers are aware of the lower probability of being audited in the future. Furthermore, the deterrence messages that emphasize the audit likelihood, penalties, and other legal consequences generally improve tax compliance. In this review, these messages are generally delivered via traditional channels, which are through letter and email. The review noted that the use of modern communication media, especially in the current technology with artificial intelligence advancement, has received limited attention in the literature.

The analysis of fines and penalties discovered that both high and low penalty levels can influence compliance, particularly when executed in conjunction with other enforcement tools such as audits or voluntary disclosure programs. This suggests that fines and penalties may be more effective when used as part of an integrated enforcement strategy rather than in isolation. This review also found that whistleblower programs are effective

in reducing tax evasion. However, the anonymity, rewards and other context details of the programs can influence the outcomes, with one study reporting the fear of the people to make a report of tax evasion activities.

On tax rates, the findings revealed that neither high tax rates nor very low (approaching zero) tax rates effectively serve as standalone enforcement tools in reducing tax evasion. Taxpayers may continue to evade taxes regardless of the rate, highlighting the complex behavioral and systemic factors that influence compliance.

This review also found that the voluntary disclosure programs are widely shown to improve tax collection. Third-party reporting and other enforcement tools, such as naming and shaming, international tax agreements and collateral sanctions, remain as underexplored areas in enforcement-related research.

5. Conclusion and Recommendations

This systematic literature review has synthesized the current body of knowledge regarding enforcement tools utilized by tax authorities in combating tax evasion. Through a rigorous and structured analysis of 45 peer-reviewed articles sourced from Scopus and Web of Science, the study identifies eight dominant themes, with tax audit, deterrence messages, and fines and penalties emerging as the most prominently employed enforcement mechanisms.

From a theoretical perspective, this review extends the application of deterrence theory (Allingham & Sandmo, 1972). By consolidating evidence on how enforcement tools such as fines, penalties, and audit strategies not only serve as corrective measures but also as psychological deterrents that can strengthen taxpayers' moral obligation to comply. These tools are particularly crucial in addressing deliberate and large-scale tax noncompliance, especially among high-income individuals who are more adept at exploiting legal and technological loopholes. While numerous studies have explored individual enforcement strategies in isolation, this review highlights the fragmented nature of current research and underscores the need for more comprehensive, comparative, and context-specific investigations. Several enforcement tools, despite their theoretical relevance, remain underexplored in empirical literature, suggesting ample opportunities for future research. In particular, understanding how enforcement interacts with voluntary compliance strategies could provide a more balanced and holistic framework for policy design.

From a practical standpoint, the review provides valuable insights for tax administrators and policymakers. By highlighting the most effective enforcement tools, this study helps tax authorities to prioritize and utilize their resources more efficiently, thereby maximizing their impact on tax compliance rates. In addition, tax administrations can use the findings to benchmark their existing enforcement strategies against global best practices and adapt to evolving taxpayer behavior and technological advancements. By aligning enforcement efforts with empirical evidence, tax authorities can improve compliance rates, safeguard public revenues, and foster greater equity in the tax system. Ultimately, this review contributes to the academic discourse by consolidating diverse research streams, identifying key enforcement practices, and recommending strategic directions for both future research and policy implementation in the ongoing fight against tax evasion.

Future Research

Future research should explore the impact of digitalization in tax enforcement, including the use of technology in audits, third-party reporting, and automated detection systems. The integration of digital tools in tax administration holds potential for improving efficiency and accuracy in enforcement, but remains insufficiently examined in current literature. Moreover, future systematic literature reviews should broaden their scope to include a wider range of sectors and other types of taxes. This would allow for a more robust comparative analysis. This study also recommends that future research utilize a broader range of academic databases to ensure a more comprehensive search and to mitigate the potential for publication bias, as this study was limited to Scopus and Web of Science.

Despite the diversity of enforcement strategies identified, several research gaps remain. For instance, limited attention has been paid to how enforcement tools differ in their effectiveness across specific taxpayer segments

(e.g., self-employed, corporations, high-net-worth individuals) and regional or country contexts. Only 11 out of the 45 studies reviewed conducted comparative analyses of enforcement tools, underscoring the need for comparative research that evaluates the effectiveness of various strategies in different socio-economic and institutional settings.

Furthermore, the findings offer practical implications for policy reform. They highlight the importance of strengthening the independence of tax administrations, enabling them to design and implement more data-informed and flexible enforcement policies. These reforms can enhance compliance while supporting broader goals of innovation and equity in the tax system. For business managers, particularly those responsible for strategic and financial decision-making, understanding the impact of tax policies on innovation investment is critical. Awareness of evolving enforcement trends can help managers make better-informed decisions regarding resource allocation, risk assessment, and long-term strategy.

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Beyond Administration: HRM as a Catalyst for Academicians' Self-Actualization in Higher Education Institutions

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Abstract: In an era where higher education institutions (HEIs) face increasing demands for innovation, global competitiveness, and faculty excellence, Human Resource Management (HRM) must evolve from a purely administrative function into a strategic driver of academic development. This study examines how HRM practices can promote self-actualization among academicians, a psychological state characterized by intellectual autonomy, purpose-driven work, and the fulfillment of personal potential. Grounded in Maslow's motivational theory and self-determination frameworks, the research employs a qualitative design, with semi-structured interviews with 40 academic leaders and HR professionals across Malaysian universities. Findings reveal a significant misalignment between current HRM structures and the intrinsic motivators of academic staff. Themes such as limited strategic HRM integration, narrow recognition systems, lack of tailored professional development, and restrictive organizational cultures emerged as key barriers. However, institutions that adopt transformative HRM practices, such as fostering autonomy, inclusivity, and intellectual growth, report improved academic engagement and retention. The study proposes a conceptual shift positioning HRM as a catalyst for academic self-actualization and institutional excellence. It concludes with strategic recommendations for policy, practice, and further research in aligning HRM with the psychological and professional aspirations of faculty members.

Keywords: *Human Resource Management (HRM), Self-Actualization, Higher Education Institutions (HEIs), Academic Motivation, Maslow's Hierarchy*

1. Introduction

In the modern knowledge-based economy, higher education institutions (HEIs) are increasingly recognized as key contributors to social development, innovation, and economic growth. Academicians, through their roles in instruction, research, and community engagement, often serve as the intellectual drivers of these institutions. However, despite their intrinsic importance, organizational systems that support their professional growth and motivation are often limited in nature. In particular, Human Resource Management (HRM) in academia has conventionally been confined to operational functions such as payroll management, staffing, and policy implementation (Smith & Jones, 2015). This limited administrative focus risks neglecting the more strategic and developmental facets of HRM that are crucial to maintaining academic excellence and securing high-quality talent in a competitive global landscape (Brown et al., 2018).

Higher education is now hallmarked by accelerated change, which is fostered by globalization, digitalization, heightened accountability, and evolving societal expectations (Whitchurch, 2019). As institutions endeavour to boost research production, enhance teaching excellence, and strengthen international rankings, the expectations placed upon academic staff have grown more complicated and varied. Conventional HRM models, designed originally for industrial or corporate environments, frequently do not address the unique interests of academicians whose work is intensely intellectual, creative, and intrinsically motivated (Zhang et al., 2019). Thus, there is an increasing need to envision HRM as a strategic collaborator in higher education rather than simply an administrative support function, one that supports the overall growth and motivation of academic professionals (Wilson & Taylor, 2018).

At the center of this strategic vision of HRM is the idea of self-actualization, a term coined by Abraham Maslow (1943) in his classic theory of human motivation. Maslow's hierarchy of needs suggests that once individuals have satisfied their basic physiological and psychological needs (such as safety, belonging, and esteem), they are driven to pursue self-actualization—the fulfillment of their highest potential. In the context of academic

work, self-actualization may manifest through intellectual autonomy, academic freedom, recognition of scholarly achievements, interdisciplinary collaboration, and a sense of purpose derived from teaching and research (Goldstein, 1995; Ryan & Deci, 2000).

While self-actualization has been linked to increased job satisfaction, innovation, and productivity in many professional domains (Johnson & Smith, 2016), its application in academic environments remains underexplored. Most existing studies on workplace motivation have focused on corporate employees, with limited attention to the unique organizational cultures, expectations, and career trajectories of university faculty (Zhang et al., 2019). This oversight represents a critical gap, as the failure to support academic self-actualization can lead to burnout, disengagement, and attrition, ultimately compromising institutional performance and reputation (Nguyen & Lee, 2021; Li & Wong, 2020).

There is a lack of integrated models that describe how human resource management (HRM) practices can be developed to facilitate self-actualization in higher education settings. Although many scholars have studied elements such as professional development, work-life balance, and performance appraisal systems (Rodrigues et al., 2021; Tanner & Greene, 2017), few have explicitly linked these elements to Maslow's theory or explored the purposeful design of HRM to facilitate academic self-actualization.

Additionally, organizational culture plays a major role in shaping how human resource management policies are understood by scholars. Cultures that encourage independence, collaboration, and innovation are likely to foster environments that are conducive to self-actualization (Martinez & Kumar, 2019). Inflexible hierarchies and bureaucratic constraints, on the other hand, can hamper creative expression and the desire to take intellectual risks, which are factors that are crucial to the progress of academia (Clark & Davis, 2021).

Problem Statement

Notwithstanding the pivotal position of academicians in promoting institutional excellence, innovation, and research productivity, Human Resource Management (HRM) practices in most higher education institutions (HEIs) are still predominantly administrative and compliance-oriented (Smith & Jones, 2015; Thompson, 2017). As international competition within higher education rises, universities and colleges increasingly depend on academic staff to spearhead knowledge creation, quality of teaching, and societal relevance. However, the HRM systems intended to serve these professionals do not capture their higher-level psychological and professional aspirations, especially the quest for self-actualization (Brown et al., 2018; Zhang et al., 2019).

Self-actualization, which Maslow (1943) described as the fulfillment of an individual's highest potential, is particularly applicable to academic environments where work is inherently motivated by curiosity, intellectual independence, and the need to make a significant contribution to society. For academicians, achieving self-actualization can enhance job satisfaction, creativity, and scholarly productivity (Ryan & Deci, 2000; Johnson & Smith, 2016). However, HRM frameworks in HEIs rarely incorporate this motivational construct into their strategic models. Instead, most HRM departments continue to emphasize administrative efficiency over developmental impact, resulting in environments that may inadvertently stifle creativity and academic fulfillment (Nguyen & Lee, 2021).

Moreover, there is a noticeable gap in empirical research and theoretical models that systematically explore the relationship between HRM practices and academic self-actualization (Martinez & Kumar, 2019). Although isolated elements such as professional development, recognition systems, or work-life balance have been studied (Rodrigues et al., 2021; Tanner & Greene, 2017), few studies offer a holistic framework that aligns HRM strategies with the complex needs of academic professionals. This gap is further exacerbated by evolving challenges in academia, such as increased workload, digital transformation, and rising expectations for interdisciplinary research and global engagement (Whitchurch, 2019; Li & Wong, 2020).

Consequently, the underutilization of HRM as a strategic tool not only undermines the well-being and performance of academic staff but also threatens the long-term sustainability and reputation of HEIs. Without purposeful HRM strategies that facilitate intellectual growth, autonomy, and recognition, universities risk disengagement, turnover, and decreased research and teaching outcomes.

Therefore, this study addresses the core problem of the absence of a comprehensive, strategic HRM framework explicitly designed to foster self-actualization among academicians. By investigating how HRM policies can be reimagined to align with the psychological and professional aspirations of academic staff, this research aims to position HRM as a transformative force in enhancing both personal fulfillment and institutional success.

Research Objectives

Given these challenges, this study seeks to reframe HRM as a catalyst for self-actualization in higher education institutions. It is grounded in three key objectives:

- To identify the drivers or challenges in HRM practices that contribute to self-actualization's achievement among academicians.
- To evaluate the extent to which current HRM practices align with or deviate from these factors.
- To develop a framework for strategic HRM that fosters academic self-actualization and institutional excellence.

2. Literature Review

The Evolution of HRM in Higher Education Institutions (HEIs)

Human Resource Management (HRM) in higher education has historically been positioned as an administrative rather than developmental function, primarily tasked with recruitment, payroll, and compliance (Smith & Jones, 2015). However, with increasing demands for global competitiveness, digital transformation, and performance accountability, universities are under pressure to reconceptualize HRM as a strategic driver of faculty growth and institutional excellence (Brown et al., 2018). More recent scholarship underscores that faculty are not only employees but knowledge creators whose productivity depends on intrinsic motivators such as autonomy and recognition. Sulistiyani (2022), for example, showed that HRM practices in Indonesian universities influence self-actualization by fostering organizational support and professional growth opportunities. Yet, many institutions still regard HRM as a compliance-driven unit rather than a strategic partner (Nguyen & Lee, 2021).

Self-Actualization: Theoretical Foundation and Relevance to Academia

Maslow's (1943) concept of self-actualization, representing the fulfillment of one's highest potential, remains foundational to understanding intrinsic motivation in academic work. In higher education, self-actualization is often expressed through intellectual autonomy, scholarly recognition, and meaningful contributions to society (Ryan & Deci, 2000; Johnson & Smith, 2016). More recent perspectives emphasize the application of self-determination theory, which highlights autonomy, competence, and relatedness as drivers of engagement (Deci & Ryan, 2000). These principles remain highly relevant for faculty, whose careers are less linear than those in corporate environments. Despite this theoretical clarity, there is still limited empirical exploration of how HRM frameworks can actively foster academic self-actualization.

HRM Practices and Academic Motivation

Evidence increasingly shows that HRM practices shape faculty motivation, retention, and engagement. Pratama, Samani, and Buditjahjanto (2024) highlight how continuing professional development (CPD) enhances lecturers' capacity for self-directed learning, ultimately contributing to self-actualization. Similarly, Hassan, Rahman, and Lee (2022) found that strategic HRM initiatives such as performance-based promotions and cross-disciplinary training drive innovation and job satisfaction in Malaysian universities. Conversely, generic, one-size-fits-all training schemes often fail to meet diverse academic needs (Rodrigues et al., 2021). Another recurring concern is reward and recognition systems: while publications remain the gold standard, excellence in teaching, mentorship, and service often receives less attention, leading to disengagement (Tanner & Greene, 2017).

Organizational Culture and Conditions for Self-Actualization

Organizational culture mediates the effectiveness of HRM practices. Studies show that collaborative, trust-based environments enable self-actualization, while hierarchical, compliance-focused cultures undermine it. Zuleha and Sawitri (2024) observed that when HRM practices are embedded in a positive institutional culture, employees report greater satisfaction and self-fulfillment. Likewise, Karppinen, Dimba, and Kitawi (2021) demonstrated that supportive leadership reduces absenteeism and fosters intrinsic motivation by fulfilling

higher-level psychological needs. In higher education, this translates into faculty who feel valued and empowered to innovate, teach, and research without fear of bureaucratic constraint.

HRM as a Strategic Lever for Institutional Innovation

A growing body of work positions HRM as a catalyst for institutional transformation. Wilson and Taylor (2018) argue for a "transformative HRM" model that integrates human resources into academic governance and policy. More recent evidence supports this approach. Sulistiyani (2022) showed that HRM's active involvement in shaping organizational strategy strengthens faculty motivation, while Cinches and Borbon (2024) stressed that digital inclusivity is now a prerequisite for equitable faculty development. This suggests that HRM reforms must not only target traditional HR policies but also address structural inequities in access to digital and professional resources.

Gaps in the Literature

Despite growing interest in the change-making function of Human Resource Management (HRM) in higher education, several key gaps remain, weakening both theoretical advancement and daily practice. Among the most overwhelming limitations is the lack of synchronization between self-actualization theory and HRM practices as utilized in academic environments. While Maslow's theory is widely established in motivation literature, its application within the academic environment, where intellectual freedom and personal fulfillment are essential, is comparatively untested.

Additionally, most existing studies focus on individual variables such as job satisfaction, professional development, or employee engagement, without situating these variables within a broader framework. Thus, they fail to capture the root, interrelated motivational drivers of academic performance and behavior. A more unified framework is necessary for understanding how HRM practices may align with the overall psychological and developmental needs of academicians.

Furthermore, there is a notable absence of long-term empirical studies examining the outcomes of strategic HRM interventions in academic contexts. Specifically, little is known about how such practices impact sustained research productivity, teaching quality, and faculty retention over time. Without longitudinal data, institutions are left with fragmented insights that may not support informed policy-making or structural change.

Lastly, despite the progress made, there remains no holistic framework that explicitly connects HRM practices to Maslow's and Ryan and Deci's motivational theories in academic contexts. Instead, studies tend to focus narrowly on individual aspects, such as training or recognition. Longitudinal research on the sustained effects of HRM practices, particularly on faculty retention, innovation, and job satisfaction, is rare. Many interventions documented in the literature are also context-specific and fail to address systemic barriers such as entrenched hierarchies and resistance to change. Finally, the role of digital inequalities in shaping faculty opportunities for self-actualization has only recently emerged as a research concern (Cinches & Borbon, 2024), requiring more systematic study.

The literature underscores the importance of aligning HRM practices with faculty motivations to achieve both individual fulfillment and institutional excellence. However, fragmented insights and limited empirical frameworks leave universities without a clear roadmap. This study aims to fill these gaps by offering an integrated framework for HRM that fosters academic self-actualization while responding to contemporary challenges in higher education.

3. Research Methodology

Research Design

This study employed a qualitative research design to explore the relationship between HRM practices and academic self-actualization in higher education institutions. Qualitative approaches allow for the rich capture of personal experiences, institutional dynamics, and organizational culture, all of which are central to understanding how HRM policies are interpreted and enacted (Creswell & Plano Clark, 2018).

Participants and Sampling Strategy

Purposive sampling was used to identify 40 information-rich participants across Malaysian universities: 20 academicians and 20 HR professionals. Selection criteria included a minimum of five years of professional experience, direct involvement in HRM policy design or implementation, and representation across different institutional types (public and private). This diversity ensured both strategic and operational perspectives on HRM practices.

Data Collection Methods

Semi-structured interviews served as the primary data collection tool. The interview protocol was informed by established frameworks, including Hackman and Oldham's (1980) Job Characteristics Model, Deci and Ryan's (2000) Self-Determination Theory, and prior HRM studies in academia (Nguyen & Lee, 2021; Sulistiyani, 2022). The following guiding questions were used during interviews:

- How do HRM policies in your institution support or constrain your academic work and intellectual autonomy?
- Which HRM practices have most influenced your professional development and career trajectory?
- In what ways do recognition and reward systems reflect or overlook your contributions to teaching, research, and service?
- How would you describe the role of organizational culture in enabling or hindering your professional growth?
- Can you share experiences where HRM initiatives contributed to your sense of achievement or self-actualization?
- What challenges do you face in aligning institutional expectations with your personal and professional goals?
- How are opportunities for continuing professional development provided, and how do they affect your motivation?
- In your view, how should HRM practices be reformed to better support faculty self-actualization?
- Follow-up probes were employed to encourage depth and elaboration, ensuring participants could reflect on their experiences while still covering the study's core themes.

Interviews were conducted in two modes: 15 face-to-face sessions on university campuses in private meeting rooms and 25 virtual sessions via Zoom and Google Meet. Each interview lasted 45–90 minutes. All sessions were audio-recorded with consent and transcribed verbatim.

Data Analysis

Qualitative Analysis: Thematic Coding

The qualitative data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-step approach, which includes familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and the final step is producing the report.

A combination of deductive coding (based on the research questions and Maslow's theory) and inductive coding (emerging from the data) was employed. NVivo 12 software was used to assist with coding and organizing data. Inter-coder reliability was ensured through peer review and iterative refinement of the coding scheme.

Ethical Considerations

Ethical approval was obtained from the organizations before data collection. Participants were informed of the study's aims, their rights, and data confidentiality. All participation was voluntary, and informed consent was obtained before interviews and surveys. Data were anonymized and stored securely in password-protected files, accessible only to the research team.

Trustworthiness and Validity

To ensure trustworthiness in qualitative analysis, the study adhered to Lincoln and Guba's (1985) four criteria: credibility, transferability, dependability, and confirmability. Techniques used include member checking to validate interpretations with participants, peer debriefing with academic colleagues, audit trail to document decisions and processes, and thick description to provide contextual detail for transferability.

4. Findings and Results

The findings from this study underscore the complex interplay between Human Resource Management (HRM) practices and the pursuit of self-actualization among academicians in higher education institutions (HEIs). Drawing from semi-structured interviews with 40 participants (20 HR professionals and 20 academic leaders), several thematic insights emerged. These insights collectively reveal that current HRM frameworks in many HEIs are insufficiently aligned with the intrinsic motivations and psychological needs of academic staff. The findings are organized thematically and presented below.

HRM's Administrative Focus and Lack of Strategic Integration

A dominant theme from the interviews was the persistent framing of HRM as a support service with limited strategic input. HR functions were largely described in terms of administrative efficiency; handling contracts, compliance, payroll, and procedural matters. Academic leaders expressed concern that HR was not meaningfully embedded in institutional efforts to enhance academic excellence or faculty well-being. This view was mirrored in the survey results, where 72% of respondents agreed that their institution's HRM was administrative rather than strategic. Only 18% felt that HR actively contributed to their professional development or long-term academic growth. The interviews revealed that such a limited HRM role often resulted in missed opportunities to align institutional goals with the developmental needs of faculty members.

Disconnect Between HRM Practices and Academic Motivators

Another key finding was the evident misalignment between HR policies and the intrinsic motivators that drive academic work, such as intellectual curiosity, autonomy, and social contribution. Academicians noted that current performance appraisal systems and promotion criteria were heavily skewed toward quantifiable outputs, especially research publications, while teaching excellence, community engagement, and interdisciplinary collaboration received minimal recognition. This performance-centric focus was seen as demotivating, particularly for academics whose strengths or passions lay outside mainstream research agendas.

Intellectual Autonomy as a Core Component of Self-Actualization

The concept of intellectual autonomy emerged as a recurring and powerful driver of self-actualization. Participants described autonomy in research, teaching, and academic exploration as essential to their sense of purpose and fulfillment. Several academics spoke passionately about the joy derived from developing their own curricula, mentoring students, or pursuing unconventional research questions. One associate professor shared, "The moment I was allowed to shape my own curriculum and lead a community project, I felt more fulfilled than any pay raise ever made me feel."

Organizational Culture as a Moderator of HRM Effectiveness

Findings also indicated the central role played by organizational culture in shaping the experience and perception of HRM practices. Organizations that fostered open communication, psychological safety, and collegiality were seen to be more conducive to self-actualization. Work environments that were described as having tight hierarchies and bureaucratic control were often depicted as stifling, leading to frustration and disengagement. As one HR director commented, "We have policies for everything, but where there's no culture of trust, the policies don't get translated into actual support." This suggests that HRM reforms, no matter how well-intentioned, must be underpinned by an enabling institutional culture if they are to achieve their intended impacts.

Recognition and Reward Systems Misaligned with Diverse Contributions

A central issue among participants was that their scholarly work outside of high-impact journals was not adequately valued. Pedagogical excellence, student mentoring, service to the community, and administrative leadership were not provided sufficient room in promotion and evaluation frameworks. Academics who excelled in pedagogical creativity or public scholarship believed that they were excluded from institutional reward systems. The lack of an equitable sense of appreciation was regarded as not only demotivating but also damaging institutional diversity and creativity.

One-Size-Fits-All Professional Development Programs
The participants also denounced the uniformity of professional development programs. Even though workshops and training were offered by the majority of institutions, they were mainly described as irrelevant to the diverse needs of academic staff by discipline and stage of career. For example, new lecturers required mentorship and pedagogy training, whereas experienced academics required leadership training and international collaboration experience. Despite these varied needs, the programs were described as uniform and inflexible.

Pockets of Transformative HRM Practice
Aside from the system-wide problems, though, the study also identified areas of exemplary HRM practices in some institutions. These were career development track-related mentorship programs, flexible work-life arrangements synchronized with cycles of research, and merit systems rewarding teaching, service, and innovation as well as research. These institutions had improved faculty participation, lower turnover, and improved morale. These are instances of the way HRM can be strategically employed for inspiring personal growth and institutional excellence.

Synthesis of Findings
In sum, this study reveals that while self-actualization is a salient and desired outcome for many academicians, current HRM practices in HEIs are not adequately configured to support this aspiration. The prevailing administrative orientation of HRM, combined with misaligned reward structures, generic development programs, and unsupportive institutional cultures, significantly limits the potential for academic staff to realize their full potential. However, emerging best practices demonstrate that with intentional design and leadership support, HRM can indeed become a catalyst for both individual fulfillment and organizational success.

Discussion
This study set out to explore how HRM practices can function as catalysts for academic self-actualization in higher education institutions. The findings point to a persistent tension: while faculty aspirations are rooted in autonomy, recognition, and intellectual growth, HRM systems remain predominantly compliance-oriented. The discussion below addresses each research objective in turn.

Research Objective 1: Identify drivers and challenges in HRM practices.
The findings revealed autonomy, recognition, and supportive organizational culture as the strongest enablers of self-actualization. Conversely, bureaucratic procedures and narrow performance metrics were identified as major barriers. These observations echo Sulistiyani's (2022) work, which found that organizational support is central to faculty engagement, and align with Karppinen et al. (2021), who highlighted culture as a decisive factor in motivation.

Research Objective 2: Evaluate alignment of current HRM practices with faculty needs.
Interview data indicated a sharp misalignment: performance appraisal systems heavily weighted research output while undervaluing teaching, mentoring, and service. This mirrors critiques by Zhang, Wang, and Liu (2019), who noted the dangers of corporate-style performance logic in academia. Yet, best practices identified in a handful of institutions—such as tailored CPD programs (Pratama et al., 2024) and inclusive recognition systems (Hassan et al., 2022)—demonstrate that alignment is achievable when HRM is strategically reimagined.

Research Objective 3: Develop a framework for strategic HRM.
Synthesizing insights from this study and the literature, a framework is proposed with four pillars: tailored professional development designed around career stage and discipline, inclusive recognition systems valuing diverse contributions from research to teaching and community engagement, cultural transformation to foster trust, autonomy, and collaboration, and digital inclusivity to ensure all faculty have equal access to professional opportunities (Cinches & Borbon, 2024). This framework responds to the research gap by moving beyond fragmented interventions toward an integrated model that explicitly links HRM practices to faculty self-actualization.

5. Interpretive Implications

The study's results reinforce the relevance of Maslow's hierarchy and self-determination theory in academia, where intrinsic motivation drives long-term productivity and satisfaction. More importantly, they show that HRM reforms cannot succeed without cultural change: policies must be supported by an environment of trust and inclusivity. This underscores that HRM in higher education should be viewed not as a service unit but as a strategic partner in faculty development and institutional excellence.

Limitations

While the rich qualitative data offer a robust foundation for insights, several limitations must be acknowledged. First, the geographic scope of the study is limited, with data collected primarily from Malaysian universities. Cultural norms, organizational hierarchies, and faculty expectations vary significantly across global academic systems, and thus, the findings may not be universally generalizable. Institutional factors such as governance models, funding structures, and national education policies were not systematically controlled in this study, which may have influenced participant perceptions of HRM.

Second, the sample composition, though balanced between HR professionals and academic leaders, may have introduced bias due to role-specific interests. For instance, HR professionals may have underreported institutional shortcomings, while academic leaders may have emphasized systemic barriers as a justification for low morale or stagnation in their departments. Though member-checking and peer debriefing were used to mitigate interpretive bias, these subjective lenses may still shape the findings.

Third, the concept of self-actualization itself is philosophically and psychologically complex, with individual interpretations varying widely. While Maslow's hierarchy provides a useful heuristic, some critics argue that self-actualization is culturally contingent or difficult to operationalize in organizational settings (Ryan & Deci, 2000). The study sought to address this through thematic richness, but future research may benefit from multi-theoretical approaches.

Recommendations

The implications of this research are both profound and actionable. Based on the findings, the following recommendations are proposed for higher education institutions, HR professionals, and policy-makers aiming to foster self-actualization among academicians.

Reframe HRM as a Developmental and Strategic Function

HRM departments must evolve beyond their operational remit and be embedded in institutional strategy and academic governance. This includes participation in faculty development planning, academic promotions, research support, and leadership training. Empowering HRM professionals to act as partners in academic development can help align institutional goals with faculty aspirations.

Institutionalize Holistic and Inclusive Recognition Systems

HEIs should develop performance appraisal systems that recognize a broad spectrum of academic contributions, such as teaching, mentorship, service, innovation, and interdisciplinary collaboration. Recognition should be context-sensitive and designed in consultation with academic staff to ensure credibility and buy-in.

Design Professional Development That Is Tailored and Co-Owned

Generic training programs must be replaced with modular, personalized offerings that reflect career stage, disciplinary focus, and individual goals. Institutions should create mechanisms for co-creation of development tracks such as peer-led workshops, action learning sets, and cross-disciplinary coaching.

Foster a Culture of Autonomy and Intellectual Trust

Institutional leaders must work deliberately to cultivate a culture that supports academic freedom, psychological safety, and collegiality. This may involve flattening hierarchies, enabling decentralized decision-making, and modelling inclusive leadership behaviors that validate the diverse motivations of faculty.

Conduct Longitudinal Impact Assessments of HRM Practices

Future research and internal assessments should include long-term tracking of faculty outcomes in relation to HRM initiatives. Metrics could include faculty retention, well-being, productivity, interdisciplinary collaboration, and impact beyond academia. Such data would support evidence-informed HRM reform and policy decisions.

Integrate Self-Actualization Theory Into Faculty Life Cycle Models

Finally, institutions should consider embedding self-actualization principles into every stage of the faculty lifecycle from recruitment and induction to tenure and retirement. Orientation programs, mentoring structures, and exit interviews should all be aligned with an overarching goal: to help each academic realize their fullest professional and intellectual potential.

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Factors Restraining Parents of School Children from Purchasing Educational Museum Tours and Their Behavioral Intentions

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Abstract: Educational tourism, as an important component of the tourism industry is drawing a lot of attention in recent years. However, museum educational tourism is different from common leisure tourism. The constraints to educational tourism may be different from those of traditional tourism, hence this study intends to bridge this gap with a museum case study. This research aims to study the determinants of purchasing intention of educational tourism products via a case study of the Grand Canal Museum of China. This study used a quantitative approach by collecting data through online survey questionnaires guided by the Leisure Constraint Theory. The collected data consisted of 276 valid responses, which were analyzed using Factor Analysis and Regression Analysis techniques. The study found that four main determinant variables are restraining the purchasing intention of educational tourism products. Findings of this study show that intra-personal constraint factors, influential constraint factors and structural constraint factors are the determining factors of the purchasing intention toward educational tourism. However, the inter-personal constraint factor, being one of the original variables in Leisure Constraints Theory shows no effect on the intention to purchase educational tourism products. Findings of this study contribute to the Leisure Constraints Theory by incorporating influential constraint factors into the current model.

Keywords: *Constraint Factors, Purchasing Intention, Educational Tourism, Museum*

1. Introduction and Background

Educational tourism has emerged as a significant component of the tourism sector. A substantial body of literature exists regarding the definition of educational tourism. Nevertheless, no agreement has been achieved regarding the definition of educational tourism. The primary ongoing debate focuses on learner or traveler motivation, the connection between formal and informal learning, and the relationship between tourism and education. Gibson (1998) defines educational tourists, including students, adults, and seniors, as individuals who engage in study tours or workshops to acquire new skills or enhance existing ones during their vacations. Pitman et al. (2011) characterize educational tourism as a type of tourist experience designed to facilitate structured learning via active and engaged intellectual praxis. Learning is fundamental and central to product delivery. Falk et al. (2012) examined the relationship between travel and learning, positing that a learning component is inherently present in travel, albeit frequently in a passive form. McGladdery and Lubbe (2017) define educational tourism as a transformative process that integrates experiential learning and international education, resulting in measurable outcomes classified into cognitive (knowledge gained), affective (attitudes and perspectives), and behavioral (skill enhancement) categories. In 2016, Nugroho and Soeprihanto examined the interconnection between education and tourism more thoroughly. Educational tourism is characterized as a three-dimensional product: (a) the educational experience at the destination and the resulting learning benefit (main product); (b) the tourist package that fulfils the tourist's needs (real product); (c) all tangible and intangible elements of the tourism experience that enhance the primary service (additional product). Additionally, various formats of educational tourism were identified: school trips, potentially followed by a visit from the children's parents; study abroad experiences characterized by intensive study sessions with full cultural and linguistic immersion; seminar vacations, senior seminars, and hands-on enhanced experience vacations, primarily appealing to adults and seniors; skills enhancement vacations, which include practical learning activities such as 'how-to-do' learning or ecology-based activities; and educational cruises that merge leisure with specific-topic lectures.

Generally, educational tourism refers to tourism activities undertaken to obtain education and learning (Ritchie, 2003). The two main special interest tourism products of educational tourism are natural and cultural

heritage tourism (Ritchie, 2003). China is a country with over 5,000 years of history rich in culture. Thus, this study focuses on the supply of educational tourism experience of selected cultural heritage tourism.

In this study, the Grand Canal Museum of China (GCMC) was used as a case of educational tourism on the Beijing–Hangzhou Grand Canal. For tourists to visit the museum in the present day, it has to be appealing, providing a unique and enriching experience to the visitor (Rosario and Campos, 2021). The attention to play in museum settings is a relatively recent and growing tendency (Holdgaard & Olesen, 2023), not only in China but also around the world. Museums are complex, dynamic, and empowering learning environments that have great potential for informal and lifelong learning (Kristinsdóttir, 2016). Choi et al. (2020) find that museums can contribute to achieving cultural sustainability, adding a cultural construct to the traditional three pillars of sustainability. Research on museums varies from the types of museums, museum accessibility, use of technology in museums. Oren and Shani (2012) studied educational dark tourism via the Yad Vashem Holocaust Museum. Torabi Farsani et al. (2023) investigated mine museums and considered them as a creative economic approach towards sustainable tourism. This study also uses the museum as a setting of educational setting.

In recent decades, there has been a significant increase in the number of tour operators and travel agencies providing educational tourism packages for school groups and higher education students (McGladdery & Lubbe, 2017). An increasing number of parents are inclined to invest in educational tourism products for their school-aged children to enhance their knowledge beyond traditional textbooks. Educational tourism in China is experiencing rapid growth (Li & Xu, 2023). The research conducted by Wang and Li (2008) indicates that, in addition to teenagers, individuals with higher education levels represent a significant portion of educational tourists. Their preferred destinations encompass cosmopolitan areas, ancient cities, and renowned tourism cities characterized by rich cultural environments and advanced tourism industries and economies. The Beijing–Hangzhou Grand Canal is recognized as one of the longest and largest canals globally. The route from Beijing to Hangzhou (north to south) links China's five major water systems, significantly influencing the ecological environment and economy of both northern and southern China. It possesses a significant amount of intangible cultural heritage (ICH). The GCMC, located in Yangzhou city, eastern China, covers an area of 200 hectares with 79 thousand square meters of construction area. The GCMC is run by the Bureau of Culture and Tourism of Jiangsu Province, and aims at a symbolic and specialized museum concentrating on collecting, exhibiting, researching and educating about antiques related to the Grand Canal. More and more visitors are pouring into the GCMC, not only for tour guiding as an internet celebrity scenic spot, but also for knowledge learning, i.e., educational tourism. Due to its connection between Beijing and the 2,500-year-old Grand Canal, pupils with parents are the dominant segment of the market of GCMC market. However, this kind of educational tourism sometimes focuses most of its content or time on touring, and not on knowledge learning. More importantly, there are neither enough facilities for educational tourism. In this paper, we consider educational tourism as a follow-up visit or experience of school children, mainly conducted under parents' intention. Due to all the varieties of definitions, we argue that educational tourism in museums for school children, whose purchase intention is usually decided and completed by their parents, to exploit the effect of non-travel agencies on educational tourists. More specifically, the study focuses on the purchasing intention of the GCMC as an educational tourism destination affected by school children's parents.

McGladdery and Lubbe (2017) contended that determining whether the desire to learn while travelling constitutes a primary or secondary motivation for educational tourism presents a challenge. This study employs the Leisure Constraints Theory to examine the factors influencing purchase intention in educational tourism. The Leisure Constraints Theory classifies the factors affecting leisure activities into three categories: intrapersonal constraints, interpersonal constraints, and structural constraints (Crawford & Godbey, 1987; Crawford et al., 1991). Many researchers have sought to validate this theory across various service-oriented industries. Kono and Ito (2023) indicate that promoting leisure enjoyment necessitates an understanding of various constraints and that negotiation strategies are contingent upon the context of the activity. Hinch et al. (2005) utilized leisure constraints theory in the context of sports tourism. Dale et al. (2012) identified a four-factor structure, distinguishing between destination and school-based structural factors, rather than a three-factor structure. Intrapersonal and interpersonal constraints were identified as significant factors in conducting overnight school excursions (Dale et al., 2012). Educational tourism represents a distinct segment within the broader tourism sector, and the constraints associated with it may differ from those identified in

traditional Leisure Constraints Theory. This study, informed by Leisure Constraints Theory, investigates the factors influencing the purchasing intentions for educational tourism products, using the Grand Canal Museum of China as a case study. This study aims to address the distinct constraints of educational tourism compared to traditional tourism through a museum case study.

Based on the review of the literature, this study hypothesized that constraints of the purchase intention of GCMC educational tourism products were negatively related to the purchase intentions of parents of school children as follows:
H1: Intra-personal constraints are negatively associated with consumers' purchase intention
H2: Inter-personal constraints are negatively associated with consumers' purchase intention
H3: Influential constraints are negatively associated with consumers' purchase intention
H4: Structural constraints are negatively associated with consumers' purchase intention

2. Methodology

Study case and object

The GCMC has collected more than 10 thousand exhibitions reflecting the Grand Canal from the Chunqiu Times to the Contemporary Times, including ancient books, calligraphy, paintings, carvings, inscriptions, porcelain, metal ware, and more. The museum sets beautiful life brought by the Grand Canal as its theme with 3 normal exhibitions, 6 expert exhibitions, 1 digital exhibition, 1 small theatre for the traditional folks and 1 interactive experience programmed for teenagers. The GCMC is renowned as a cyclopedia of Chinese grand canals, exhibiting the history, culture and technique through the whole Grand Canal and all the periods. Visiting the GCMC with a proper educational attitude or mindset enables more people to understand and appreciate the precious cultural heritage while broadening people's knowledge and views.

Questionnaire design

The target respondents of this study are parents of school children. The questionnaire is divided into three parts. The first part comprises respondents' demographic characteristics, including age, gender, education level and monthly income. The second part encompasses four categories of measurement indicators: intra-personal constraints, inter-personal constraints, influential constraints and structural constraints. All constructs' items were mainly adapted from the Leisure Constraint Theory created by Godbey et al. (2010). Therefore, the independent variables contain intra-personal constraints, inter-personal constraints and structural constraints. To fully explore the constraints on purchasing intention on educational tourism from parents' perspective, this study added influential constraint factors from the Push and Pull Theory. Here, the influential constraint factors refer to the limits of the scenic spot showing no typical characteristics, no knowledge, and no reputation. An evaluation of the items was conducted by the two experts to measure the accuracy of the concepts as well as to increase the comprehensibility of the statements. Based on the expert evaluation and feedback, the questionnaire items were revised and improved. Finally, 31 items were extracted, as shown in Table 1. All items were assessed with a 5-point Likert-type scale (1 = strongly disagree; 2 = disagree; 3= neutral; 4 = agree; and 5 = strongly agree).

Data collection

This study conducted a formal survey using non-probability sampling (convenience sampling). Questionnaires were created using the Wenjuanxing applet, which was distributed for one month in March 2024. The questionnaire was collected both online and through face-to-face interviews. During the survey period, 2 primary schools, 2 middle high schools and 1 senior high school were visited in collecting collect the data. 328 data questionnaires were collected. However, 52 questionnaires were invalid with a total of 276 valid questionnaires were recorded.

Table 1: Measurement indicators for constraints on purchasing intentions of educational tourism

Indicator	Items
Intra-personal	Parents do not endorse educational tourism.
	Parents show no interest in humanistic or historical knowledge such as the GCMC.
	Children show no interest in humanistic or historical knowledge such as the GCMC.
	Parents do not have sufficient leisure time to visit the GCMC.
	Children don't have sufficient leisure time to visit the GCMC.

Indicator	Items
Inter-personal	Children are too small to visit the GCMC.
	It takes too much economic burden to visit the GCMC.
	No relatives or children of relatives accompany to visit the GCMC.
	No friends or children of friends invited to visit the GCMC.
	No classmates invited to visit the GCMC.
	No teachers from the school were introduced to visit the GCMC.
	No training organizers are introduced to visit the GCMC.
Influential	The GCMC has no typical characteristics.
	The GCMC does not show sufficient knowledge.
	The GCMC does not provide enough entertainment to allure children.
	Knowledge in the GCMC is difficult for children to absorb.
	The reputation of the GCMC is not high enough.
	There is not enough marketing from the GCMC.
Structural	The distance from the GCMC to your apartment is far.
	The transportation to the GCMC is not convenient.
	It is hard to find the reservation tunnel.
	It is too popular to book tickets from the official website of GCMC.
Purchasing Intention	The GCMC still lures your children.
	I will bring the children to visit the GCMC.

3. Results

Demographic and statistical analysis of respondents

Through descriptive statistical analysis of the demographic variables (Table 2), the study found that the proportion of respondents with children in primary school accounted for 27.9%, followed by those of middle high school (22.8%), pre-school (20.7%), senior high school (16.3%) and college and above (12.3%). According to the data, 67.1% of respondents come from Jiangsu Province, while 32.9% come from the other provinces. Most respondents have a relatively low monthly income per family, with 68.8 % earning less than 20,000 yuan per month. Only 31.2% of the remaining respondents earn a monthly income per family greater than 20,000 yuan. Most respondents work in common companies and 37% of respondents work in either government or executive organizers, and 29.3% of respondents are freelancers.

Table 2: Respondents' demographic profile

Item	Demographics	Number of Respondents	Percentage (%)
Learning stage of children	Pre-school	57	20.7
	Primary school	77	27.9
	Middle high school	63	22.8
	Senior high school	45	16.3
	College and above	34	12.3
Residence	Yangzhou	62	22.5
	Jiangsu Province (Non-Yangzhou)	123	44.6
	Other Provinces	91	32.9
Monthly income per family (¥)	<10000	74	26.8
	10000–20000	116	42.0
	20001–30000	45	16.3
	>30000	41	14.9
Types of working company	Companies	93	33.7
	Executive organizers	54	19.6
	Government	48	17.4
	Freelance	81	29.3

Factor Analysis

This study used SPSS 26 to perform factor analysis to explore the model's reliability and validity. First, we conducted the Kaiser-Meyer-Olkin (KMO) and Bartlett Sphericity Tests to assess whether the collected data were suitable for factor analysis. The KMO value for the scale was 0.975, and the significance value of

Bartlett's Sphericity Test is less than 0.05, both indicated that the collected sample size was suitable for factor analysis (Table 3).

Table 3: KMO and Bartlett Sphericity Tests

KMO		0.975
Bartlett Sphericity Tests	Chi-square	8347.842
	df	325
	Sig.	0

Principal component analysis and the maximum variance method were employed to extract six factors from 24 items: intra-personal constraints, inter-personal constraints, influential constraints, structural constraints and purchasing intention. Based on the criteria of factor analysis, items with factor loadings below 0.6 and those that loaded onto incorrect factors were removed. Ultimately, we obtained 22 items (Table 4).

Table 4: Rotated factor loading matrix

Constraint Factors	1	2	3	4	5
Intra1	0.675				
Intra2	0.699				
Intra3	0.622				
Intra4	0.683				
Intra5	0.65				
Intra6	0.721				
Inter1		0.617			
Inter2		0.656			
Inter3		0.655			
Inter4		0.647			
Inlu1			0.735		
Inlu2			0.803		
Inlu3			0.717		
Inlu4			0.762		
Inlu5			0.719		
Inlu6			0.697		
Struc1				0.717	
Struc2				0.727	
Struc3				0.738	
Struc4				0.724	
Inten1					-0.650
Inten2					-0.877

Extraction Method: Principal Component Analysis.

Descriptive analysis of principal components

We analyzed the mean value and the standard deviation, as they show the actual situation of constraint factors from visiting the GCMC. According to the data, we found that the mean value for each of the constraint factors is around 3, with a medium perception. And the standard deviation values are between 1.14 to 1.29, showing that all the data of the four constraint factors have a small degree of deviation.

Table 5: Descriptive Analysis of Principal Components

Constraint Factors	Mean	Standard Error	Standard Deviation
Intra	2.94	0.07	1.14
Inter	3.05	0.08	1.29
Influe	2.98	0.08	1.29
Struc	2.99	0.08	1.25

Regression Analysis

The relationships between the independent variables and the dependent variable were analyzed through linear regression. Particularly, we examined how the four constraint factors (intra-personal, inter-personal, influential and structural) were related to the purchasing intentions of the GCMC. The results showed that three independent variables were negatively and significantly associated with purchasing intention ($p < 0.05$) (Table 6). They are intra-personal constraint factors (0.003), influential constraint factors (0.003) and structural constraint factors (0.007). However, the p-value of the independent variable namely inter-personal constraint factors was 0.299, exceeding 0.05, showing an insignificant association with purchasing intention. Thus, inter-personal constraint factors were deleted in the purchasing intention model.

Additionally, the variance inflation factor (VIF) <5 indicated no collinearity issues among the independent variables. R^2 for the impact of the four predictor variables on purchasing intention is 0.447, which means that these four independent variables explain 44.7 % of the variance in the dependent variable, reaching a moderate level of explanation.

Thus, it can be inferred that H1, H3, and H4 were supported, while H2 was not supported. Based on the result presented in Table 6, this study concludes that intra-personal constraint factors, influential constraint factors and structural constraint factors are negatively and significantly associated with parents' purchasing intention. However, inter-personal constraint factors do not exert influence on parents' purchasing intention toward the GCMC, which may be explained by the insignificant relationship and less relative in the Chinese society. A new constraint model for educational tourism toward museums can be concluded as in the following Table 6.

Table 6: Regression Analysis

DV	IV	B	Standard Error	Beta	t	Sig.	Tolerance	VIF	R2
	(Constant)	5.373	0.155		34.587	0			0.447
	Intra	-0.304	0.1	-0.283	-3.046	0.003	0.235	4.247	
Inten	Inter	0.095	0.091	0.101	1.041	0.299	0.218	4.596	
	Influe	-0.254	0.086	-0.269	-2.973	0.003	0.25	4.004	
	Struc	-0.249	0.092	-0.256	-2.699	0.007	0.227	4.404	

**p<0.05; **p<0.01*

4. Discussion and Implications

The findings of this study offer significant insights into the relationship between constraint factors and parents' purchasing intentions regarding educational tourism products. A notable negative correlation was identified between intra-personal and structural constraint factors and parents' purchasing intentions regarding the GCMC. This finding aligns with the Constraints Leisure Theory posited by Crawford et al. (1991). This study's findings indicate that intra-personal constraints are influenced by several factors, including personal attitudes towards educational tourism, interest, family income, and available leisure time from work. The structural constraints can be attributed to distance, transportation, and reservation issues. The intra-personal constraints primarily rely on parental psychology and social status, whereas the structural constraints involve the geometrical relationships and the services provided by educational tourist scenic spots. This study demonstrates that the negative correlation between intra-personal and structural constraints and parents' purchasing intentions has significant implications for both government entities and marketers within the GCMC. Effective implementation of policies regarding public holidays and annual leave is essential to ensure adequate leisure time for parents accompanying their children. To enhance educational tourism and boost purchasing intentions, destination governments should prioritize improving infrastructure that facilitates access for tourists from various regions.

The findings also reveal a significant and negative relationship between the influential constraint factors and parents' purchasing intention of the GCMC. The influential constraint factors can be attributed to various factors, including characteristics, knowledge abundance, entertainment, vividness, reputation and marketing

of the GCMC. These influential constraints can not only resist the parents' purchasing intention, but can also evoke a low mass reputation among educational tourists. Therefore, educational tourist scenic spots should not only focus on supplying a suitable product for school children, but also have to emphasize the marketing of such kind of scenic spots, especially on the cultivation of mass reputation as a way to create products that stand out in the market and attract parents' attention.

Based on the results of this study, the inter-personal constraint factors have a less significant and negative relationship with parents' purchasing intention of GCMC. This indicates that the inter-personal factors attributed to classmates, teachers or relatives do not play a crucial role in parents' decisions to purchase the museum products for their school children. This finding does not align with the universally used Leisure Constraint Theory. This may be affected by the social relationships of Chinese families. The school children seldom have any close relatives under the one-child policy. Each family selects their educational product for their children on their own. Thus, marketers from these educational scenic spots should differentiate themselves in the market and cultivate the parents' loyalty.

Therefore, in the product development of educational tourism, it is important to fully consider attributes such as intra-personal constraints, influential constraints and structural constraints. This can be achieved by alleviating the above constraints, such as shortening the psychological distance to the museum, upgrading the infrastructure of the destination, guaranteeing leisure time, and raising the reputation of the museum. By investigating consumers' purchase intentions for the GCMC, this study contributes to the existing literature in several ways. First, it fills a research gap in the field of tourist intention studies, as previous research has primarily focused on college educational tourism or educational tourist products organized by schools. This study focused on educational tourists from the parents' perspective.

Secondly, the study validates and expands existing consumer-behavior theories by examining the relationship between the factors (intra-personal constraints, influential constraints and structural constraints) and parents' purchasing intention. This analysis not only verifies the universal Leisure Constraint Theory, but also differentiates the theory by removing interpersonal constraint factors while adding influential constraint factors into the model. Thus, this study contributes to the theoretical development of tourist behavior theories. Last, examining purchasing intention for educational tourist products, such as the GCMC, holds significant importance in the field of educational tourism economy. Analyzing the intra-personal constraint factors, influential constraint factors, structural constraint factors and parents' purchasing intention for educational tourism products can reveal the economic potential of educational tourist products and provide theoretical support for the transformative development of the tourism industry.

The results of this study have practical implications for government, educational tourist scenic spots and also travel agencies involved in the production and marketing of educational tourist products for school children and their parents.

For the government, understanding consumers' constraint factors for purchasing intention for educational tourist products can guide more suitable policies for the public to promote the tourism industry. By supplying better infrastructure at the destination, implementing policies of reasonable annual leave by the government, parents of school children can ease the intra-personal and structural constraint factors. This, in turn, can enhance the parents' purchasing intention toward educational tourist products.

Moreover, this study provides insights into effective marketing and communication strategies for educational tourist scenic spots. The influential constraint factors prevent parents from purchasing educational tourist products in the aspects of knowledge abundance, vividness, entertainment and reputation. This knowledge can guide educational scenic spots in designing marketing campaigns that effectively highlight the advantages and uniqueness of educational tourist products.

Furthermore, the findings can inform travel agencies involved in educational tourism. Understanding the constraint factors and their purchasing intention can guide efforts in the good design of educational tourist products. As travel agencies are those who can aggregate all the tourist elements, this knowledge can contribute to the sustainability and transformation of educational tourism.

As with all research, this study has some limitations. First, the sample for this study was obtained through convenience sampling. Convenience sampling is a non-probability sampling method that is based on the researcher's convenience and accessibility in selecting the sample. Moreover, the sample comprises mainly parents from Jiangsu Province, who accounted for 67.1 % of the total sample size. However, tourists from Shanghai and Zhejiang Province are also the dominant tourists in the GCMC. Additionally, it is hard for parents to understand the constraint factor, which may contribute to the opposite answer to the questions in the questionnaire. Therefore, in the future, researchers are encouraged to adopt the random sampling method, increase the sample spots and specify the questions to enhance the representativeness of the research results. Secondly, this study mainly included the constraint factors originating from the Leisure Constraint Theory as independent variables to explain parents' purchasing intentions of educational tourism products, and the independent variables only explained 44.7 % of the variance in purchasing intentions. In statistical terms, the explanatory power of these independent variables reached only a moderate level, which shows that some other variables may be more influential in affecting parents' purchasing intentions toward the educational tourist product. Therefore, in future research, it would be beneficial to include other variables, such as service from the educational scenic spots, forms of education in the educational scenic spot to further expand the model.

Lastly, according to the results, interpersonal constraint factors have less significant impact on parents' purchasing intention among all the variables, and this conclusion may be too absolute. There are two possible reasons for this. First, school teachers or teachers from training organizations usually would not recommend any educational product to their pupils or students. However, if they recommend, parents will follow the suggestions. Second, due to the limited leisure time or the different periods of leisure time for each family, parents of different families may rarely have a common time to purchase an educational tourist product. Therefore, it would be beneficial to investigate other factors in parents' purchasing behavior regarding educational tourist products in future research.

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Intention of Using Self-Service Kiosk in Fast Food Restaurants amongst Malaysian University Youth: Evaluating the Role of Perceived Usefulness, Ease of Use, Enjoyment and Safety Risk

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Abstract: Self-Service Kiosks (SSKs) are a common self-service technology, consisting of a large screen mounted on a pillar from which customers place their food orders. It is a contactless service that was rapidly adopted in fast food operations during the COVID-19 pandemic as an effort to minimize the risk of transmission and was generally well-received by the younger tech-savvy population. This study aims to explore fast food SSK usage intention amongst the university student population using the Technology Acceptance Model with the injection of Perceived Safety Risk as a moderating variable. A total of 400 responses were collected using online questionnaires. Data were analyzed using the SEM-PLS method. Perceived usefulness (PU), perceived ease of use (PEOU) and perceived enjoyment (PE) did affect intention to use the self-service kiosk. However, Perceived Safety Risk did not have a significant moderating effect on intention to use. While perceived safety risk may not deter university youths from using self-service kiosks, continuous practice of cleaning and sanitizing touchscreens by the fast-food management should be practiced even in the post-pandemic stage of COVID-19. Periodic software and hardware upgrades will make the self-service kiosk more user-friendly and improve the streamlined services at fast food outlets.

Keywords: *Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment, Perceived Safety Risk, Intention to Use*

1. Introduction

Consumer behavior has been influenced by new technology because of its rapid development, and it has played an important role in the food and beverage industry (Zurena et al., 2015). Self-service technologies (SSTs) are a type of technology that allows customers to use services without having to interact with staff (Iqbal et al., 2018; Martins et al., 2014; Jeon et al., 2020). Self-service technologies such as touch-screen menu displays assist customers in placing orders and making payments, and most SST systems are located on pillars or at tables (Kim & Csudh, 2012). Self-service kiosks (SSKs) are one of the most common types of SSTs, with a large screen on a pillar as a point where customers place their food orders (Han et al., 2020). Customers can use the kiosks to place orders quickly and easily and receive assistance from staff if necessary (Kim & Csudh, 2012). Furthermore, SSKs are useful to restaurateurs because they reduce labor costs in restaurants (Cross, 2017; Kashif et al., 2015; Baba, Aslinda & Hafiz Hanafiah, 2020).

SSKs are also gradually becoming more prevalent in the fast-food industry in Malaysia. The first fast food establishment to introduce SSKs was McDonald's in Klang Valley in 2017 (Yang & Gheeta, 2019). McDonald's had a competitive advantage over its rivals at the time thanks to the new technology (Yang & Gheeta, 2019). After waiting two years, KFC added SSKs to their menu in Klang Valley locations in 2019 (Qishin Tariq, 2019). In addition to the fast-food industry, SSKs are used in convenience stores for any worker assistance (Chin et al., 2018). It is specifically the Irispay E-Concept Store, where customers may choose their preferred food from a variety of touchscreen vending machines and then pay using the Irispay application (Chin et al., 2018).

University youths are often recognized as one of the major customers of the fast-food industry (Garg 2014, Bakar et al, 2017). As the fast-food business continues to modernize through the utilization of self-ordering kiosks, it has become accustomed to the younger generation since they have been growing up within a technologically prevalent environment (Nakagawa & Yellowlees, 2020; Wei et al., 2021). However, several scholars note that a digital divide with regard to technology literacy may persist especially between youths from urban and rural backgrounds (Spariosu, 2018; Kamarudin et al., 2019; Kalonde, 2017).

Restaurant owners must comprehend their customers' acceptance of SSKs, given their rise. Researchers have frequently utilized the Technology Acceptance Model (TAM) to express their desire to use a specific technology (Rastegar et al., 2018; Ujang et al., 2016; Yang & Gheeta, 2019). Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), the two key variables in this model that represent an individual's acceptance of information technologies, were developed by Davis (1989). Therefore, TAM can address the issue of how customers adopt and use new technologies (Vanan & Subramani, 2015). This TAM has been utilized extensively in research including self-service kiosks at fast food restaurants(Yang & Gheeta, 2019). According to Hor et al. (2020), TAM is a well-liked methodology for examining technological acceptance. They also utilized it to determine how SSTs were being adopted in terms of consumer purchasing patterns. Studies have already been conducted that contrasted customers' and service providers' perspectives through the attributes (Park et al., 2021). This led to the use of two different sets of questionnaires from patrons and restaurant managers. The previous investigations found no appreciable variations between male and female behavior regarding technology uptake (Dabholkar et al., 2003; Kincaid & Baloglu, 2005). Kim and Csudh (2012) used the implication to measure how the gender gap is connected to the customers' prior experience, preparation, and likelihood of using kiosks.

Meanwhile, perceived safety risk has often been explored as a moderator towards technological usage intention (Sharma & Sharma, 2019) especially during safety and security crisis (Mohd Ayob & Masron, 2014; Som et al., 2015; Tan et al., 2017), Although the COVID-19 outbreak indirectly encourage the growth of contactless services in fast-food industry (Wang et al., 2021), customers safety concerns would continue to remain. The hygiene of the self-service kiosk's touchscreen is often questioned since traces of fingerprints may be a catalyst for transmitting harmful microorganisms and would require a strict cleaning SOP to minimize the potential harm (Baba et al, 2023). Despite, the world's transition into the endemic stage of COVID-19, sanitation practices are still being practiced within the fast-food business. While university students may show favorable acceptance patterns towards the wide usage of SSK at fast food restaurants, little is understood about the role of perceived safety risk which may have the potential to alter their usage intention patterns.

Having highlighted the key issues and gaps, this paper aims to explore fast food SSK usage intention amongst the university student population using the Technology Acceptance Model and any potential deterrence from Perceived Safety Risk.

2. Literature Review

Technology Acceptance Model (TAM)

The original technology Acceptance Model (TAM) has been used since 1989 (Rastegar et al., 2018). It is a theory of information systems that predicts customer acceptance of new technology (Ujang et al., 2016). This model is based on a psychological theory known as the theory of reasoned action (TRA), which examines behavior (King & He, 2006). In short, it is a well-known model that is used in the research framework of any technology acceptance study (Rastegar et al., 2018). As a result, many researchers have used TAM to assess the level of acceptance of technology (Ujang et al., 2016; Rastegar et al., 2018; Yang & Gheeta, 2019). The original TAM comprises two factors are perceived ease of use (PEOU) and perceived usefulness (PU) (Ujang et al., 2016). Later on, perceived enjoyment (PE) was added after PEOU and PU because they discovered that it could also influence technology acceptance (Lee et al., 2006).

Perceived Usefulness (PU)

One of the important factors in TAM is perceived usefulness (PU). It is a variable in which people can improve their productivity, performance, and effectiveness by utilising a specific technology (Davis, 1989; Jarina et al., 2019). Meanwhile, Wang (2012) stated that perceived convenience influences PU, thus customer satisfaction as well as customer intention to use (Yang & Gheeta, 2019). Perceived usefulness (PU) is important because it describes how technology can help customers save time and effort (Yang & Gheeta, 2019). Cho and Sagynov (2015) discovered a significant relationship between PU and consumer behaviour in self-service technology, as well as the potential for adoption in apparel retail settings (Jarina et al., 2019). Furthermore, Lee et al. (2012) demonstrated a positive influence on passengers' intentions to use the Self-service Check-In machines at Singapore Changi Airport. Lu et al. (2009) investigated SSKs in airports, which positively influenced PU and customer attitudes towards it. In airport kiosks, Taufik and Hanafiah (2019) discovered a positive relationship between PU and customer attitude.

Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU) is defined as the degree to which a user believes that using a particular system or technology will be painless (Ujang et al., 2016). According to the study of Aboelmaged and Gebba (2013), consumers are focused on the effort when using technology for payments and the complexity level of new technology. As a result, PEOU has a significant impact on people's intentions to use new technology because it is simple to use and will be widely used in their daily lives (Gunawardana, Kulathunga & Perera, 2015; Yang & Gheeta, 2019). A previous study found that PEOU has a positive relationship with technology spending behavior (Hor et al., 2020). This is because the perceived ease of using SSTs has shortened the time used for payments, and the convenience has increased spending behavior (Hor et al., 2020). Meanwhile, PEOU had a significant impact on the customer's intention to use technology (Kattara & Said, 2014; Yang & Gheeta, 2019). The reason for this is that consumers are more comfortable with new technology and can learn how to use it in a short period (Yang & Gheeta, 2019). Tarhini et al. (2016) discovered that a person's demographic profile can influence their use of SST. Some elderly people and those with limited education may struggle to use SSKs technology without assistance (Hor et al., 2020). Several studies have found that age has a significant impact on PEOU (Chien et al., 2019; Hor et al., 2020).

Perceived Enjoyment (PE)

Perceived enjoyment (PE) is defined as "the extent to which the activity of using a specific system is perceived to be enjoyable in and of itself, apart from any performance consequences resulting from system use" (Venkatesh, 2000; Jarina et al., 2019). Perceived Enjoyment (PE) was added later on into the TAM because they discovered that it could influence technology acceptance (Lee et al., 2006). Aside from PU and PEOU, PE is an important factor influencing behavioral intention (Lee et al., 2006). Furthermore, Perceived Enjoyment (PE) is an important factor in technology adoption (Venkatesh et al, 2012; Lewis & Loker, 2014; Jarina et al., 2019). Through perceived enjoyment, customers become interested in and accepting of the use of technology (Yang & Gheeta, 2019). Customers, for example, will return to McDonald's because they enjoyed using the SSKs to order their meal in the restaurant (Jarina et al., 2019). Consumer intention to use new technology is positively correlated with perceived enjoyment (PE). Customers will enjoy and be excited to use the new technology if it has an enjoyable element to it (Ulaan et al., 2016; Yang & Gheeta, 2019). Another previous study found that consumer satisfaction with SSTs will encourage future repurchases when there is an enjoyable element to try (Norazah & Norbayah, 2011; Yang & Gheeta, 2019). Furthermore, PE had a significant influence on the intention to use SSTs (Dabholkar & Bagozzi, 2002; Yang & Gheeta, 2019).

Perceived Safety Risk

Perceived risk is commonly associated with the perception of uncertainty and adverse outcomes in purchasing. It is often represented by safety and security issues such as the impact of terrorism threats towards tourism destinations (Mohd Ayob & Masron, 2014; Som et al., 2015; Tan et al., 2017; Alkahsawneh & Alfandi, 2015), as well as infectious disease outbreaks, including the recent COVID-19 (Bakar & Rosbi, 2020; Hasanat et al., 2020). Previous studies claim that perceived risk is a subjective evaluation and should be conducted and measured based on the risk experience (Yang & Nair, 2014). Risk perception often triggers a distressing signal to customers' behavioral intention in the event they perceive any harmful consequence from a particular measure (Kani et al., 2017; Visschers & Siegrist, 2008). Consumers who perceived the risk of being high (Kani et al., 2017). tend to reflect a negative usage intention compared to those who perceive low-level risk (Tavitiyaman & Qu, 2013; Sinha et al., 2021).

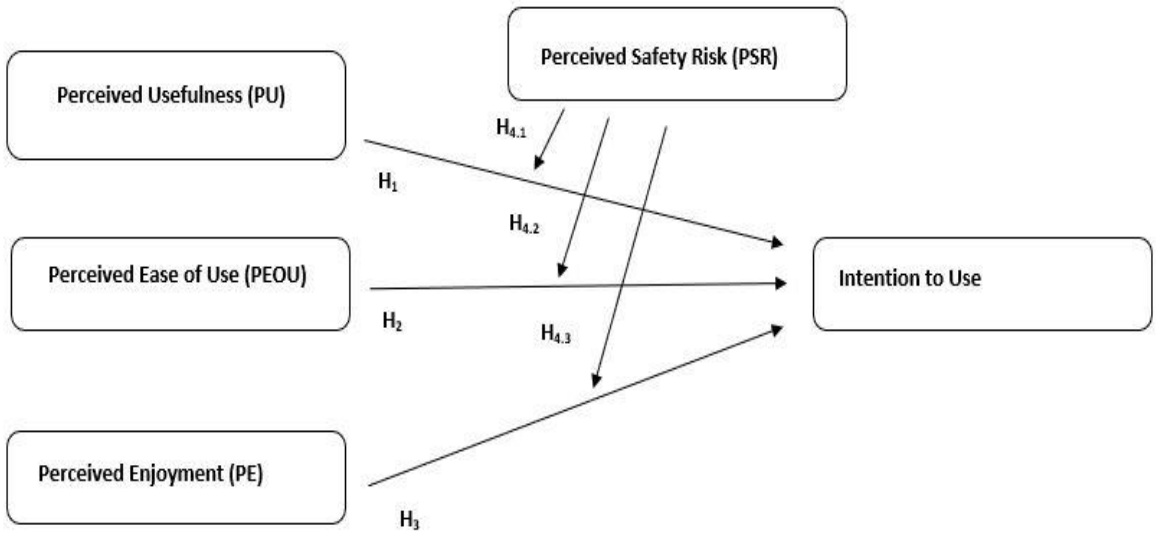
Intention to Use

Intention to use is also known as behavioral intention (BI) (Yang & Gheeta, 2019). In the TAM, it also serves as a dependent variable. It is possible to derive the two variables, perceived usefulness and perceived ease of use, from the TAM (Yang & Gheeta, 2019). It focuses on consumers' willingness to adopt new technology (Dillon, Morris & William, 1996; Yang & Gheeta, 2019). According to the TAM framework, intent to use is influenced by Perceived Usefulness, Perceived Ease of Use, and Perceived Enjoyment (Rastegar et al.,2018). When customers have the ability to use new technology, their intention to use increases (Yang & Gheeta, 2019). In a nutshell, refers to a person's proclivity to use new technologies (Yang, 2012; Yang & Gheeta, 2019).

Proposed Framework

Using the Technology Acceptance Model from Davis (1989), this study will predict the impact of Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Perceived Enjoyment (PE) towards the intention of using fast food self-service kiosk amongst the university student population. Intention to use is the dependent variable in this study. Perceived Safety Risk is injected into the model as the sole moderating variable. Figure 1 below shows the conceptual framework for this study.

Figure 1: Conceptual Framework



From the above model, the following hypotheses were formulated:

H_1: There is a causal relationship between perceived usefulness and the intention to use among university students.
H_2: There is a causal relationship between perceived ease of use and intention to use a self-service kiosk among university students.
H_3: There is a causal relationship between perceived enjoyment and intention to use self-service kiosks among university students.
$H_{4.1}$: Perceived safety risk moderates the causal relationship between perceived usefulness and intention to use a self-service kiosk among university students.
$H_{4.2}$: Perceived safety risk moderates the causal relationship between perceived ease of use and intention to use self-service kiosks among university students.
$H_{4.3}$: Perceived safety risk moderates the relationship between perceived enjoyment and intention to use self-service kiosks among university students.

3. Research Methodology

Questionnaire Structure

Questionnaires which are structured into four major parts were utilized to obtain data from the respective respondents. A number of items in each construct are listed in Table 1. Section A comprises respondents' demographic profile, such as gender, ethnicity, age, state of origin, area of residence, education level, frequency of visiting fast food restaurants and frequency of using self-service kiosks. Section B is divided into 3 subsections encompassing Perceived Usefulness, Perceived Ease of Use and Perceived Enjoyment. Meanwhile, Perceived Safety risk is represented by 4 items in Section C. Lastly, Section D comprises items relating to Intention to use. Items were adapted from past studies relating to the usage of Technology Acceptance Model within the context of self-service kiosk at fast food restaurant, banks, airlines check in as well as usage of multimedia in education (Jarina et al., 2019; Weng et al., 2018; Teo and Noyes, 2011; Mexen et al., 2015) in

which Five-point Likert scale (1= strongly disagree to 5= strongly agree) were opted to measure the relevant items.

Table 1: Dimensions, numbers, and sources of the items

Section	*Variables*	*No of Items*	*Sources*
A	Demographic Background	8	Self-developed
B	Technology Acceptance Model (TAM) variables		
B1	Perceived Usefulness (PU)	7	Jarina et al. (2019), Weng et al. (2018)
B2	Perceived Ease of Use (PEOU)	7	Jarina et al. (2019), Weng et al., (2018)
B3	Perceived Enjoyment (PE)	5	Teo and Noyes (2011)
C	Perceived Safety Risk	4	Baba, et al, 2023
D	Intention to Use	5	Teo and Noyes (2011), Mexen et al. (2015)

Data Collection Process

A total of 400 completed responses were obtained from students in two campuses in Kuala Terengganu, Malaysia, using a cross-sectional approach through online structured questionnaires. The necessary ethical clearance was obtained from Universiti Malaysia Terengganu Research Ethics Committee (UMT/JKEPM/2002/99), Online questionnaire distribution was opted for as the country was still imposing restrictions limiting the number of customers that can be inside food premises during the time of survey. The data collection process lasted two months, from August 1st to September 30th, 2021.

Statistical Analysis

Data were analyzed through SPSS 25.0 using a frequency test and descriptive statistics to determine demographic characteristics. The partial least squares (PLS-SEM) was used to investigate correlations between variables, test hypotheses, and evaluate models in the proposed framework and model. It usually involves evaluating the measurement model, followed by a structural path analysis (Ramayah et al., 2018; Hair et al., 2011) and has been used for theory building or confirmation (Hair et al., 2014). It is also suitable for proposition formulation via variable association. The multivariate analysis was then used to uncover differences in technology usage among people of different ages and genders. According to Tabachnick and Fidell (2007), PLS-SEM is fundamentally a confirmatory approach for model testing.

4. Results

Respondent profile

Six demographic categories, including gender, age, ethnicity, education level, area of residence, frequency of eating at fast food restaurants and frequency of using SSK at fast food restaurants were reported in Table 2.

Table 2: Demographic Profile of Respondents

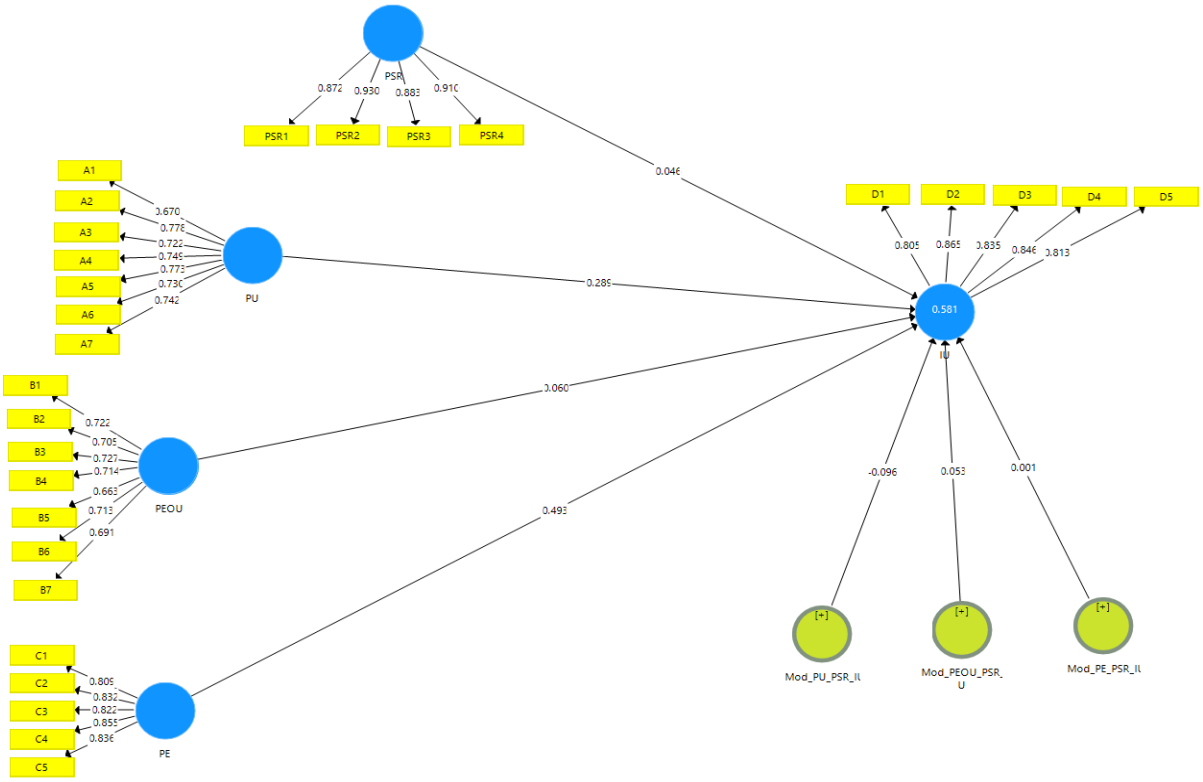
Characteristics	*Number of respondents (n=400)*	*Percentage (%)*
Gender		
Male	85	21.3
Female	315	78.6
Age		
18 - 21 years old	67	16.8
22 - 25 years old	328	82
26 - 29 years old	4	1
>29 years old	1	0.2
Ethnicity		
Malay	116	29
Chinese	270	67.5

Indian	13	3.3
Dusun	1	0.3
Current education level		
Foundation	3	0.8
Diploma	5	1.2
Bachelor's degree	388	97.0
Postgraduate	4	1.0
Area Residing		
Rural Area	103	25.8
Urban Area	297	74.3
Frequency of visiting a fast food restaurant.		
Less than once a week	244	61.0
Once a week	126	31.5
2-4 times a week	30	7.5
Frequency of using self-service kiosks at a fast food restaurant		
Less than once a week	315	78.8
Once a week	67	16.8
2 - 4 times a week	18	4.5

The Measurement Model Assessment

The measurement model is executed to establish the reliability and validity of the construct measures and will be used as a support to determine the suitability of the construct measures for inclusion in the pathway model. Figure 2 and Table 4 present the outer loading scores as well as results relating to the measurement model evaluation.

Figure 2: Measurement Model



As presented in Table 3, the indicator loadings scores are between 0.720 and 0.855, exceeding the recommended value(0.7), suggesting a satisfactory degree of reliability. Meanwhile, the Composite Reliability value ranged from 0.874 and 0.919, thus affirming the items' internal consistency (Hulland, 1999; Diamantopoulos et al,2012). Next, the Average Variance Extracted (AVE) value was recorded between 0.528 to 0.694, achieving convergent validity satisfactorily (Hulland, 1999).

Table 3: Results of Measurement Model

Latent Variable	*Code*	*Items*	*Outer Loading*	*Cronbach's Alpha*	*Composite Reliability*	*Average Variance Extracted (AVE)*
Perceived Usefulness	PU	A1	0.67	0.861	0.893	0.545
		A2	0.778			
		A3	0.722			
		A4	0.749			
		A5	0.773			
		A6	0.73			
		A7	0.742			
Perceived Ease of Use	PEOU	B1	0.722	0.832	0.874	0.528
		B2	0.705			
		B3	0.727			
		B4	0.714			
		B5	0.663			
		B6	0.713			
		B7	0.691			
Perceived Enjoyment	PE	C1	0.809	0.888	0.918	0.690
		C2	0.832			
		C3	0.822			
		C4	0.855			
		C5	0.836			
Intention Use	IU	D1	0.805	0.89	0.919	0.694
		D2	0.865			
		D3	0.835			
		D4	0.846			
		D5	0.813			

As shown in Table 4,the square roots of the AVE that are in bold font, recorded between a value of 0.705 to 0.833. This fulfills the criteria as stated by Fornell and Larcker (1981b), thus confirming the discriminant validity of the model.

Table 4: Latent Variables Correlation Using the Fornell-Larcker Criteria

	IU	*PE*	*PEOU*	*PU*
Intention Use	0.833			
Perceived Enjoyment	0.716	0.831		
Perceived Ease of Use	0.599	0.661	0.705	

Perceived Safety Risk	-0.057	-0.113	-0.028	
Perceived Usefulness	0.645	0.631	0.729	0.739

Analysis using Heterotrait-Monotrait Ratio of Correlations as shown in Table 5 confirms no discriminant validity problems (HTMT<0.85 criteria). Collinearity problems among the latent constructs were not present. Overall, the measurement model confirms that discriminant validity exists between the relevant constructs. Lastly, the global goodness of fit model for the saturated(0.053) and estimated model (0.053) meets the criterion of SRMR < 0.08 (Henseler et al. 2016).

Table 5: Heterotrait-Monotrait Ratio of Correlations (HTMT) Results

	IU	PE	PEOU	PU
INTENTION USE				
PERCEIVED ENJOYMENT	0.8			
PERCEIVED EASE OF USE	0.692	0.764		
PERCEIVED USEFULNESS	0.731	0.719	0.85	

Structural Model Assessment

Upon completing the measurement model, the second step in PLS-SEM involves evaluating the structural model. The structural model results were compiled in Table 6. Both the R^2 and Q^2 recorded values of 0.581 and 0.562 indicating a satisfactory level of predictive accuracy and predictive relevance.

Table 6: Path Coefficient (β), T-Value and Significance Level

	B	T STATISTICS	P VALUES	R^2	Q^2	HYPOTHESIS
PERCEIVED USEFULNESS -> INTENTION TO USE	0.055	9.038	<0.001	0.581	0.562	**SIGNIFICANT**
PERCEIVED EASE OF USE -> INTENTION TO USE	0.062	9.272	0.005			**SIGNIFICANT**
PERCEIVED ENJOYMENT -> INTENTION TO USE	**0.070**	**4.146**	**<0.001**			**SIGNIFICANT**

*Notes: 99% confidence interval: p-value<0.00***; 95% confidenceinterval: p-value<0.05***

The first hypothesis (H_1) states that Perceived Usefulness positively influences Intention to Use. The results reveal that Perceived Usefulness has a significant positive impact on customers' intention to use the self-ordering kiosk (β = 0.055, t-value = 9.038). Thus, the proposed H_1 is supported. Findings are in line with previous studies as the utilization of self-service kiosks in various hospitality-related sectors would indeed streamline and enhance customer service experience (Tsai and Gheeta,2019; Wang,2012; Yang and Gheeta, 2019)

The second hypothesis (H2) mentions that Perceived Ease of Use has a positive effect on customers' Intention to Use. The results affirm the significant positive influence (β = 0.062, t-value = 9.272). Therefore, H2 is statistically supported. As highlighted by previous studies, a self-service kiosk is designed to simplify usage amongst customers as it allows them to cut down multiple processes, thus encouraging intention to use (Collier & Kimes, 2013; Tsai & Gheeta, 2019; Gunawardana, Kulathunga & Perera, 2015; Aboelmaged & Gebba, 2013; Kattara and Said, 2014).

Similarly, the results obtained also support the third hypothesis (H3), i.e., a significant and positive relationship between perceived Enjoyment andintention to use (β = 0.070, t-value = 4.146). Often when any technology that is easy to use and is continuously being improved to be very interactive, it would often create the sense of emotional enjoyment of usage amongst customers including the younger tech savvy generations (Chin & Ahmad, 2015; Ulaan, Pangemanan & Lambey, 2016; Tsai & Gheeta, 2019; Baba, et al, 2023; Kim et al., 2013a, 2013b)

Moderating Effects

Perceived Safety Risk was hypothesised to moderate the relationship between Perceived Ease of Use, Perceived Enjoyment and Perceived Usefulness towards Intention To Use. Results of the moderating effect of Perceived Safety Risk are compiled in Table 7, adapting the technique employed by Chin et al. (2003) proposition.

Table 7: Moderating Effect of the Perceived Safety Risk

	BETA (B)	T STATISTICS	P VALUES	RESULT
PERCEIVED EASE OF USE + PERCEIVED SAFETY RISK -> INTENTION USE	0.066	0.792	0.214	**Not Significant**
PERCEIVED ENJOYMENT + PERCEIVED SAFETY RISK -> INTENTION USE	0.070	0.008	0.497	**Not Significant**
PERCEIVED USEFULNESS + PERCEIVED SAFETY RISK -> INTENTION USE	0.095	1.011	0.156	**Not Significant**

Based on the analysis, it was found that perceived safety risk does not have a noticeable moderating effect between all three predictor variables (Perceived Usefulness, Perceived Ease of Use, Perceived Enjoyment) towards intention to use. Thus, $H_{4.1}$, $H_{4.2}$ and $H_{4.3}$ are rejected. Similar to the argument made by Baba et al (2023), the associated risk related to COVID-19 was significant enough to discourage customers from making purchases at fast food restaurants using the self-ordering kiosk technology. This was due to significant changes made for fast food operations during and after the COVID-19 pandemic, such as implementing cashless transactions (Hao et al., 2020), while regularly sanitizing the self-service kiosk screen. When proper precautions are continuously practiced, it eliminates the sense of potential risk deterring customers from using a self-service kiosk (Baba et al, 2023)

Limitations and Suggestions

Several limitations in this research can be improved to obtain more accurate findings in the future. Firstly, the youth sample of this research only involved the students from two Malaysian public universities. Hence, future research relating to self-service kiosk usage intention can be carried out on different youth demographics who are already in the workforce in Malaysia to make the study more generalizable. As this study found that perceived safety risk to not a strong moderator, the roles of other variables such as age generation, rural-urban background, perceived value, and trust could be explored to understand self-service kiosk usage intention from a different perspective.

5. Implications and Conclusion

As a recap, findings of this study suggest that Perceived usefulness (PU), perceived ease of use (PEOU) and perceived enjoyment (PE) did affect intention to use self-service kiosk amongst university students. However, Perceived Safety Risk was found not to have a significant moderating effect on intention to use the self-service kiosk. Adoption of self-service kiosk technology into fast food operations has helped lessen service failures associated with conventional cashiers due to the simplified and streamlined process. While it is well accepted by the youth generation, in which most are undergoing undergraduate studies, support for continuous investment in self-service kiosks is needed. Periodic hardware and software upgrades would make the self-service kiosk more interactive and easier to use for a wider social demographic of fast food customers. An improved user interface can showcase richer information regarding products and services will indeed be helpful for customers to make a sound purchase decision. From the perspective of restaurant operators, the well-optimized self-service kiosk will enable them to forecast customer purchase patterns, which would benefit the menu cycle process and pricing.

Despite the fear of potential transmission of COVID-19 due to the touchscreen surface being operated by many users, such risk was not evident enough to discourage even the younger generations from using self-service

kiosks. Nevertheless, cleaning and sanitation of touchscreens should be continuously practiced by the fast-food management even in the post-pandemic stage of COVID-19.

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Understanding Restaurant Service Robot Adoption: The Moderating Effect of Age Generations

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Abstract: As Malaysia transitions into the endemic phase, ensuring customer satisfaction and public approval is critical for the successful implementation of robotic services in restaurants. This research investigates the critical factors influencing customer attitudes, emphasizing the reliability and efficiency of robots, as well as their capacity to deliver a personalized, human-like dining experience. As the restaurant industry navigates post-pandemic challenges, robot services are poised to revolutionize operations by enhancing safety and addressing public health concerns. Using the Unified Theory of Acceptance and Use of Technology (UTAUT2) as its framework, this study employed a quantitative research methodology, gathering data through survey questionnaires from 225 respondents. Descriptive statistics and Partial Least Squares Structural Equation Modelling (PLS-SEM) were utilized to test the hypotheses and evaluate the proposed model. Multivariate analysis revealed no significant generational divide in the adoption of service robots, with both younger and older generations displaying comparable levels of acceptance and usage. The findings underscore customer habit as the most significant predictor of robot service adoption, highlighting the UTAUT2 model's applicability in the Malaysian context. The study also reinforces the importance of considering age-related factors in understanding technology acceptance during the endemic period. Given the positive reception of robot services, the restaurant industry should focus on refining these technologies, ensuring that they meet the diverse needs of different age groups.

Keywords: *Customer acceptance and Usage, Trust, Robot Service Technology, Restaurant*

1. Introduction

The emergence of innovative technologies frequently elicits concerns regarding the displacement of traditional media forms. Historically, similar apprehensions were expressed when radio was thought to threaten the relevance of books, and later when television was anticipated to render radio obsolete (Ivanov et al., 2017). In contemporary times, rapid developments in robotics have reignited such fears, particularly surrounding the replacement of human labor in diverse industries (Decker et al., 2017). According to Zemke et al. (2020), service robots are self-operating systems engineered to execute useful tasks with minimal human involvement, except in specific industrial applications. Although many of these robotic technologies were originally intended for manufacturing environments, they have since been adapted for use in tourism and hospitality contexts, performing tasks such as baggage handling, cleaning services, and operating as automated baristas (Zemke et al., 2020).

In Malaysia, the restaurant industry has experienced significant growth over the past decade, encompassing a diverse range of establishments including high-end, fast-food, themed, ethnic, and casual dining venues. This expansion has not only fueled economic development but also created numerous job opportunities (Shahzadi et al., 2018). Concurrently, the robotics industry has made rapid strides, with continuous innovations leading to robots capable of interpreting human thoughts and gestures (Asif et al., 2015). The COVID-19 pandemic further accelerated the adoption of robotic service providers in restaurants as health concerns and dining restrictions shifted customer preferences toward low-contact and takeaway services (UNWTO, 2020; Bartik et al., 2020). The integration of robots in roles such as order taking and food delivery has enhanced service efficiency and minimized infection risks, as noted by Hwang et al. (2021) and Garcia-Haro et al. (2021).

Despite these advancements, there remains a lack of empirical research on customer satisfaction and acceptance of robotic services, particularly in the post-pandemic context (Lee et al., 2018; Hwang et al., 2019; Seo & Lee, 2021). This study aims to address this gap by examining Malaysian customers' perceptions of robot waitstaff and their intentions to use these services, with a focus on generational differences in acceptance and adoption (Kim et al., 2021; Kautonen et al., 2015). By integrating customer intentions into the UTAUT2 model, the research seeks to enhance the understanding of technology acceptance and provide actionable insights for

restaurants considering the adoption of robotic systems (Venkatesh et al., 2012; Zemke et al., 2020). The findings are expected to reveal how age influences customer attitudes and behaviors toward service robots, thereby assisting restaurants in improving the dining experience, operational efficiency, and competitiveness in an increasingly technology-driven market (Kim et al., 2021; Zemke et al., 2020). This study aims to develop and test a theoretical model to answer the following research questions:

RQ1: Do customer acceptance and usage of robot service positively influence customer behavior and customer usage intention?
RQ2: Does age generation moderate the relationship between customer behavior and usage intention?

This study enhances the existing literature on technology adoption and application usage in the post-pandemic setting of restaurant business transactions by examining the impact of trust and age generation. In addition, this study aims to explore the awareness of the possible advantages of comprehending customer usage intention in relation to the utilization of customized robot service technologies.

2. Literature Review

Restaurant Industry and Technology

The competitive nature of the restaurant industry compels business owners to continually develop new strategies aimed at increasing revenue and enhancing customer satisfaction (Huber et al., 2010). The growing tendency of consumers to dine out—largely influenced by hectic work routines and reduced time for home cooking—has contributed to significant expansion in the sector. In response to these evolving consumer habits, restaurateurs have been motivated to adopt more creative marketing approaches to differentiate their businesses and attract a broader clientele (Barrish, 2012).

In Malaysia, the food service industry faces increasing challenges, including the influx of diverse international cuisines (Harrington & Schaefer, 2014). The abundance of food options has made it difficult for restaurants to stay competitive. Globally, the food service industry is a major economic sector with producers and customers spread across various regions (Lee & Ha, 2012). As Malaysia's economy continues to grow, especially in the food service sector, businesses must adopt aggressive marketing strategies to attract and retain customers (Kimes, 2008). One such strategy involves integrating technology into restaurant operations, such as displaying visual representations and nutritional information on menus (Buchanan, 2011; Huber et al., 2010; Hsu & Wu, 2013).

Robot Service in the Food Service Industry

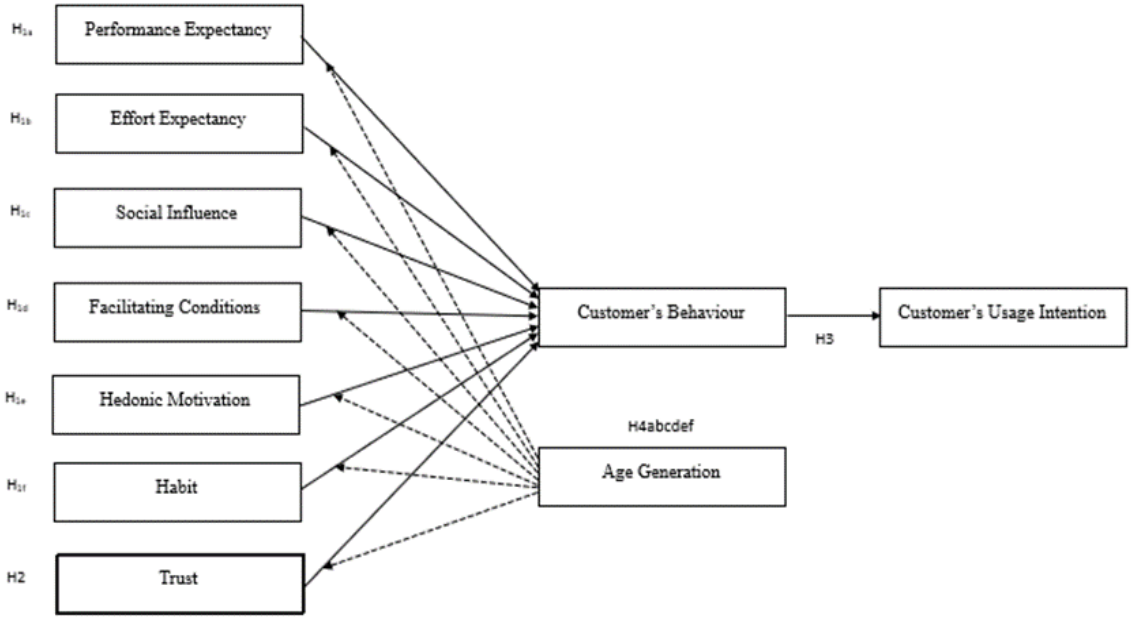
Robots are defined by the International Organization for Standardization (ISO) as actuated mechanisms that are programmable across multiple axes with a certain degree of autonomy. Robots fall into two main categories: industrial robots and service robots. According to the International Federation of Robotics (2016), service robots are autonomous entities that perform useful tasks for humans or equipment in non-industrial settings without needing human interaction. Service robots can be further divided into personal service robots, used in non-commercial settings like automated wheelchairs, and professional service robots, used for tasks like deliveries or cleaning in commercial environments. The operation of professional service robots often requires a human operator to initiate, monitor, and terminate activities (Zemke et al., 2020).

Service robots are designed to enhance human productivity and engage in social interactions through sensing, cognition, and action (Chan & Tung, 2019). Before service robots became widespread, industrial robots were used in manufacturing as early as the 1960s to reduce production costs and protect workers from hazardous tasks (Bard, 1986; Chan & Tung, 2019). These robots were mainly employed in tasks like welding, polishing, and assembly to replace manual labor (Chan & Tung, 2019). As robotic technology advanced, service organizations began integrating robots into customer interactions to support employees and provide services (Chan & Tung, 2019).

The adoption of robotic technology in restaurants offers several potential benefits. Robotic restaurants may attract technology enthusiasts who are eager to experience the latest innovations (Ivanov et al., 2017). According to Eksiri and Kimura (2015), younger generations of tech-savvy individuals are more likely to have

a positive attitude toward the use of robots in restaurants, which can help differentiate robotic restaurants from their competitors. Moreover, robots offer practical advantages over human employees, as they are not prone to illness, do not require vacations, and do not complain, making them a reliable option for consistent service (Berezina et al., 2019).

Figure 1: **Depicts the interrelationships between customer acceptance and usage of robot service and their usage intention in a restaurant setting.**



Hypotheses development

To understand customers' technology usage patterns, it is important to explore their expectations regarding its functionality (Ariaeinejad & Archer, 2014; Escobar-Rodriguez & Carvajal-Trujillo, 2014; Raman & Don, 2013; Venkatesh et al., 2012). "Customers are likely to adopt a technology if they believe it will help them accomplish tasks more efficiently (Venkatesh et al., 2012). In this context, performance expectancy relates to customers expecting quicker and more accurate service from robots. In using technology, customers are somewhat influenced by external factors, driven by the utilitarian aspects of technology, such as its perceived usefulness and expected outcomes (Venkatesh et al., 2003). "Perceived utility" (Phonthanukitithaworn et al., 2016) involves customers' expectations of how the service will enhance their ability to complete a transaction successfully. It is generally believed that using technology to save time and effort is beneficial. Therefore, this study suggests that individuals' perceptions of the usefulness of AI-powered food service establishments significantly shape their views, as supported by previous research (Liébana-Cabanillas et al., 2017; Upadhyay & Jahanyan, 2016).

H1a: Performance expectancy positively affects customers' behaviour.

According to Venkatesh et al. (2012), effort expectancy refers to an individual's perception of how simple and straightforward a particular technology is to use. As technological innovation progresses, users encounter increasingly advanced features, with user-friendliness often exemplified through tools such as touchscreens, graphical user interfaces, and diverse input devices (Mroz, 2013). Within the context of this study, effort expectancy pertains to customers' perception of the ease with which they can operate robot services—a factor that significantly shapes both initial acceptance and ongoing engagement. Prior studies have established a strong connection between perceived effort and users' behavioral responses toward technological systems (Ariaeinejad & Archer, 2014; Escobar-Rodriguez & Carvajal-Trujillo, 2013; Raman & Don, 2013; Venkatesh et al., 2012). Alalwan et al. (2017) observed that individuals tend to perceive new technologies as accessible and efficient. Additional research has reinforced the importance of perceived ease of use, often referred to as effort

prediction, in influencing adoption behavior (Davis et al., 1989; Alagoz & Hekimoglu, 2012; Alalwan et al., 2016; Okumus & Bilgihan, 2014). Ivanov et al. (2017) highlighted the role of computer-based services in enhancing operational productivity and alleviating workload, while Kwak and Park (2012) indicated that such technologies contribute to improved service standards and cost efficiency. Furthermore, Wirtz et al. (2018) stressed that customer receptiveness to service robots is contingent on how effectively these machines fulfill users' functional, interpersonal, and emotional expectations.
H1b: Effort expectancy positively affects customer behavior.

Social influence refers to the extent to which a person perceives that important others believe they should adopt a new technology system (Venkatesh et al., 2003). Research by Ouattara (2017) and Venkatesh & Davis (2000) has demonstrated that social influence significantly impacts behaviour. This influence is rooted in the internalization of the social system's culture, often referred to as "social impact" (Huang & Kao, 2015). Studies have also shown that age moderates the relationship between social influence and purchasing power (Okumus, 2018; Venkatesh, 2013). Social interaction plays a crucial role in spreading innovative technologies, with Hwang et al. (2019) finding that customers use drone food delivery services to stand out. Similarly, Chuah et al. (2021) examined how different types of value functional, emotional, social, epistemic, co-creative, and conditional influence customer behaviour towards robot waiters, including their willingness to use and pay more for these services. Since effort is a finite resource, customers are more inclined to adopt technologies that are easier to use (Yang, 2017). Factors such as the diversity of the restaurant's clientele, customer engagement, and the establishment's reputation and perceived legitimacy can all influence social impact.
H1c: Social Influence positively affects customer behavior.

Facilitating conditions, as defined by Venkatesh et al. (2012), pertain to customers' perceptions of the resources and support available to them for performing a specific behaviour. This concept is a well-established predictor of user acceptance and behaviour across various fields, including healthcare (Ariaeinejad & Archer, 2014; Zhou et al., 2010), mobile tour guides (Lai, 2013), and internet banking (Foon & Fah, 2011). Customers are more likely to use automated services, have positive experiences, and make recommendations if they believe that supportive conditions are in place. For instance, providing clear instructions and support for using robot services in restaurants such as user-friendly interfaces and responsive staff can enhance customer satisfaction. When customers receive thorough guidance and support, they are more likely to view the restaurant positively due to their successful interaction with the robot service.
H1d: Facilitating Conditions positively affect customer behavior.

Hedonic motivation, one of the additional components introduced into the original Unified Theory of Acceptance and Use of Technology (UTAUT), is defined as the pleasure or satisfaction derived from using technology (Venkatesh et al., 2012). This component enhances the model by integrating intrinsic motivation alongside the existing focus on extrinsic motivation related to performance expectancy (Venkatesh et al., 2012). The importance of hedonic motivation in technology acceptance has been supported by various studies on customer technology use (Wang et al., 2013; Venkatesh et al., 2012; Magni et al., 2010; To et al., 2007). Scholars argue that hedonic motivation significantly influences technology adoption and use due to the enjoyment and pleasure it provides (Arenas Gaitán et al., 2015; Baptista & Oliveira, 2015; Huang & Kao, 2015). From a hedonistic perspective, customers are inclined to seek pleasure and satisfaction in their interactions with products or services, including robotic systems for food delivery or customer engagement, which can result in positive experiences and increased customer satisfaction.
H1e: Hedonic motivation positively affects customer behavior.

Venkatesh et al. (2012) incorporated the concept of habit into the Unified Theory of Acceptance and Use of Technology (UTAUT), defining it as the predictable patterns in technology usage behaviour (Escobar-Rodriguez & Carvajal-Trujillo, 2014). Habit influences technology use through two main perspectives: the "habit/automaticity perspective" (HAP), which views technology use as an automatic response to habitual actions (Kim et al., 2005; Limayem et al., 2007; Venkatesh et al., 2012), and the "instant activation perspective" (IAP), which emphasizes the role of cognitive processes in forming habits through continuous use (Kim et al., 2005; Venkatesh et al., 2012). Venkatesh et al. (2012) found that individuals' desire to engage in activities is closely linked to their actual behaviour. Research by Morosan and DeFranco (2016) and Singh and Matsui (2017) shows that habitual behaviour and technological proficiency significantly affect system use, while

Palau-Saumell et al. (2019) highlight that technology usage patterns in restaurant settings are a key determinant of actual use.
H1f: Habit positively affects customer behavior.

Trust refers to the confidence placed in another party whether a person or a system to carry out responsibilities reliably and fulfill expected obligations, thereby promoting loyalty and effective interaction. It plays a vital role in sustaining assurance and interpersonal or institutional relationships, especially under uncertain conditions. In the context of technology acceptance, trust profoundly influences users' perceptions of security, ambiguity, and perceived risk. Liébana-Cabanillas et al. (2016) emphasized that trust contributes to enhanced user satisfaction in mobile banking environments. Although much of the existing literature on trust is based on self-reported evaluations, advancements in artificial intelligence and machine learning have enabled the development of algorithmic models that offer more objective and predictive insights into trust formation (Kaushik et al., 2015).
H2: Trust positively affects customer behavior.

Usage intention, which includes intent to use and willingness to pay more (Oliver, 2014), is shaped by positive evaluations of a product or service (Davis, 1989; Fishbein & Ajzen, 1977). In the context of robotic restaurants, this intention depends on the user's understanding of the technology and can be influenced by service issues (Lee & Lee, 2009; Go et al., 2020). Factors such as perceived value, ease of use, and social influence affect the likelihood of using robots (de Kervenoael et al., 2020; Gursoy et al., 2019). Overall, usage intention strongly predicts actual technology adoption (Taylor & Todd, 1995; Ajzen, 2002; Raman & Don, 2013).
H3: Customer behavior influences customer usage intention.

3. Research Methodology

This study investigates customers' behavioural intention towards the usage of robot services by analysing the causal relationship between constructs and variables, following the positivist method. The study data were acquired using a cross-sectional approach. The focus of this study is on persons who utilised robot service technology at eateries during the COVID-19 pandemic's movement control order (MCO). The MCO, or Movement Control Order, is a set of nationwide quarantine measures enforced by the Malaysian government in response to the COVID-19 pandemic. These restrictions were initiated on 18 March 2020. During the Movement Control Order (MCO), businesses were permitted to operate with limited human interaction, leading to an increased utilization of robot service by foodservice operators.

The survey items utilized in this inquiry (refer to Appendix 1) were adapted from previous studies (Parasuraman and Colby, 2015; Lien et al., 2011; Parasuraman et al., 2005) with minor modifications in language and substance to correspond with the research objectives. To align the questionnaire with the study's goals, modifications were applied to selected items while retaining their original meanings. The researchers employed a five-point Likert scale. The questions were developed in English and Malay. A pilot study was conducted to enhance the reliability and precision of the questionnaire. Based on the GPower minimum sample size calculation, a minimum of 163 respondents is required. The poll link was mostly disseminated on Facebook and WhatsApp through the snowball method. The participants were screened based on whether they had encountered any robot service at the restaurant. This is an important aspect to consider. At the beginning of the survey, each participant received a consent form. Then, they were assessed using a set of questions to determine if they met the precise requirements for participation.

The participants are Malaysian persons with prior proficiency in utilizing robot service technologies. Information was collected over three months. The surveys were collected via online questionnaires administered using Google Forms. The survey URLs were shared via social media platforms and actual QR codes were distributed at certain locations to guarantee broad distribution and engagement of participants. The research was performed utilizing a substantial dataset of 240 responses. The descriptive analysis was performed with SPSS version 24. Before performing hypothesis testing, the data were analyzed for any potential common method bias using Harman's single-factor test (Koh et al., 2003). Before conducting the structural equation modelling investigation, the data were tested for common method bias. Because the research data did not match the normality condition, this study used the variance-based technique known as

partial least squares-structural equation modelling. Partial least squares-structural equation modelling is suitable for this study environment when using a predictive strategy, addressing a complex structural model, and when the data distribution deviates from normality. The SmartPLS3.1.1 software is utilized for the validation of measurement and structural models.

Demographic profile

Of the 225 total respondents, 41.8% (n= 131) were men, while the female respondents were fewer than the male respondents by a noticeable slight margin. Meanwhile, 24.4% (n= 55) of the respondents were 18–24 years old, 51.6% (n= 116) respondents were 25–34 years old and 8.90% (n= 20) respondents were 35–44 years old. On the other hand, 66.70% (n= 150) of the respondents were single, while 33.30% (n= 75) were married. Most of them have a bachelor's degree (34.7%; n= 78), while 25.30% (n= 57) of the respondents have a master's degree. Respondents with diploma certificates were the third-largest group, reflecting 7.4% (n=59). Next, the data set comprises responses from 225 individuals, delineating various occupational categories as follows: 18.2% (n=41) identified as holding executive positions, while 20.9% (n=47) described their roles as non-executive. Further, 8.9% (n=20) reported involvement in their business endeavors, and 3.6% (n=8) indicated senior management positions. The largest cohort among respondents was students, constituting 41.8% (n=94), followed by retirees at 2.2% (n=5), and individuals not currently employed at 4.4% (n=10). Correspondingly, recent literature suggests that younger customers simultaneously affect their technology acceptance behaviour (Kim et al., 2013a, 2013b; Wang and Lin, 2017; Wang et al., 2009). Besides, the importance of education level on technology acceptance behaviour is well-researched and discussed. It can be said that most respondents are highly educated and are open to using the robot service. Notably, most researchers suggest that education level is positively related to the acceptance and adoption of technology (Schepers and Wetzels, 2007; Sinha et al., 2021), which aligns with the respondents' profile characteristics.

4. Findings

Measurement model assessment

To test the proposed hypotheses, SmartPLS 3.1.1 was employed in a two-stage process: evaluating the measurement model and then analyzing the structural model. The evaluation of the measurement model (outer model) and the analysis of the structural model (inner model). As per the findings of Hair et al. (2016), the purpose of the measurement model's assessment is to determine the validity and reliability of the items that represent the constructs. During this phase, the study performed a reflective measurement assessment that encompassed internal consistency reliability, reliability of individual indicators, convergent validity of the measured construct, and discriminant validity as suggested by Sarstedt et al. (2014) and Hanafiah (2020). Figure 1 and Table 1 display the output of the assessment of the reflective measurement model, as shown in Figure 2. The model assessment process commenced by examining the loadings of each indicator. Table 1 shows that the indicator loadings scores range from 0.700 to 0.930, which indicates that the reliability is excellent.

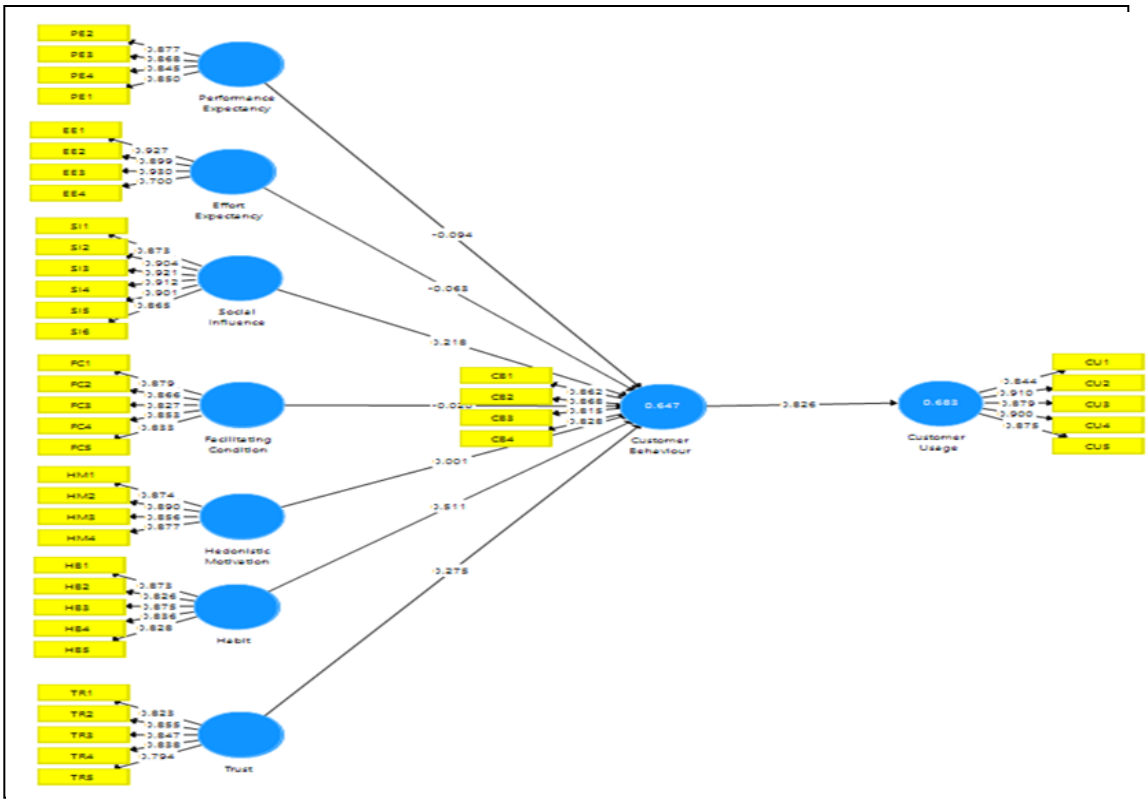
The composite dependability value for the nine constructions ranged from 0.908 to 0.946, surpassing the acceptable threshold of 0.7. The Cronbach's alpha coefficient for all constructs ranged from 0.833 to 0.928, surpassing the acceptable threshold of 0.7. Therefore, the internal consistency of the items utilized in this investigation was sufficient and verified (Bagozzi and Yi, 1988). The average variance extracted scores, ranging from 0.661 to 0.863, are above the minimum allowed value of 0.50, demonstrating a satisfactory level of convergent validity (Hanafiah, 2020).

Table 1: Reflective measurement model assessment

Latent Variable	Code	Outer Loading	Cronbach alpha	Composite Reliability	Average Variance Extracted (AVE)
Performance Expectancy	PE1	0.850	0.833	0.919	0.740
	PE2	0.877			
	PE3	0.868			
	PE4	0.845			
Effort Expectancy (EE 5 Removed)	EE1	0.927	0.887	0.924	0.756
	EE2	0.899			
	EE3	0.930			
	EE4	0.700			
Social Influence	SI1	0.873	0.951	0.961	0.803
	SI2	0.904			
	SI3	0.921			
	SI4	0.912			
	SI5	0.901			
	SI6	0.865			
Facilitating Condition	FC1	0.879	0.905	0.930	0.725
	FC2	0.866			
	FC3	0.827			
	FC4	0.853			
	FC5	0.833			
Hedonic Motivation (HM 5 Removed)	HM1	0.874	0.898	0.928	0.764
	HM2	0.890			
	HM3	0.856			
	HM4	0.877			
Habit	HB1	0.873	0.902	0.927	0.719
	HB2	0.826			
	HB3	0.875			
	HB4	0.836			
	HB5	0.828			
Trust	TR1	0.823	0.889	0.918	0.692
	TR2	0.855			
	TR3	0.847			
	TR4	0.838			
	TR5	0.794			
Customer Behaviour	CB1	0.862	0.865	0.908	0.712
	CB2	0.868			
	CB3	0.815			
	CB4	0.828			
Customer Usage Intention	CUI1	0.844	0.928	0.946	0.777
	CUI2	0.910			
	CUI3	0.879			
	CUI4	0.900			
	CUI5	0.875			

Note: N 225

Figure 2: Measurement model assessment



Structural model assessment

Structural model analysis was conducted by evaluating key statistical parameters, including path coefficients (β), the coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) (Chin, 2010; Hair et al., 2016). The analysis revealed that the explanatory variables accounted for 64% of the variance in customer behaviour and 68% in customer usage intention. To determine the significance of individual exogenous variables on the endogenous constructs, effect size (f^2) calculations were employed. Based on Cohen's (1988) guidelines, f^2 values above 0.02, 0.15, and 0.35 correspond to small, medium, and large effects, respectively. The results showed that effort expectancy, performance expectancy, and social influence exerted only a minor influence on customer behavioural responses.

Meanwhile, the study found that changes in trust have a large effect on customer behaviour. Besides this, the changes in customer behaviour greatly affect customer usage intention. The rest of the construct reports a limited effect on customer behaviour. The path model's predictive accuracy (Q2) on customer behaviour is 0.447, while the Q2 value for the customer usage intention is 0.525. To conclude, customer behaviour has moderate prediction power, while customer usage intention has large prediction power. Next, the study hypotheses were tested by looking at the path coefficient (b) and the significance level (p-value). Table 2 presents the structural model's-statistics and p-value.

Table 2: Path Coefficient (β), T-Value and Significance Level

	β	T-Value	p-values	Hypothesis
Performance Expectancy -> Customer Behavior	-0.094	0.799	0.424	Not Significant
Effort Expectancy -> Customer Behavior	-0.063	0.948	0.343	Not Significant
Social Influence -> Customer Behavior	0.218	1.457	0.146	Not Significant
Facilitating Conditions-> Customer Behavior	-0.020	0.185	0.853	Not Significant
Hedonic Motivation -> Customer Behavior	0.001	0.009	0.993	Not Significant

Habit -> Customer Behavior	0.511***	4.040	**0.000**	**Significant**
Trust -> Customer Behavior	0.218**	1.870	0.062	Not Significant
Customer Behavior -> Customer Usage Intention	0.826***	29.477	**0.000**	**Significant**

*Notes: 99% confidence interval: p-value<0.00***; 95% confidence interval: p-value<0.05***

The initial hypothesis (H1a) suggests that Performance Expectancy does not have a positive impact on customer behaviour. The results suggest that Performance Expectancy does not significantly influence customer behaviour (β = -0.094, t=0.799). Thus, the hypothesis H1a is not corroborated. The second hypothesis (H1b) posits that Effort Expectancy has a negligible effect on customer behaviour. The results indicate a negative relationship between the variables, with a beta coefficient of -0.063 and a t-value of 0.948. Therefore, there is a lack of empirical data substantiating the claim of H1b. The findings do not support the third hypothesis (H1c) that suggests there is no significant and positive relationship between Social Influence and customer behaviour (β = 0.218, t = 1.457). Hypothesis H1d posits that the Facilitating Condition positively influences customer behaviour. The results suggest that the Facilitating Condition does not exert a substantial influence on customer behaviour. Therefore, there is no evidence to support H1d. The fifth hypothesis (H1e) asserts that there is no association between Hedonic Motivation and conduct. The results suggest that Hedonic Motivation does not have a statistically significant effect on customer behaviour (β = 0.001, t=0.009). Thus, the proposed hypothesis H1e is not substantiated.

However, H1f has a favourable impact on customer behaviour. The findings indicate that the Habit has a substantial and beneficial impact on customer behaviour (β = 0.511***, t = 0.762). Therefore, the stated hypothesis H1f is confirmed. Additionally, the variable H1g has a detrimental impact on customer behaviour, with a coefficient of 0.218** and a t-value of 1.870. Nevertheless, it is crucial to acknowledge that these effects lack statistical significance. Conversely, the third hypothesis (H3) proposes that customer behaviour has a favourable influence on customer usage intention, supported by a statistically significant p-value of 0.000 and a substantial β coefficient of 0.826***. The β coefficient measures the extent to which each independent variable (IV) affects the dependent variable (DV). As the β coefficient grows, the influence of the independent variable (IV) on the dependent variable (DV) becomes more significant.

Moderating effects

According to the direct effect model (refer to Table 3), the findings indicate that Age Generation has a negative moderating effect on the link between Customer Behaviour and Customer Usage Intention (β=-0.831; t=0.579; p-value=0.563), and this association is not statistically significant. The negative beta value indicates that Age Generation has a detrimental impact on the correlation between Customer Behaviour and Customer Usage Intention. Thus, H4 was deemed invalid.

Table 3: Moderating Effect of the Age Generation

	Beta (β)	T Statistics	P Values	Result
H_4: Customer Behavior + Age Generation -> Customer Usage Intention	0.831	0.579	**0.563**	**Not significant**

*Notes: 99% confidence interval: p-value<0.00***; 95% confidence interval: p-value<0.05***

5. Conclusion

This study offers a comprehensive understanding of the primary determinants shaping the adoption of robotic services in restaurant settings, as well as their influence on customer behaviour and usage intentions. Robot-based service solutions have emerged as an innovative trend in the foodservice sector, offering a dynamic and efficient operational model tailored for restaurants. Survey results indicate that customers generally perceive these services as enjoyable, user-friendly, time-saving, and engaging. Additionally, the findings suggest that fostering customer trust plays a crucial role in enhancing behavioural engagement with robot services. The study also highlights the importance of investigating the factors that drive the acceptance of robotic technologies within the Malaysian restaurant context. By integrating and analysing the empirical data, this research contributes valuable theoretical insights and practical recommendations for the implementation of service robots.

Theoretical Implications

Restaurateurs need to comprehend customers' technological preferences to offer superior and contemporary services. This study significantly adds to the generation of fresh knowledge regarding the emergence of robot service technology in Malaysia's restaurant business. The analysis confirmed that only habit and customer behaviour significantly influenced customer usage intention, while the other variables did not have a significant impact. Significantly, due to the novelty of the robot service technology and its lack of financial incentives, it deterred additional adoption. Including trust in the analysis was a logical decision, as it was the most significant predictor of purchasing behaviour. Interestingly, the study found that trust did not significantly impact the adoption of robot service technology. This could be attributed to the widespread acceptance and use of technology across all age groups, which suggests that trust may not be a critical factor in influencing customer behaviour in this context. Instead, the familiarity and general comfort with using technology, regardless of age, appear to diminish the role of trust in the decision-making process.

Practical Implications

To ensure the successful integration of robot services in the food service industry, it's crucial to ignite customer enthusiasm and continuously gather their feedback for ongoing improvements. Building trust with customers is key, as businesses must demonstrate how these technologies can simplify decision-making, reduce effort, lower costs, and mitigate risks in a landscape filled with options. To further drive this evolution, additional research is needed to uncover what motivates or hinders the adoption of service robots in real-world scenarios. This understanding will enable more targeted marketing and communication strategies, effectively addressing the unique needs and concerns of diverse customer segments.

This study has profound implications for the food service industry. With the anticipated rise of robot services, food service businesses must embrace these innovations to maintain a competitive edge. However, understanding customer preferences, especially those influenced by age and cultural background is essential. The research highlights that younger customers may be more inclined to adopt robot services than their older counterparts. The current endemic environment provides a unique opportunity for the adoption of service robots, and further exploration of tailored marketing strategies is recommended to meet the distinct needs of different customer groups.

Additionally, effective promotional strategies for robotic restaurants should focus on reassuring customers about the capabilities of robot services, demonstrating that they can perform tasks just as efficiently as human staff. Aligning customer expectations with what robot services can deliver will likely boost acceptance and advocacy, benefiting restaurant owners and managers across various market segments.

This study also aims to raise awareness of robot services in restaurants among customers. Those who are innovation-minded are more likely to embrace new technological services, especially in an era that emphasizes contactless interactions. The findings provide valuable insights for businesses to develop strategies that cater to both their own needs and those of their customers, including leveraging social media to reach a wider audience and foster engagement. By aligning robot service adoption with customer expectations, the food service industry can ensure a positive experience for both businesses and their patrons.

Limitations and future studies

Data collection was completed immediately before the COVID-19 pandemic, which limits this study. The global epidemic may have altered popular attitudes about F&B service robots. Future studies must review attitudes to see if they have changed. Since industrialised countries will have a labour shortfall, food and beverage automation research should expand (Webster, 2021). Future research may examine the desire to pay for robot-delivered F&B services and how robots create memorable F&B experiences.

Overall, this study report shows that food and beverage automation will be built on a populace that understands the pros and cons of automation. The findings show the usefulness of dividing operations into automatable tasks in theory and methodology. This method shows that the public prefers robots for certain tasks. This recommends that future research should focus on activities rather than scenarios using robots, as the public seems to evaluate robot use differently based on tasks rather than grand scenarios like being given meals. The findings are intriguing because the public seems to recognise the drawbacks of robots in such procedures but

does not seem to question their suitability. The research suggests that fostering a positive attitude towards service robots will assist food and beverage operations in integrating robots. However, there is also evidence that the public will be willing to accept greater automation of food and beverage services, depending on the task, making some tasks easier to automate and less resistant to robots.

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Appendix 1

Table A1: Survey Instruments

Code	Items
PE1	Robot services have the features required to serve me.
PE2	Robot services will provide me with the help I need.
PE3	Robot services provide more accurate information than human beings
PE4	Robot services provide me with more consistent service than human beings.
EE1	Robot services provide me with more consistent service than human beings.
EE2	Robot services will be intimidating to me
EE3	Interactions with robot services will take too much of my time
EE4	My interaction with robot services is clear and understandable.
SI1	People who are important to me would encourage me to interact with the robot services
SI2	People whose opinions are valued would prefer that I interact with robot services.
SI3	People who influence my behaviour would want me to utilize robot services
SI4	People in my social networks who would interact with robot services in services have a high profile.
SI5	Interacting with robot services reflects a status symbol in my social networks.
SI6	People in my social networks who would be interacting with robot services have more prestige than those who don't.
FC1	In service encounters, guidance is available to me in the use of robot services.
FC2	In service encounters, specialized instruction concerning robot services is available to me.
FC3	In service encounters, a specific employee (or group) is available for assistance with robot services' difficulties
FC4	I have the knowledge necessary to use the robot service
FC5	Using the robot service is entirely within my control.
HM1	Using a robot service is fun.
HM2	Using the robot service is enjoyable.
HM3	Using a robot service is entertaining.
HM4	Using the robot service gives me pleasure.
HB1	The use of robot services has become a habit for me.
HB2	I am addicted to using robot services.
HB3	I must use a robot service.
HB4	Using the robot service has become natural to me.
HB5	A robot service is something I use without having any second thoughts when I go to a robot service restaurant.
TR1	I believe that robot service in a restaurant is trustworthy.
TR2	I feel assured that the robot service technology structures would prevent me from miscoding problems.
TR3	I usually trust a technology until it gives me a reason not to trust it.
TR4	My typical approach is to trust new technologies until they prove to me that I shouldn't
TR5	I generally give technology the benefit of the doubt when I first use it.
CB1	I usually use a robot service in a restaurant.
CB2	I use the robot service regularly.
CB3	I am content with my experience in using robot services.
CB4	I am delighted with my experience in using robot services.
CUI1	I intend to continue using the robot service in the future
CUI2	I plan to continue to use the robot service frequently.
CUI3	I will always use the robot service when possible
CUI4	I will often use robot services in the future.
CUI5	I will recommend others to use the robot service.

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Global Virtual Reality Safety Test Acceptance in Gastronomy Tourism Economy Sustainability

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Abstract: The burgeoning gastronomy tourism sector has witnessed an uptick in workplace accidents, exacerbating concerns about the safety of workers, especially those new to the commercial kitchen environment. Their lack of experience often translates into difficulty in identifying and addressing potential hazards. Responding to this urgent problem, an acceptance test was carried out. The purpose of this assessment was to evaluate, in culinary environments, the efficiency of a simple but immersive simulation called Culinary Safety Virtual Tour Hazard Identification Training Tools (VT-HiTT) in reducing and analyzing hazards. Underlining the transforming power of Virtual Reality (VR) technology in strengthening safety procedures across the hotel industry, the validation process run by commercial kitchen professionals, focused on quantitative evaluations, gave important new perspectives on the general adoption of virtual reality among professionals and acknowledged the natural limits of simply qualitative methods. The largely favorable comments highlight VR's exciting path in raising workplace safety standards. These positive results significantly inspire legislators to include VR smoothly into safety training programs designed especially for industrial kitchens. Such proactive initiatives will surely help to significantly reduce hazards and promote a strong safety culture all around the gastronomy industry.

Keywords: *Economic Sustainability, Gastronomy Tourism, Hazard Identification, Training tool*

1. Introduction

Technology may encourage inclusive, sustainable, fair economic development consistent with Islamic ideas of social justice and moral behavior. Through Islamic beliefs, technology helps to create a fairer and richer society using education and skill development.

This study investigates the acceptability of virtual reality (VR) technology as a training tool in the hotel industry to address its acceptance as part of modern issues, especially improving safety regulations and awareness in commercial kitchens. We provide top priority to adopting technological innovations to overcome present challenges, especially in the commercial kitchen setting of workplace risks. In this perspective, using VR technology for safety education shows attempts to support equitable and sustainable growth within the sustainability economy among digitalization and global imbalances. This study shows a proactive way to creatively address urgent problems and change with the times.

This invention is especially relevant for the expanding gastronomic tourism industry, which has seen an alarming increase in occupational accidents. This creates major safety issues for workers, particularly recent entrants to commercial kitchens who could find it difficult to spot and handle risks. In response, an acceptance test was run to assess the efficacy of the immersive simulation Kitchen Safety Virtual Tour Hazard Identification Training Tools (VT-HiTT), meant to reduce hazards in kitchen environments.

2. Literature Review

Safe Workplace from Islamic Perspectives

In Islam, respect permeates every sphere of life, including employment. Working healthily is a worship requirement, emphasizing physical well-being and religious duty. Prophet Muhammad stressed caring for one's body and making healthy work practices a form of prayer. Prioritizing well-being in the workplace fulfills

religious obligations and benefits society. The Prophet (ﷺ) said: Leave it, for destruction comes from being near disease". This hadith also suggests the need for protective measures at the workplace (hadith No. 3005 in Sahih Bukhari, Book of Fighting for the cause of Allah (Jihad). Another hadith implies that removing hazards is considered a charity for others. The Messenger of Allah (ﷺ) said, "Every joint of a person must perform a charity each day that the sun rises: to judge justly between two people is a charity. To help a man with his mount, lifting him onto it or hoisting up his belongings onto it, is a charity. And the good word is charity. And every step you take towards the prayer is a charity, and removing a harmful object from the road is a charity" (Sahih Bukhari 2989, Book 56, hadith 198). These hadiths demonstrate how ensuring safety in the workplace aligns with Islamic teachings and serves as a form of service to others, echoing the Prophet's emphasis on caring for one's community and surroundings.

Technology Adoption for Economic Sustainability

The integration of VR technology in the gastronomy tourism economy has the potential to significantly enhance occupational standards while promoting economic sustainability. VR can equip kitchen personnel with the required skills to prevent foodborne diseases and create high-quality culinary experiences using immersive and interesting training events.

The Technology Acceptance Model (TAM) argues that the public's perception of the value and usability of VR technology affects its application in the culinary hospitality industry. Research conducted by Lee et al. (2023) and Saad et al. (2023) indicates that kitchen staff members who perceive virtual reality as a means to augment their skills and knowledge are more inclined to embrace it for kitchen safety training. This indicates that the effective implementation of VR technology relies on favorable perceptions of it.

The extensive use of VR in the gastronomic hospitality industry can enhance economic sustainability by mitigating foodborne illness outbreaks, elevating the quality of the culinary experience, and promoting innovation and competitiveness. Enhanced food safety standards through VR training can mitigate significant outbreaks that may detract from the appeal of a tourist area. Exquisite food and beverages crafted by skilled culinary teams draw increased patronage and help the local economy. Moreover, VR technology can foster industrial innovation and competitiveness, thereby producing new products, services, and experiences.

In conclusion, virtual reality technology offers a fantastic chance to raise kitchen safety criteria and support economic sustainability in the gastronomic tourism industry. Effective integration of VR can improve safety in the industry by changing people's opinions of utility and user-friendliness.

Practical Training and KAP

Ensuring the successful implementation of VR-based OSH training in the gastronomy sector requires an emphasis on effective training approaches and assessment of Knowledge, Attitudes and Practices (KAP). Here, useful knowledge goes beyond the simple introduction of VR technology.

Training courses should be designed with the idea of adult learning in mind. Andragogy emphasizes a learner-centered approach, active participation, and applying knowledge to current events (Sengupta, 2023). VR excels at creating plausible simulations that fit this concept because it allows students to experience potential hazards and practice safe responses in a controlled environment (Squires et al., 2022). Furthermore, adding pre- and post-VR training courses based on local safety regulations will help ensure knowledge retention and foster favorable opinions about VR technology (Seabrook et al., 2020).

Second, KAP testing helps one to ascertain the acceptance of VR training among the gastronomy sector and assess its success. Knowledge Measurement assesses, in relevant circumstances, factual knowledge of safety procedures. Students' perceptions of VR safety instructions and their compliance with industry requirements form the main subject of attitude assessment. Finally, practice tests allow culinary industry trainees to put newly acquired knowledge into safe work practices (Yeargin et al., 2020). Through a comprehensive KAP framework, stakeholders will be able to identify areas that require attention for VR training initiatives and ensure their alignment with gastronomic industry standards and practices.

In summary, to achieve successful implementation of virtual reality (VR), it is important to have effective

training techniques that use adult learning concepts and culturally aware VR situations. In addition, the KAP test offers an insightful analysis of the acceptance of VR training in the gastronomy industry and its effectiveness. Stakeholders can ensure that VR technology promotes safer and more sustainable gastronomy by focusing on practical training and KAP assessment.

3. Research Methodology

Using a triangulated approach—experimental, quantitative and qualitative—this study comprehensively examines the acceptance and experience of virtual reality technology in OSH training among professionals in the Malaysian restaurant sector. A 13-expert sample received a quantitative survey grounded on the TAM model. The survey consisted of 18 items measured on a 7-point Likert scale. Data were analyzed using Fuzzy Delphi analysis due to the small sample size. A purposive sample of 13 multidisciplinary restaurant industry professionals was selected using theoretical sampling to capture diverse perspectives. Semi-structured interviews were conducted to explore participants' experiences with VR technology. Thematic analysis was used to identify key themes. A controlled experiment was conducted to assess the effectiveness of the VT-HiTT tool. A triangulation design was used to assess the effectiveness of a VR-based safety training tool compared to traditional training methods among restaurant kitchen staff. Participants were exposed to either the VR training or traditional OSH instruction. Knowledge, attitudes, and observed behaviors were measured before and after training to determine the impact of each method on safety performance.

Data analysis involved quantitative analysis which uses numbers to find patterns in data. Qualitative analysis explores meaning in words and texts. Both methods can be used together to get a deeper understanding. Statistical tests and thematic analysis are common techniques. To enhance rigor, reliability and validity were upheld through triangulation of data, checking for accuracy, and inter-rater reliability to ensure consistency in coding and analysis. Ethical considerations included obtaining informed consent from participants, ensuring participant anonymity and confidentiality, and minimizing potential harm or discomfort throughout the research process. By incorporating these elements, you will strengthen the credibility and trustworthiness of your research methodology.

Adopted and adapted questions for this study are shown in Table 1.

Table 1: TAM-based Adopted and Adapted Questions

Intention To Use	ITU1	Assuming I had access to VR technology, I intend to use it for OSH training.
	ITU2	Given that I had access to VR technology, I predict I would use it for OSH training.
Perceived Usefulness	PU1	Using VR technology in OSH training increases my productivity.
	PU2	Using VR technology enhances my effectiveness in OSH training.
	PU3	VR technology is useful in OSH training.
Perceived Ease of Use	PEU1	While attending OSH training, interacting with VR technology requires minimal mental effort.
	PEU2	I find VR technology easy to use for OSH training
	PEU3	Getting VR technology to do what I want eases my OSH training objectives.

The first phase approached Malaysian restaurants, targeting experts in food service and OSH to answer the survey. The data was analyzed using a Fuzzy Delphi analysis due to the few responses. In addition, the qualitative approach is taken to understand the quality of the experience of using VR technology as an OSH tool; this study also endeavored to explore the acceptance of said technology by industry professionals qualitatively, as quantitative methods may not uncover all the actual implications of implementing this technology in the workplace (Anderson, 2010). To accomplish this, following Martin and Woodside (2012), a survey instrument was created to allow the interviewer to guide the discussion while allowing the participant to expound upon their own relevant experiences and enabling the interviewer to ask follow-up questions should unexpected answers surface. Specifically, we experimented with the kitchen experts with a straightforward yet immersive simulation, the Kitchen Safety Virtual Tour Hazard Identification Training Tools (VT-HiTT), registered as CRLY2022W01820.

The interview group was selected using a theoretical sampling technique to select a diverse group of participants to better understand the feelings around the industry (Corbin & Strauss, 1990; Creswell, 2007). The sample included various owners and industry professionals, including front-of-house and back-of-house management representatives, who had experience in those positions in cities worldwide. Using McCracken's (1988) long interview method, a guide was developed for the interviewer using starting questions and themes and including prompts to encourage further elaboration.

The interview participants were selected based on their current and prior experiences. Before the interview was conducted, the participants were informed of the purpose of the study and were provided with a general overview of the questions they would be asked. Nine participants were scheduled for interviews, and the interviews were conducted live in their workplaces or homes or through Zoom due to COVID-19 to provide the participants a greater sense of security as they were performed in spaces where they felt comfortable following McCracken (1988).

4. Results

Quantitative Analysis

As shown in Table 2, 13 respondents were involved in the first phase of the analysis. The kitchen-related staff, including the kitchen safety coordinator, were surveyed on their acceptance based on the TAM model, ease of use, usefulness, and intent to use the VR-based tool.

Table 2: Respondents' Profile and Codes

Respondents Code	Gender	Field Expertise	Age	Working Experience
R1	Male	Food Service	44	15 years and above
R2	Female	OSH	28	5-9 years
R3	Male	OSH	40	Below 5 years
R4	Male	OSH	30	Below 5 years
R5	Female	Food Service	29	Below 5 years
R6	Female	OSH	28	Below 5 years
R7	Female	OSH	47	15 years and above
R8	Female	Food Service	48	15 years and above
R9	Female	Food Service	33	10-14 years
R10	Female	OSH	38	10-14 years
R11	Male	OSH	34	5-9 years
R12	Male	OSH	41	10-14 years
R13	Male	OSH	28	5-9 years

Fuzzy Delphi Analysis: Table 3 presents the results of the Fuzzy Delphi method regarding the acceptance of VR. These results identify the priority of VR adoption among experts in the industry. The results show that every item for each construct recorded a threshold value (d) of less than 0.2, except for item 6 in the construct "Perceived Ease of Use." This outcome indicates that agreement has been reached on every point of the defuzzification process, with a consensus percentage greater than 95%.

Moreover, the consensus among the items implies that every item exceeds the 75% mark, except for item 6. Conversely, the findings for item 6 indicate a consensus of less than 75% (0.640), with a threshold value higher than 0.2 (30.77%). In other words, item 6, "Interacting with VR does not require much of my mental effort," is rejected. This suggests that VR might cause stress if it is not developed to be user-friendly, particularly for some individuals, especially older generations, who may have difficulties and are unfamiliar with technology components or systems.

As arranged in Table 2, the priority of VR acceptance can be illustrated through ranking or positioning. The findings show that the highest priority is "Intention to Use," where users believe they can use VR if they intend

to. This is followed by "Intention of Use," where users predict they would use VR if they had access to it, which ranks equally with "Intention to Use." The second rank is "Perceived Usefulness in Effectiveness," indicating that using VR is perceived to enhance users' effectiveness in safety training. Next is "General Perceived Usefulness," where users find VR useful for safety training programs. The fourth rank is "Productivity Increase," with VR believed to increase productivity. Lastly, "Ease of Use," where VR is considered easy to use and easy to access, ranks the lowest. This ranking provides insight into users' priorities and perceptions towards VR adoption, with intention and predicted usage at the top, followed by various aspects of perceived usefulness and ease of use at the bottom.

Table 3: Perceivedness of VR consumption - defuzzification process and analysis

No	Item	Condition of Triangular Fuzzy Numbers		Condition of Defuzzification Process				Experts Consensus	Accepted Elements	Position
		Threshold Value, d	Percentage of Experts Group Consensus, %	m1	m2	m3	*Fuzzy Score (A)*			
				D1: Intention to Use						
1	[Assuming I had access to VR, I intend to use it]	0.230	92.3%	0.708	0.854	0.923	0.828	ACCEPTED	0.828	1
2	[Given that I had access to VR, I predict that I would use it]	0.230	92.3%	0.708	0.854	0.923	0.828	ACCEPTED	0.828	1
				D2: Perceived Usefulness						
3	[Using VR increases my productivity]	0.270	84.6%	0.646	0.808	0.900	0.785	ACCEPTED	0.785	5
4	[Using VR enhances my effectiveness in safety training]	0.221	92.31%	0.677	0.838	0.923	0.813	ACCEPTED	0.813	3
5	[I find VR is useful for a safety training program]	0.241	92.31%	0.677	0.831	0.915	0.808	ACCEPTED	0.808	4
				D3: Perceived Ease of Use						
6	[Interacting with VR does not require a lot of my mental effort]	0.433	30.77%	0.508	0.654	0.777	0.646	REJECTED	0.646	8
7	[I find VR is easy to use]	0.316	84.62%	0.662	0.808	0.885	0.785	ACCEPTED	0.785	5
8	[I find it easy to get VR to do what I want it to do]	0.316	84.62%	0.662	0.808	0.885	0.785	ACCEPTED	0.785	5

Qualitative Analysis: Based on the results, this study decided to experiment with the tool with the kitchen experts. The tool is the Kitchen Safety Virtual Tour Hazard Identification Training Tools (VT-HiTT). Table 4 provides background information regarding the participants from several countries.

Table 4: Interviewed Participants' Profile and Codes

Code	Most Recent Position	Years	Serving Countries
EC1	Restaurant Executive Chef	20+	USA, Delaware, Maryland, South Carolina, California
CI1	Culinary Instructor, Restaurant Owner	20+	Philippines, Samoa, New Zealand, Korea
CI2	Culinary Instructor, Executive Chef	30+	Korea, Switzerland, Malaysia, Thailand, Israel, USA
CI3	Culinary Instructor, Executive Chef	20+	England, France, Spain, Singapore, Korea
HI1	Hospitality Instructor, Hotel Manager	30+	Switzerland, Korea
HI2	Hospitality Instructor, Café Owner	10 +	Portugal, Japan, Korea
M1	Hotel Food and Beverage Director	20+	USA, Iowa, New York, North Carolina, South Carolina

Content Analysis: Each respondent's interview was recorded, transcribed, and coded to determine the relevant material (Bryman, 2016; Kvale & Brinkmann, 2009). Following each interview, the interviewer reviewed the recording session to ensure the accuracy of the transcription. Interviews continued until theoretical saturation had occurred (Bryman, 2016; Kvale & Brinkmann, 2009; McCracken, 1988).

By utilizing both a quantitative and qualitative approach, this study not only improved our understanding of the effectiveness of using VR technology for OSH training but also furthered our understanding of whether those in the industry will accept this new technology. This aspect is crucial as restaurants must adapt and use the latest technology (Oronsky & Chathoth, 2007).

During the interviews, several trends emerged regarding how the industry perceives the importance of OSH and the use of VR technology to improve OSH in restaurants. First, while many participants cited the importance of safety, a continuing theme was exposed regarding the differences in views between independent and corporate restaurants. Many of the participants noted that independent restaurants often needed more resources. While owners were concerned for the safety of the employees, the overwhelming feeling was that the top priority was maintaining profitability in this very competitive industry. To illustrate this, EC1 stated in the interview that "Corporate is very attuned to hazards and mishaps and how it should be handled… privately owned, not so much. Although they care, it is not as critical…" and M1 stated that while "hotels and corporate restaurants do have the means to take on proper training… restaurants and independents often do not." M1 also noted that due to the impact of COVID-19, "there is going to be a real crunch for money, and therefore, safety and training are likely to take a back seat."

In addition to the types of businesses, the interviews also exposed differences regarding the perceived importance of safety based on geographic locations. Several participants mentioned differences based primarily on the location of the business. HI1 stated that "every country has its own 'unique' ways of getting things done, and they can be safety hazards…" While CI1 noted that "safety is more important in places where the executive chefs are more likely to have had a formal education." Another participant, CI2, did not feel that geography was a factor but did note that expectations were often different for foreign chefs who worked in Asia and insinuated that their background and training might be part of the reason.

Second, the interviews also uncovered a potential issue regarding the acceptance of industry professionals and businesses regarding VR technology. Most participants commented on the differences regarding the available resources of corporate-run companies as opposed to independent restaurants. While the majority felt corporate restaurants had the resources and would likely consider this new technology, many were skeptical regarding the acceptance of independent operators, citing the availability of resources as a powerful impediment to adopting this new technology.

Finally, all the participants commented on the advantages VR technology brings to the training environment regarding experiential learning. Being able to simulate actual work scenarios was considered very valuable. One participant, CI3, even commented on how his students and people in culinary arts are "hands-on learners… and need to experience it and do it." Later in the interview, when discussing VR technology, CI3 also remarked

that "if you can create scenarios and different situations that you wouldn't create in real life because it could be dangerous… you can kind of create an instant reaction… an instinct…" and then speculated that employees in the fast-paced culinary environment needed this. Although the first acceptance could be difficult, individuals interviewed pointed out the extraordinary possibilities of this new technology.

Discussion

While economic sustainability is important, the broad application of VR technology in the food industry can further enhance occupational safety and health (OSH) training. Through realistic and engaging training courses, VR can provide employees with the tools they need to avoid workplace accidents, injuries and illnesses. Studies have shown that VR technology is quite successful for OSH training, especially in the gastronomy industry. By allowing trainees to practice safe work practices in a controlled environment, realistic VR simulations can help retain knowledge and improve skills (McCaffrey et al., 2022).

The effective use of VR-based OSH training, however, depends on a thorough assessment of several factors. One of the main challenges is the limited resources available to many gastronomy businesses. Independent eateries and small businesses may struggle to pay for the necessary training courses and tools. Affordable VR equipment and research into financial potential can help address this issue and increase the availability of VR training. Another challenge in the food sector is cultural and geographical variation. Virtual reality training programs must meet the needs and cultures of various countries and cuisines. This may require incorporating local safety regulations, cultural standards and language options.

Despite these obstacles, VR technology has great potential to improve OSH training in the food sector. Through engaging and engaging experiences, VR can help improve employee knowledge retention, motivation and skill development. This can lead to safer and more efficient workplaces, supporting the long-term viability of the gastronomy industry. Future research should focus on developing and deploying VR training programs specifically for the food sector. These projects should combine the specific needs and constraints of businesses in the sector with best practices in OSH training and technology use. This will allow us to fully utilize VR technology to advance the occupational safety and economics of the food industry.

5. Conclusion and Recommendations

Mainly through its application in safety training in the culinary sector, this paper emphasizes the possibility of VR technology to drive sustainable economic growth. The study addresses the issues of the digital revolution and global economic inequality to demonstrate the need for inclusive and equitable use of VR. Incorporating virtual reality into food safety education offers a specific tool to improve safety standards and culture. By providing immersive and interactive learning possibilities, VR can help reduce accidents, injuries and fatalities in a variety of ways, thus creating a safer workplace for people in the culinary arts.

The research findings highlight how significantly the acceptance and use of virtual reality technology depends on knowledge, attitudes and practices (KAP). Understanding these components will enable policymakers and business players to design targeted actions to maximize the benefits of VR and encourage adoption of the technology. Educational programs, for example, could be designed to close knowledge gaps and eliminate misconceptions about VR technology. In addition, especially for small and medium-sized companies, support initiatives and incentives could help increase the adoption of VR-based safety training solutions.

This paper shows the policy and practical relevance of including VR in kitchen safety, therefore enhancing the body of knowledge already in use on the application of new technologies to enhance occupational safety and health. For legislators, business leaders, and safety experts trying to improve safety culture and support a more resilient culinary sector, it offers vital information.

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The Effect of Tourists' Shopping Experience on Their Loyalty Intention Towards Shopping Malls in Klang Valley, Malaysia

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Abstract: The fundamental aim of this study is to investigate the effect of the tourists' shopping experience on their loyalty to shopping malls in Klang Valley, Malaysia. The existing literature has been precise experiential to examine the correlation between shopping experience, service and loyalty intention. In this research, the quantitative method has been applied for data collection, and primary data collection instruments have been utilized by online questionnaire data collection methods using Google Forms and were disseminated via social media. 98 responses were gathered and used for further analysis. The methods of data analysis used are descriptive and multiple regression. The results of this investigation demonstrate a significant association between shopping experience and loyalty intention. The research findings are discussed from the viewpoint of local and international tourists.

Keywords: *Shopping Experience, Loyalty Intention, Shopping Malls*

1. Introduction

Malaysia is considered a shopping paradise because of the huge variety of goods in its malls, from high-end designer clothing and accessories to IT gadgets. Malaysian shopping malls typically have the same layout, with multiple stores that house retailers. The economic impact of shopping tourism in Malaysia is significant, which contributes to national economic growth and job creation (Azmi et al., 2022). Income from shopping tourism has increased significantly, with the sector generating billions of Malaysian Ringgit (Abidin & Mahdzar, 2021). The expansion of Malaysia's retail sector has been facilitated by the rise in the country's number of shopping malls. According to the National Property Information Centre (NAPIC), a definition of shopping complexes refers to a multi-unit retail establishment that is situated under a covered walkway, which is designed to promote pedestrian flow for the sustainability of business activity (NAPIC, 2024). Accurate tourism demand forecasting is essential to plan strategies and minimize potential negative impacts on the tourism industry, including shopping tourism (Hamzah et al., 2018). The distribution of shopping complexes by NAPIC encompasses Shopping malls, Shopping arcades, and Hypermarkets (stand-alone). Shopping malls are purpose-built retail establishments that are planned, developed, and operated as a collection of outlets within a center for commercial purposes.

The most recent data on domestic tourism trends in 2021 from the Department of Statistics Malaysia (DOSM) indicates that shopping tourism is becoming a more significant part of the tourist value chain (DOSM, 2022). This indicates that a big factor in judging the value of a vacation spot is shopping and it plays a significant role in the whole shopping experience for tourists. When a destination offers little to no shopping opportunities, it may even be the primary reason why some travelers choose to travel elsewhere. According to the DOSM's Domestic Tourism Survey conducted last year, shopping is one of the major factors influencing domestic tourists' spending in Malaysia. The following data can be used to determine how Malaysia's gross domestic product (GDP) is affected by shopping tourism. Shopping, hotel, and dining made up the top three categories of visitor spending in Malaysia in 2019 (33.6%, 24.4%, and 13.3%, respectively). This pattern underscores the significant role of retail in Malaysia's overall tourism economy (Tourism Malaysia, 2020). The travel and tourism industry accounts for between 6% and 10% of Malaysia's gross domestic product. Although the precise amount that retail tourism contributes to Malaysia's GDP cannot be accurately calculated, it is anticipated to have a significant impact on the overall earnings of the tourism sector, thus substantially affecting Malaysia's GDP. Apart from its economic impact, shopping tourism also has implications for other sectors of the tourism industry. Shopping malls in Malaysia have implemented themed and experiential purchases to meet consumer demands and maintain competitiveness (Wong et al., 2018).

The country has established itself as a shopping destination, attracting international tourists interested in the

shopping experience. The shopping environment in Malaysia provides tourists with the opportunity to immerse themselves in local culture and experience the uniqueness of the country's offerings (Azmi et al., 2022). A range of shopping options, including traditional markets, malls, and outlet malls, is available in Malaysia, with Kuala Lumpur, the capital of Malaysia, acknowledged as one of the top shopping cities globally (Abidin & Mahdzar, 2021). Mega shopping malls have the potential to shape tourists' perceptions of their destination and behavior and the role of shopping malls in providing for the shopping needs of tourists and influencing their intention to revisit is an area that necessitates further attention (Al-Sulaiti, 2022). Additionally, exploring the relationship between tourists' shopping experience and their loyalty intentions is imperative (Abidin & Mahdzar, 2021). This raises apprehensions about the satisfaction and enjoyment of tourists during their shopping experience. However, the shopping experience of tourists in Malaysia confronts several challenges and factors in understanding. Lack of unique offerings, which some malls may not offer unique or distinctive experiences, can make them less appealing to shoppers (Ganesan, 2023). These include addressing complaints about compulsive shopping, exploring shopping expectations and experience attributes, understanding the role of shopping centers and technology-enabled amenities, examining the relationship between shopping experience and loyalty intentions, and investigating the influence of store atmosphere on tourists' revisit intentions. Therefore, this study aims to analyze the effect of tourist shopping experience on loyalty intention in Malaysian shopping.

2. Literature Review

Tourist Shopping Experience

Tourists' shopping experience is an important aspect of the tourism industry, as shopping has become a major attraction and an important part of the overall tourist experience (Phucharoen et al., 2021). Tourists' shopping experiences and their intent to stick with these shopping malls may be influenced by their understanding of tourist experiences based on the theory of experiential marketing, also referred to as Strategic Experiential Modules (SEMs) by Schmitt (1999. Experiential marketing provides a robust framework for integrating elements of experience and entertainment into a product or service. In the present market, consumers evaluate products or services based on more than just quality, functionality, and benefits. Consumers pursue products, communications, and marketing strategies that offer a multisensory experience, evoke emotional responses, engage cognitive processes, and correspond with their lifestyle preferences. In other words, consumers yearn for products that offer experiential value. Schmitt identified five types of experience, which he designated as SEMs: (1) Sensory experience/SENSE, (2) Affective experience/FEEL, (3) Creative cognitive experience/THINK, (4) Physical experience/ACT, and (5) Social identity experience/RELATE. Soliha et al. (2021) further describe the five experiential elements, beginning with (1) SENSE. The senses facilitate the creation of experiences for consumers by engaging the five sensory modalities. Feel. The emotional aspect is essential to the experiential marketing strategy. Consider. Companies utilize continuous customization as a method to transform commodities into experiential offerings. (4) ACT. An act is designed to create a consumer experience concerning the physical body, lifestyle, and interactions with other people. and, Relate. Relate can be measured through several indicators, consisting of taste and social relations. This suggests that the implementation of SEMs, aimed at creating satisfying and memorable experiences, can positively influence tourists' intentions to remain loyal to products (Rosanti et al., 2014). Lemon and Verhoef (2016) also added that tourism shopping experiences may also relate to shopping environment, typology of tourists, services and product attributes, as well as the overall perceptions of the products, services, and place. This study employed SEMs to enhance client satisfaction and influence their future loyalty intentions towards the mall.

Loyalty Intention

The loyalty intention of tourists in shopping tourism is a crucial aspect of the tourism industry, as it reflects their willingness to revisit a destination and recommend it to others. Huang and Bu (2022) suggest that behavioral intention is often utilized to reflect tourist loyalty in the context of tourism research. Azmi et al. (2022) emphasize the significance of comprehending tourist experiences based on experiential marketing and their impact on loyalty intentions, particularly regarding the shopping landscape in Malaysia. Abidin and Mahdzar (2021) underscore the importance of experiential marketing in shaping visitors' shopping experiences and loyalty intentions in Malaysian outlet shopping centers. Amin et al. (2020) contend that mall attributes are crucial in predicting visitors' shopping satisfaction and behavioral intentions, including repurchase intention, loyalty, and the desire to prolong their stay. Based on the above literature, this study

proposed the following hypothesis: There is a significant relationship between visitors' shopping experience and their loyalty intentions.

H1a: There is a significant relationship between Sense experience and visitors' loyalty intentions
H1b: There is a significant experience between Feel experience and visitors' loyalty intentions
H1c: There is a significant relationship between Think experience and visitors' loyalty intentions
H1d: There is a significant relationship between the Act experience and visitors' loyalty intentions
H1e: There is a significant relationship between Relate experience and visitors' loyalty intentions

3. Research Methodology

The population of this study involved shopping malls considered super regional malls, which are classified as over 750,000 square feet with three or more department stores in Klang Valley, such as Sunway Pyramid, 1 Utama, Midvalley, IoI Citymall, The Garden, Pavilion, Paradigm Mall, Sogo, I-City and Amcorpmall. The sample size used in the study amounted to 98 performed using G-power software. A survey approach utilizing online self-administered questionnaires that were distributed via Google Forms using a link and QR code posted through social media platforms and were distributed to local and international tourists who have experienced shopping in Klang Valley shopping malls. The questionnaire's items are derived from Tsaur et al. (2007) study. A total of twenty items were used to measure shopping experience, while five items were used to measure the dependent variable, loyalty intention. A five-point Likert scale was used. Instruments were tested for reliability, and the Cronbach alpha value for all factors ranged from 0.775 to 0.944 for shopping experience and 0.855 for loyalty intentions indicating good validity and reliability. The data was analyzed using Statistical Package for Social Sciences (SPSS) software, where descriptive and regression analyses were used to analyze the relationship between the variables.

4. Results

Descriptive Analysis

The demographic profile of respondents (Table 1) indicates that 42.1 percent of these respondents were male, while 57.7 percent were female. Most of the respondents were aged 41 to 50 years old, followed by 31 to 40 years old (23.5 percent), under 20 years old 21.4 percent, 21 to 30 years old 20.4 percent, 15.2 percent aged 50 years old and above, and 9.2 percent. In terms of level of education, most of the respondents were degree holders with 30 respondents (30.6%), then Diploma background with 23 respondents (23.5%), and others include certificate level or skill certificate holders comprising 16.3 percent. Furthermore, 12.2 percent obtained Master's degrees, 10.2 percent are from high school, and 7.1 percent hold a doctoral degree. The table also reported the type of tourists, where the respondents were local and international tourists who had visited shopping malls in the Klang Valley area. Most of the respondents were local tourists, 91 respondents (92.9%) and 7 respondents (7.1%) were international tourists.

Table 1: Profile of Respondents

	Category	Frequency	Percentage
Gender	Male	43	42.1
	Female	55	57.9
Age	18-20	21	21.4
	21-30	20	20.4
	31-40	23	23.5
	41-50	25	25.5
	above 51	9	9.2
Education	High School	10	10.2
	Diploma	23	23.5
	Bachelor's Degree	30	30.6
	Master's Degree	12	12.2
	Doctoral Degree	7	7.1
	Others	12	12.4
Type of Tourist	Local	91	92.9
	International	7	7.1

Table 2 shows the tourists' perceptions of their shopping experience in shopping malls. Based on Table 2, the most important aspect of sense experience among tourists is 4.00: 'Shopping malls have good scenery'. On the other hand, the lowest mean score is 3.03, indicating that Shopping malls lack sensory appeal for tourists. The highest mean score for Feel experience is 'Shopping mall tries to put me in a certain mood' (M=3.45), and the lowest score is 'I felt bored in the shopping mall' (M=3.08). The highest mean score for the think experience in shopping is 3.82 indicating that most tourists agree that shopping malls are easily accessible and the act experience is that respondents would like to invite their friends to the shopping mall (M=3.75). Furthermore, most tourists agree that shopping malls provide a related experience, with the highest mean score of 4.21, in which shopping malls have many facilities that improve their shopping experience. The results of the descriptive analysis indicate that in general, tourists tilt towards a level of agreement, thus the perception experience of sense, feel, think, act, and relate in shopping malls has an impact on their shopping experience.

Table 2: Means and Standard Deviations (N=98)

	Mean	SD
Sense Experience		
Shopping mall tries to engage my senses	3.48	1.16
Shopping mall has good scenery	4.00	0.90
Shopping mall lacks sensory appeal for me	3.03	1.20
Feel Experience		
Shopping mall tries to put me in a certain mood	3.45	1.09
Shopping malls make me respond in an emotional manner	3.33	1.19
Shopping mall does not try to appeal to feelings.	3.19	1.28
I felt bored in the shopping mall	3.08	1.24
Think Experience		
Shopping mall is safe	3.61	1.09
Shopping mall stimulates my curiosity	3.64	0.99
Shopping mall tries to appeal to my convenience	3.68	1.04
Shopping mall is easily accessible	3.82	0.92
Act Experience		
I would love to share what I experienced in the shopping mall	3.60	1.03
I would like to take pictures in the shopping mall as mementos.	3.55	1.01
I would invite my friend to the shopping mall	3.75	0.94
I would share my experience in a shopping mall on social media	3.58	1.07
Relate Experience		
I would buy some souvenirs that are related to the shopping mall	3.31	1.18
Shopping mall induces a sense of identity towards ecological conservation	3.26	1.21
Shopping malls give me an interesting experience	3.89	0.85
Shopping mall has a variety of shops	4.11	0.82
Shopping mall has many facilities	4.21	0.85

Regression Analysis

A single-step multiple regression analysis was performed to determine whether there is a significant correlation between visitors' shopping experiences and their intent to remain loyal to shopping malls. The twenty items in the independent (shopping experience) dimension and five items in the dependent dimension (loyalty intentions) were collapsed and entered into the equation. The outcomes demonstrated that there is a significant relationship between tourist shopping experiences and their loyalty intentions towards shopping malls. Tourists' perception of their shopping mall experience was able to explain 47.1% ($R2 = 0.472$, F—F-change = 16.001, $p < 0.000$) of the variance in loyalty intentions. It shows that tourists' perceptions of shopping experience are found to significantly and positively influence their loyalty intentions. Besides that, Table 3 shows the value of the beta coefficients for this study. This study suggests that the Act experience (0.491) is the strongest influence on their loyalty intentions with shopping malls. However, out of five dimensions of experience, the Sense, Feel and Relate experiences in shopping have statistically insignificant relationships with tourists' loyalty intentions with shopping malls ($p>0.005$). The results of hypothesis testing indicate that H1a, H1b, and H1e are not supported, whereas H1c and H1d are supported in this study.

Table 3: Coefficient

Model	Unstandardized B	Std Error	Standardized Beta	Sig.
(Constant)	1.526	.318	.195	.000
SENSE	.173	.097	.195	.076
FEEL	-.003	.086	-.003	.976
THINK	-.159	.087	-.187	.001
ACT	.434	.110	.491	.000
RELATE	.218	.121	.226	.075

5. Discussion and Conclusion

The results of the descriptive analysis reveal that the perceived shopping experience among tourists at shopping malls is moderate to high (M=3.03 to M=4.21). The regression analysis results reveal that the independent variables, sense experience, feel experience, think experience, act experience, and usage experience in shopping malls, have a substantial impact on tourists' loyalty intentions. Among the elements of shopping experiences, their actual experiences have the greatest influence on their loyalty behavior. Thus, this study's findings indicate there is a significant association between think experience and act experience on their loyalty intentions to shopping malls. It implies that when elements of act and think are high in their shopping experiences, their loyalty intention increases. This study is in line with the study by Abidin and Mahdzar (2021) on the relationship between tourists' shopping experience and their loyalty intentions in Malaysian outlet shopping centers. They discovered a significant relationship between shopping experience and loyalty intentions, emphasizing the importance of comprehending the marketing aspects of the tourist experience. This finding indirectly corroborates the findings of Azmi et al. (2022) that focused on tourist shopping expectations, experience, satisfaction, loyalty, and country image in the Malaysian shopping landscape, highlighting the importance of shopping atmosphere, store service orientation, and merchandise in influencing shopping expectations and experiences.

Besides, on creative cognitive experience (THINK), a study by Amin et al. (2020), revealed that shopping mall attributes played a crucial role in predicting tourist shopping satisfaction and behavioral intentions, including repurchase intention, loyalty, and desire to stay longer at shopping malls. For example, shopping malls with creative personalization and design will influence and pose favorable impressions on consumers' loyalty to the site (Martínez-González & Álvarez-Albelo, 2021). This finding also aligns with a study by Huang and Bu (2022) highlighting the significance of physical experience, behavioral and lifestyle (ACT) shopping experience in influencing revisit intention and store loyalty. For example, Shopping mall operators are expected to cater to more entertainment activities and occasions by inviting celebrities, local festivals and cultural activities that cater to behavioral and lifestyle and enhance visitors' desire to visit shopping malls (Abidin & Mahdzar, 2021). Furthermore, to stay competitive, shopping malls may also develop an attractive and convincing physical environment to give great pleasure to their visitors. For example, adding other physical environments and ACT experiences of the shopping mall such as embedding state or country identity such as local art, local food, local merchandise, and souvenirs may act as a pull factor that may also enhance local and even international visitors' happiness and develop revisit intentions. Similar to any research study, this study's limitations including its results, cannot be generalized. The results of this study warrant careful interpretation when applied to various types of shopping malls or across different states. Additional studies with other shopping malls of different categories and at distinct times of the year, or on distinct population backgrounds should be conducted to increase the opportunity to make comparisons and gain further insights.

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Evaluating the Tourism Suitability Index and Carrying Capacity of Pangandaran Beach, West Java, Indonesia

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Abstract: Pangandaran Beach, a marine tourism destination located in Pangandaran, West Java, is stipulated as a priority tourism area and has three eminent locations, i.e., East Coast, West Coast, and White Sand Coast, all of which are famed for their natural appeals, bringing about a sharp increase in the number of visitors after the pandemic. This research explores the tourism suitability index and carrying capacity of Pangandaran Beach as a recreation tourism area. Data analysis method using the tourism suitability matrix for beach recreation and carrying capacity for tourism activities including beach recreation, swimming and sunbathing. The tourism suitability index demonstrated that the West Coast belonged to the Very Suitable category, and the East Coast and White Sand Coast belonged to the Suitable one. Furthermore, each tourism area' carrying capacity related to recreation activities at the beach, swimming, and sunbathing was 1,536 visitors per day. Policies applicable at Pangandaran Beach are also expected to cover the regulations concerning visitors' visits and tourism activities. Thus, it is necessary to manage a sustainable marine tourism development strategy and the development of various tourism activities by considering the carrying capacity so as not to damage the ecosystem.

Keywords: *Pangadaran Beach, Suitability Index, Carrying Capacity, Marine Tourism*

1. Introduction and Background

Pangandaran, West Java, Indonesia, nurtures a leading sector in tourism and is designated as a National Tourism Strategic Area (Hasibuan et al. 2019; Rizal, Apriliani, and Permana, 2021; Taofiqurohman, Zallesa, and Faizal, 2023). The swift expansion of tourism along the Pangandaran coastlines indicates a broader variety of water-based recreational activities. The number of both domestic and international visitors to these coastal areas has risen, particularly after the COVID-19 pandemic, as well as the Special Economic Zone was designated for development as one of Indonesia's international tourist destinations in March 2019. Regardless of the COVID-19 pandemic, the number of tourists visiting in 2020 and 2021 reached 2,930,506 and 3,604,128, respectively, and even at the end of 2022, it increased sharply to 3,851,962 (INEWS 2022; BPS Jawa Barat 2023). The district's five most visited beaches by tourists are Pangandaran Beach, Batukaras Beach, Madasari Beach, Batuhiu Beach, and Karapyak Beach, which have different characteristics and numbers of visits (Putri, Khadijah, and Novianti 2020). Among those five beaches, Pangandaran Beach is the most visited as it is visited by almost three million visitors (Hasibuan et al. 2019; Taofiqurohman, Zallesa, and Faizal 2023; ruber.id 2023).

Tourists also find that the East Coast, West Coast, and White Sand Coast, three areas in Pangandaran Beach, are attractive, but the ever-increasing number of tourists brings on concerns that it may harm the physical and ecological conditions of the marine tourism areas and cause unsustainable tourism. The Tourism Suitability Index (TSI) serves as a tool for evaluating an area's capability to support specific tourism activities by examining its environmental conditions and resource availability, taking various parameters into account (Renjaan and Raka Susanty, 2020; Yulianda, 2019; Lelloltery et al. 2018; Shokri and Mohammadi, 2021). In addition to assessing the suitability of a particular tourism site, another approach to evaluating a tourism area is by determining its carrying capacity. According to the United Nations World Tourism Organization (UNWTO), carrying capacity is defined as the maximum number of visitors that a tourist destination can accommodate simultaneously without causing adverse effects on the physical, economic, sociocultural, and environmental conditions surrounding the tourism area, which can ultimately affect customer satisfaction (UNWTO 2018).

Carrying capacity is strongly connected with the many tourists visiting to enjoy the attractions. The high number of tourists and carrying capacity above the threshold will affect the quality of tourist convenience, tourist satisfaction (Egi and Darsiharjo, 2014; Nian et al. 2023), and environmental degradation (Stefanica et al. 2021).

According to Suana et al. (2020) and Tan et al. (2020), A tourist area needs to be able to manage a large number of tourists, generating an environmental carrying capacity that allows tourists to enjoy the beauty of nature to the fullest and reduces environmental damage. It can also increase their awareness of the importance of protecting nature and increasing the development of natural tourism. Tourism support is oriented to the maximum number of people who visit tourist attractions without causing physical, economic, and socio-cultural damage to the environment and loss of quality, which is detrimental to tourist satisfaction (Rahmafitria et al. 2021; Renjaan and Raka Susanty 2020). Moreover, by applying the carrying capacity of nature-based tourism using zoning, it can provide recommendations for the maximum number of tourists that can be accommodated in the destination so that it can be sustainable (Rahmafitria and Nurazizah, 2022).

In this study, it is vital to investigate the extent to which Pangandaran Beach, a popular destination, can be protected for the sake of the environment without forgoing tourist convenience. The purpose of this study is to assess Pangandaran Beach's appropriateness for beach leisure tourism and its carrying capacity for activities like beach recreation, swimming and sunbathing. In addition, it is critical to develop sustainable marine tourism by considering the beach's tourism suitability and carrying capacity, which are probed here to sustain the tourism area.

2. Research Methodology

Research Location and Time

This study focused on tourist areas in the coastal areas of Pangandaran Beach: East Coast, West Coast, and White Sand Coast. The criteria used in selecting potential research locations include location accessibility, tourism activities that are already running at the location, and popular tourism destinations. This research was conducted in Pangandaran, West Java, Indonesia from July to early August 2023

Data Collection Technique

Primary and secondary data were used. The primary data was gathered through on-site and off-site observations (via Google Earth), surveys, and interviews with respondents such as visitors and local government officials. Secondary data was collected from relevant studies and literature concerning the data about Pangandaran Beach. The first was collected through direct field observation and interviews with 150 informants regarding their perceptions of the tourism location, and the secondary data was collected through a literature study and data gathered by relevant institutions, e.g., the Tourism Office in Pangandaran and the Geospatial Information Agency (BIG).

Data Analysis

Marine Tourism Areas' Tourism Suitability Index

The TSI analysis was conducted to determine if an area was suitable or unsuitable for tourism by observing available parameters and comparing them with those in a suitable area (Yulianda, 2019). Determining the coastal tourism areas' tourism suitability index (TSI) was done using the following formula (Yulianda, 2019):

$$TSI = \sum_{i=1}^{n} (Bi\ xSi)$$

n = the number of suitability parameters
Bi = the weight of the parameter i-th
Si = the score of the parameter i^{th}

Description:
Very Suitable: TSI ≥ 2.5
Suitable: 2.0 ≤ TSI < 2.5
Unsuitable: 1 ≤ TSI < 2.0
Very Unsuitable: < 1

The outcomes of multiplying the scores and weights assigned to each parameter were utilized to assess the suitability of an area for tourism activities. The overall suitability score for each parameter reflects the final result of the tourism suitability index. Based on the obtained TSI value, four categories can be identified from the tourism suitability assessment (Very Suitable, Suitable, Unsuitable, Very Unsuitable)

Marine Tourism Areas' Carrying Capacity

Researching the carrying capacity was crucial for developing marine tourism using sustainable marine resource potentials (Sun et al. 2022). Tourism Carrying Capacity (TCC) refers to an ecotourism destination's capacity to accommodate the number of visitors without jeopardizing the ecosystem(Adrianto et al. 2021; Yulianda 2019). Carrying capacity was calculated based on the maximum number of visitors a tourist area could physically accommodate at a certain time without damaging nature and human beings.

We identified the coasts' carrying capacity using the following formula (Yulianda 2019):

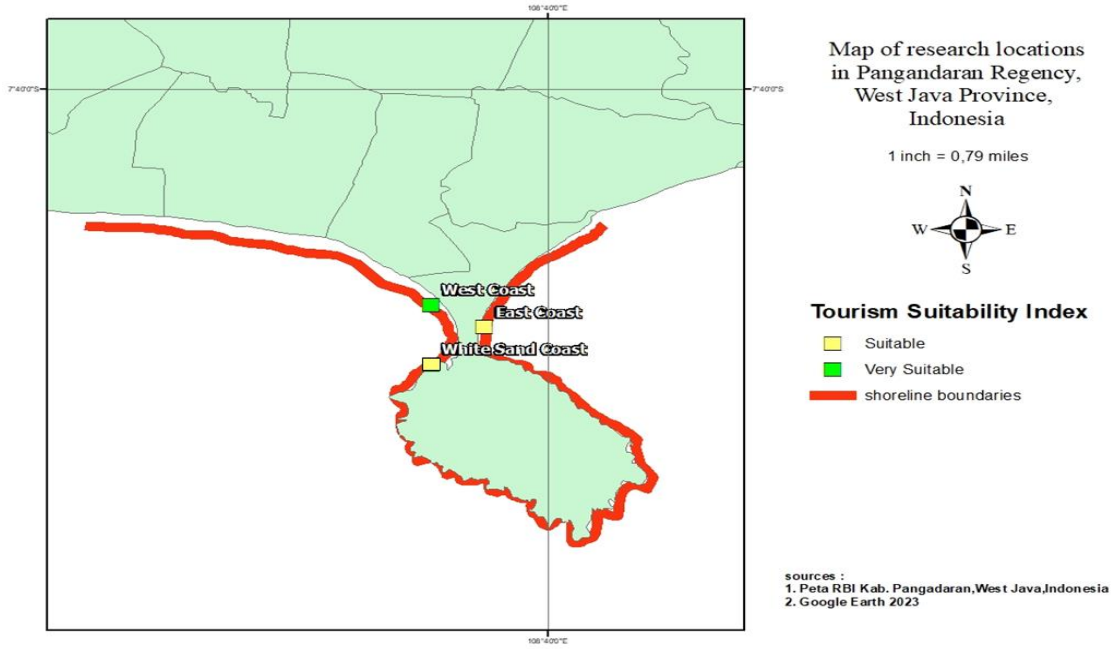
$$CC = Kx\frac{Lp}{Lt}x\frac{Wt}{Wp}$$

Where:
DDK= Carrying capacity of each tourism area (people/day)
K = Ecological potency of visitors per area unit
Lp= Width or length of each area that could be used
Lt= Area unit for a particular category
Wt= Time provided by each area to do a tourism activity in a day
Wp= Time spent by visitors on a specific activity

3. Results

Pangandaran had a 91 km line area and beaches in the southern part of Java Island, Indonesia. One of the beaches, Pangandaran Beach, was famous for its breathtaking natural beauty and a range of recreational and tourism activities that its visitors could enjoy.

Figure 1: Research Location and the Tourism Suitability Index of Pangandaran Beach



Tourism Suitability Index

Measuring the tourism suitability index relied on suitability parameters of a beach as a tourism area, and the parameters encompassed beach type, beach width, beach base material, water depth, water brightness, current

speed, beach slope, beach land cover, dangerous biota, and freshwater availability. We exhibit the tourism suitability index of Pangandaran Beach in Table 1.

Table 1: Beach's Tourism Land Suitability Matrix

Parameter	Score	Category				West Coast	East Coast	White Sand Coast
Beach type	0.2	Beach sand	White sand mixed with coral fragments	Black sand, slightly steep	Muddy, rocky, steep	0.6	0.4	0.4
Beach width (m)	0.2	> 15	> 10-15	3- < -10	< 3	0.6	0.4	0.2
Water-based material	0.17	Sand	Sandy coral	Muddy sand	Muddy, sandy mud	0.51	0.34	0.34
Water depth (m)	0.125	0-3	> 3-6	> 6-10	> 10	0.375	0.25	0.375
Water brightness (%)	0.125	> 80	> 50-80	20-50	< 20	0.25	0.375	0.375
Current speed (cm/second)	0.08	0-17	17-34	34-51	> 51	0.24	0.24	0.24
Beach slope (°)	0.08	< 10	> 10-25	> 25-45	> 45	0.24	0.16	0.24
Land cover	0.01	Coconut trees, open land	Low scrubs, savanna	High scrubs	Mangroves, settlements, harbor	0.03	0.03	0.02
Dangerous biota	0.005	None	Sea urchins	Sea urchins, stingrays	Sea urchins, stingrays, lionfish, sharks	0.015	0.015	0.015
Freshwater availability/ distance to the freshwater source (km)	0.005	< 0.5	> 0.5-1	> 1-2	> 2	0.015	0.015	0.005
Tourism Suitability Index (TSI)						**2.875**	**2.225**	**2.21**

Source: field observations and data processing, 2023-2024

Table 1 indicates that among the three studied locations in Pangandaran Beach, the West Coast was very suitable based on the parameters of a beach for recreational tourism, while the East Coast and White Sand Coast were suitable. Based on observation in the field, the West Coast of Pangandaran Beach has become tourists' favorite due to a sandy beach with a width of more than 15 meters, which offers leisure marine tourism activities like sunbathing, swimming, relaxing, sitting, playing and taking photos. The more the width beach the more spacious the area for various tourism activities (Renjaan and Raka Susanty 2020). The water depth of the West Coast near the shoreline area is within 0-3 meters, which is very suitable for swimming (Manu, Kangkan, and Saraswati 2023). However, the bright water in the White Sand Coast is clearer than the others. Both the West Coast and White Sand Coast areas, the beach slopes that tend to be gently sloping in comparison with the East Coast. The coastal land cover on both the West Coast and the East Coast is open land with coconut trees while the White Sand Coast is mangrove trees although very few. Observing the dangerous biota in marine tourism needs to be carried out due to tourists' inconvenience and disturbance. During the field, Pangandaran beach as a research location doesn't contain dangerous biota. The availability of fresh water, both on the East Coast and on the West Coast, is very close, in contrast to the White Sand Coast, which is a conservation area that is a little bit far away from the sources of fresh water.

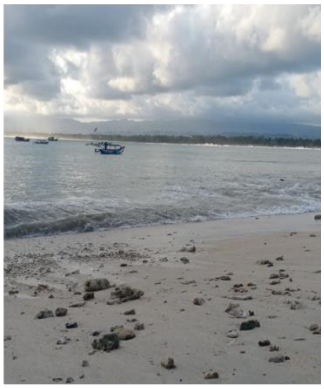
Figure 2: Tourism Suitability Index of Pangandaran Beach (West Coast, East Coast and White Sand Coast)



"VERY SUITABLE"
WEST COAST
PANGANDARAN BEACH.



"SUITABLE"
EAST COAST
PANGANDARAN BEACH.



"SUITABLE"
WHITE SAND COAST
PANGANDARAN BEACH.

Beach Tourism Areas' Carrying Capacity

The carrying capacity of a beach tourism area points out the area's capacity to accommodate visitors performing a certain activity. This study scrutinized Pangandaran Beach's carrying capacity by taking into account recreational activities at the beach, swimming and sunbathing on the East Coast, West Coast, and White Sand Coast. We present the results in Table 2.

Table 2: Pangandaran Beach's Tourism Carrying Capacity

No.	Tourism Activities at Pangandaran Beach	Carrying Capacity
1	Beach recreation	1,536 people/day
2	Swimming	1,536 people/day
3	Sunbathing	1,536 people/day

The Tourism Carrying Capacity (TCC) calculated for the three study locations shows varying results depending on the scale of tourism activities and the size of each site. For Pangandaran Beach, the maximum number of visitors it can accommodate in a single operational day, specifically for water-based ecotourism (beach recreation, swimming, sunbathing), is approximately 4.608 visitors per day. This number was determined after factoring in seasonal and weather conditions that could limit visitor activities. The calculation assumes that the tourism sites are operational for 8 hours per day. Table 2 shows that the beach's carrying capacity for each tourism activity of beach recreation, swimming, and sunbathing was 1,536 people/day at a total beach length of 19,200 m. The suitability of any attractions that could be improved at Pangandaran Beach. Tourists could perform the three tourism activities in a day but not necessarily at the same time. Efforts were made to regulate tourism activities, help visitors undertake tourism activities well, and maintain the area's carrying capacity. Besides, they prevented over-tourism and preserved the area's sustainability (Butler, 2020; Mihalic, 2020; Zekan et al., 2022). The management of tourist visits by the carrying capacity of coastal areas is crucial for achieving sustainable tourism. The carrying capacity of a beach includes the environmental limits on the number of visitors it can accommodate without damaging the ecosystem. By limiting the number of visitors to match the area's capacity, managing tourism activities to avoid disrupting the natural balance, and implementing environmentally friendly policies such as waste management and resource conservation, coastal destinations can be preserved. This effective management approach not only maintains the quality of the tourism experience but also ensures the ecological functions of the coastal areas are sustained for future generations. Moreover, based on the literature states that limiting the number of visitors was carried out to realize a sustainable use of marine tourism (Adrianto et al. 2021; Samal and Dash 2023; Nofiansyah, Akbar and Sulastri 2021; Sun et al. 2022).

4. Conclusion

To conclude, based on the results, Pangandaran Beach, as a tourism area, was very suitable for tourism recreation, particularly its West Coast, and suitable, specifically, its East Coast and White Sand Coast. The area's carrying capacity for beach recreation, swimming, and sunbathing activities was 1,536 people/day. Our study of tourism suitability and carrying capacity is expected to be the groundwork for making policies concerning Pangandaran Beach's sustainability. The limitation of this research is the short time, so further research is needed regarding the number of tourists that can be accommodated based on variations in marine tourism activities on Pangandaran beach so that it regulates the pattern of tourist visits based on tourism activities based on the carrying capacity of tourism activities.

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Conflict of interest: The authors declare that there is no conflict of interest

Author Contribution: We certify that each author contributed to the writing of this article. Purna Hindayani, as the main author contributed as primary researcher, method development, conceptual and data analysis. Fitri Rahmafitria and Heri Puspito Diyah Setiyorini as the authors contributed to the development of observation methods and designs as well as data analysis.

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Tourist Behavior Towards the Environment: Systematic Literature Review

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Abstract: This research presented in this literature review aims to examine tourist behavior towards the environment. The methodology employed is a Systematic Literature Review (SLR) with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, which includes 62 literature reviews following the preferred reporting items from The Watase Uake Research Collaboration Tools. Sources for the literature review were retrieved from several publications, including Elsevier, MDPI, Wiley, Science Direct, Springer, Sage, and Taylor & Francis. Four major aspects are the subject of this bibliometric analysis: 1) The distribution of articles on each year; 2) The number of articles that are published in each publication; 3) The distribution of articles according to the research methodologies that were utilized; and 4) The frequency of keywords that used, with a particular emphasis on those that are use the most often and those that are use less often. All the articles are categorized into various topics based on their respective categories. The themes are categorized into 1) Tourist Environmental Behavior, 2) Environmental Education and Knowledge, 3) Social and Personal Norms, 4) Others.

Keywords: *Pro-environmental behavior, tourist environmentally responsible behavior, SLR, PRISMA*

1. Introduction and Background

Sustainable Development Goals (SDGs) it is widely recognized as a set of goals put forth by the United Nations (UN), are considered as being essential for the advancement of sustainable tourism. The SDGs are intended to address global issues, among them is the sustainable environmental quality in the tourism sector. This alignment is necessary, hence that visitors to a destination are provided with the impetus to consider the merits of their decisions, and how with this holistic strategy they may select and act more responsibly while in-destination. Tourists have increased their awareness of the role they bear concerning the sustainable development of tourism, and the extent to which tourists could contribute to the economic, environmental and social sustainability of tourist destinations. It is possible to infer from that fact that tourists get informed about environmental problems, which has an impact on their attitudes and behavior towards responsible tourism practices. This consciousness has been further raised because of the COVID-19 pandemic, causing a shift in tourists' behavior toward more responsible behaviors (Eichelberger et al., 2021). This implies that companies are having to adapt to cater to the increasing demand from holidaymakers for greener solutions. The capacity of the tourist sector to protect the environment and foster sustainable development is "the role that it plays" where small tourism business already has a role in adopting sustainable business practices based on factors such as self-efficacy and situational constraints (Ernawati, 2023).

Tourists practicing ecologically sustainable behaviours, reducing waste, saving resources and supporting environmentally friendly businesses help in the protection of natural ecosystems. The perceptions held by tourists about green tourism significantly affect their attitudes and behaviors in terms of environmental preservation (Ibnou-Laaroussi et al., 2020). This positive relationship means that the more responsible the tourists are, the greater the benefit to the overall health of the ecosystem and biodiversity of the tourist destination. It is because when tourists travel, they intend to watch their surroundings. Businesses are also motivated to implement strategies that align with the tourists' expectations when considering sustainable solutions. This leads to a stronger general direction towards sustainability throughout the industry. To the extent that it affects businesses, it will stir economic consequences. This is equally relevant and crucial for potential tourists who attach significant value to the idea of sustainability: such tourists are more likely to support businesses that operate in an environmentally friendly way (Bozdaglar, 2023). These impacts could increase the income of sustainable tourism providers and motivate other businesses to adopt sustainable practices. In terms of societal perspective, proper conduct within a tourist destination promotes a social identity and responsibility shared by locals and tourists. Asmelash and Kumar (2019) established that sustainable tourism development is highly related to the satisfaction of both tourists and other local community

members. It is not uncommon for considerate tourists to contribute positively to the destinations they visit, such as promoting cultural exchange and respect between tourists and the visited local communities. As a result, the overall tourism experience can be enhanced as a result of leading to more local support for tourism-related activities.

The development of the scientific research of tourist environmentally responsible behavior (TERB) and tourist pro-environmental behavior (PEB) has resulted in substantial contributions to the understanding of antecedents that motivate sustainable behaviors in tourism. Environmental behavior plays of key role when it comes to sustainability as it encourages eco-friendly travel behaviour, supporting destination management through sustainable tourism and developing interaction with the natural environment. In this context, the educational initiatives, high-quality tourist experiences, reliable information distribution, and the use of technology can encourage tourists to behave more sustainably (Zhang et al., 2024; Gomes and Lopes, 2023; Zhang et al., 2024; Adnan et al., 2024; Dar, 2024). TERB and PEB are based on the Theory of Planned Behavior (TPB). TPB has commonly been used for explaining environmental behaviour. Azjen (1191) stated that TPB suggests that an individual performs a behavior or intends to perform a certain behavior. Three key factors affect this intention: attitude towards behavior, subjective norms, and perceived behavioral control.

Theory of TPB, TERB and PEB are often used interchangeably in research on environmental behavior. Reflecting similar concepts related to the actions and attitudes of tourists towards environmental sustainability, specifically for the theory of TERB and PEB. To promote a greater understanding of the factors affecting tourist environmental behavior, systematic literature reviews (SLR) and Preferred Reporting Items for systematic reviews and meta-analyses (PRISMA) could be applied to compile and analyze many studies focusing on TERB and PEB, which are connected to tourism-related environmental and social behavior through the Watase Uake Research Collaboration Tools.

2. Research Methodology

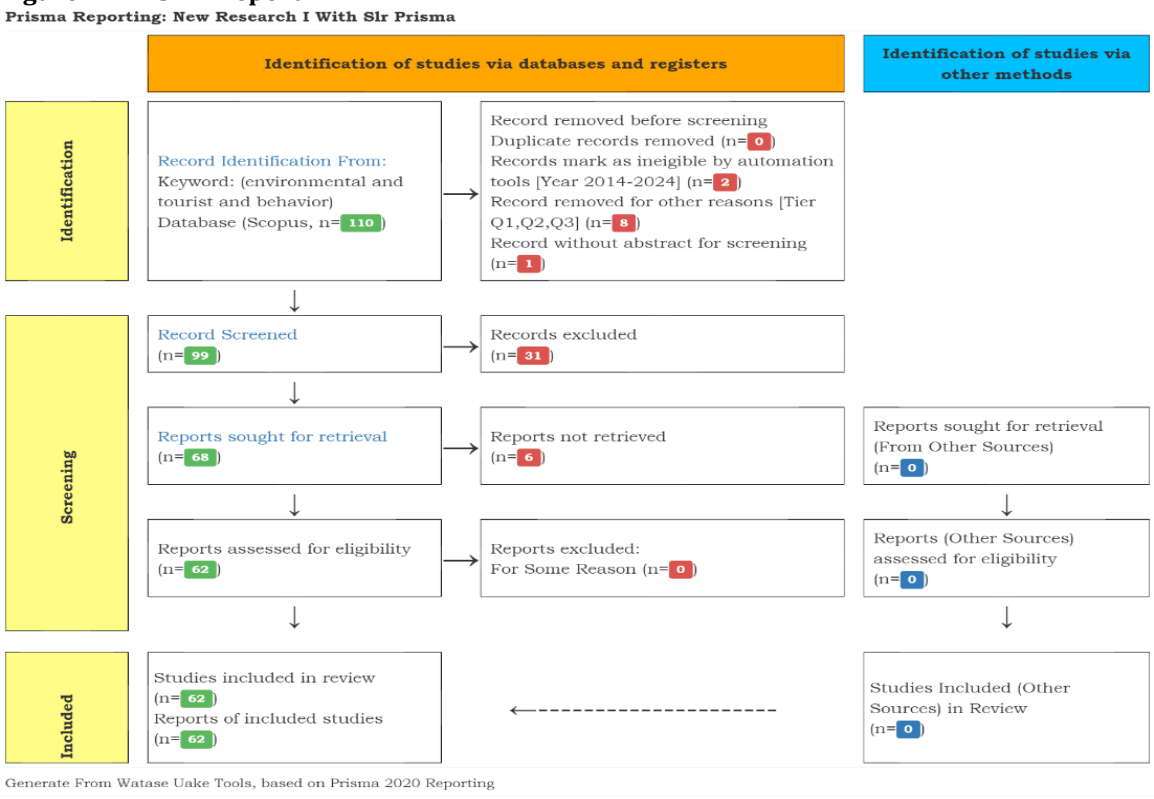
Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

Research methodology employs the systematic literature review (SLR) method, according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol. Watase Uake Research Collaboration Tools (watase.web.id) is the tool to obtain the PRISMA reporting framework result. There are several important steps to writing a literature review in this research: First, start with the identification step. This step involves the identification of relevant keywords such as: "environmental," "tourist" and "behavior". Searches are limited to English-language only articles and are narrowed down to a specific period, ranging from 2014 to 2024, in SCOPUS-indexed journals, amounting to rank Q1 to Q3. Publications such as Elsevier, MDPI, Wiley, Science Direct, Springer, Sage, and Taylor & Francis are among the prominent academic journals that are included in this collection.

The second step calls for an initial assessment of the titles and abstracts of the articles that have been found, to retain only those papers that satisfy the requirements for the keywords and are related to the aims of the research. At this step, irrelevant articles are not considered for inclusion. After the screening, all the papers that were chosen are examined to make certain that full-text versions are available, either for free or for a price, and that they are by the criteria that were specified during the identification step. If a paper does not satisfy these criteria, it will not be considered further.

The third step is retrieval, where full-text articles are examined in detail and then uploaded into the application with the intention of additional analysis. This is the stage when the source publication, the number of citations, and the ranking of the journal are noted for each article. The last part of the inclusion process entails gathering the articles that have been deemed suitable for inclusion after undergoing all rounds of screening and review, ensuring that they satisfy the initial identification criteria. Even though the Watase Uake program provides an extensive range of tools for organizing and analysing scientific material, the capabilities that are relevant to the PRISMA protocol are the only ones that are utilized in this research.

Figure 1: PRISMA Report



Bibliometric Analysis

The following four major aspects are the subject of this bibliometric analysis: 1) The distribution of publications on each year; 2) The number of publications that are published in each journal; 3) The distribution of publications according to the research methodologies that were utilized; and 4) The frequency of variables that used, with a particular emphasis on those that are utilized the most often and those that are utilized less often. It was shown in Table 1 that there were no articles recorded for the year 2014. This does not suggest that there were no articles that had the right keywords for that year; rather, it indicates that the articles that were discovered did not meet the criteria that were established during the phase of identification. The year 2022 was the year that had the highest number of articles, followed by the years 2023 and 2020. Between the years 2022 and 2023, a total of 14 articles were published, while the number of articles published reached 12 in 2023.

Table 1: Articles per Year

Year	Article Numbers Per Year
2014	0
2015	4
2016	1
2017	2
2018	3
2019	5
2020	9
2021	4
2022	14
2023	12
2024	8
Total	62

Note: Processed by the Author

The articles that were found in this research aren't limited to journals that relate to tourism and the environment; rather, they also include journals that are associated with a variety of fields, such as management, psychology, and business. According to the data presented in Table 2, the Journal of Sustainable Tourism is responsible for the greatest number of articles. The Journal of Business Research, Sustainability, and Current Issues in Tourism are the next three journals in the list. Research on tourist behavior in relation to the environment spans multiple disciplines, which reflects the interdisciplinary nature of the field. This distribution shows the fact that this research is conducted. In addition, the majority of the journals that are featured are Q1-ranked, which is another evidence of the high quality and significant effect of the research that is conducted in this area of research.

Table 2: Article Numbers per Journal

Journal	Article Numbers	Journal Rank
Anatolia	2	Q2
Asia Pacific Journal of Tourism Research	3	Q1
Business Strategy and Development	1	Q1
Current Issues in Tourism	7	Q1
Current Psychology	1	Q2
Environmental Management	1	Q1
Environmental Science and Pollution Research	1	Q1
Frontier in Psychology	2	Q1
Heliyon	1	Q1
International Journal of Environmental Research and Public Health	2	Q1
Journal of Business Research	8	Q1
Journal of Cleaner Production	4	Q1
Journal of Ecotourism	1	Q2
Journal of Environmental Management	2	Q1
Journal of Environmental Planning and Management	1	Q1
Journal of Hospitality Insights	1	Q3
Journal of Hospitality and Tourism Management	2	Q1
Journal of Mountain Science	1	Q2
Journal of Sustainable Tourism	10	Q1
Journal of Tourism and Cultural Change	1	Q1
Journal of Tourism Futures	1	Q1
Journal of Travel Research	1	Q1
Land	1	Q2
Psychology	1	Q3
Science of The Total Environment	2	Q1
Sustainability	8	Q1
Tourism Economics	1	Q1
Tourism Management	1	Q1
Tourism Recreation Research	1	Q1
Total	62	

Note: Processed by the Author

Subsequently, categorizing articles based on journal and journal rank, the next step is categorizing the articles by research methods: quantitative, qualitative and mixed-method. It has been determined that quantitative research methods are the methodology that is used most frequently among the 62 articles that were examined. Nevertheless, the prevalence of quantitative studies does not invalidate the existence of articles that make references to qualitative or mixed-methods research. These articles may not have been captured by the filtering

procedure that is included in the Watase Uake program. The possibility for methodological variety that extends beyond the scope of the current dataset is shown by this evidence, as is illustrated in Table 3.

Table 3: Research Method

Research Method	Articles Numbers
Quantitative	59
Qualitative	1
Mixed-Method	2

Note: Processed by the Author

To explore in depth, several key terms frequently recur in publications related to tourist behavior toward the environment between 2015 and 2024. Commonly appearing keywords include "pro-environmental behavior," "environmental behavior," "tourist behavior," "pro-environmental tourist behavior," and "environmentally responsible behavior." It can be concluded that the variables "pro-environment," "tourist behavior," "environmental," and "environmentally" are the most frequently employed. On the contrary, less commonly used keywords include "self-congruity," "destination personality," "values–identity–personal norms," "place satisfaction," and "activity participation." The infrequent use of these terms suggests that these areas remain relatively underexplored in the context of environmental behavior research.

Table 4: The most and least repeated keywords

Most Repeated	Least Repeated
Pro-environmental behavior	Self-congruity
Environmental behavior	Destination personality
Tourist behavior	Values–identity–personal norms
Pro-environmental tourist behavior	Place satisfaction
Environmentally responsible behavior	Activity participation

Note: Processed by the Author

During the process of SLR, a significant number of articles did not make it past the identification and screening stages. To clarify, this does not suggest that these articles are devoid of worth or importance; rather, the focus of this SLR is explicitly on the terms "environmental," "tourist," and "behavior" in relation to the tourism and hospitality industry. The identification of developing trends that could serve as focal points for future research is made possible by the analysis of the selected articles, which also provides a fuller understanding of the diversity of research that has been conducted in this field. Through the application of this understanding, the tourism industry will be able to generate a body of knowledge that is both more complete and diverse.

3. Results

All of the 62 detected articles are categorized into various topics based on their respective categories. The articles are categorized into: 1) Tourist Environmental Behavior; 2) Environmental Education and Knowledge; 3) Social and Personal Norms; 4) Others, with the findings displayed in Table 5.

Table 5: Article Categories

Category	Article Numbers
Tourist Environmental Behavior	35
Environment Education & Knowledge	5
Social and Personal Norms	7
Others	15
Total	62

Note: Processed by the Author

In the category of tourist environmental behavior, Li and Wu (2020) suggested exploring PEB from an altruistic perspective as well as collective action and social relationships. Their research extended and adapted research areas on this topic. Accordingly, it introduced a new method based on social capital theory as a framework for investigation into significant layers of interaction and involvement that impact the PEB of tourists. Integrating the elements of this theory and the goal of PEB toward tourists, researchers can have an in-depth understanding of the psychological drivers of tourist behavior. To portray a more comprehensive understanding of how PEB is formed, this research adopts the altruism and collective action concept for PEB that emphasizes the impacts of social interaction elements. On the other hand, the method by which social interaction elements influence REB reciprocity can be scientifically appraised through this interdisciplinary lens. Nature-based tourism applies with pleasant leisure experiences that foster environmental attitudes, biospheric values, and general and site-specific ecologically responsible actions. Tourists' environmental attitudes and behaviors will gradually become well-rooted, encouraging eco-friendly tourism, with beautiful natural landscapes and thought-provoking experiential participation (Lee & Jan, 2015). Another model of REB research, Environment Interpretation as a moderating role. Environmental interpretation is an essential aspect and a principal situational aspect affecting tourism environments. This research examines the impact of sightseeing locations and environmental interpretations on Responsible Environmental Behavior Intention (REBI). This research collected data to approximate how environmental interpretations impact between tourists' REBI and REB via the SEM-MGA approach. The data indicate environmental interpretations play a role as a moderator in this relationship. This illustrates the importance of creating an encouraging sociocultural environment for positive behavioral norms. Well-designed environmental interpretation strategies can greatly advance the tourist REB (Wang et al., 2018).

Moreover, in the category of Environmental Education and knowledge, Kim and Stepchenkova (2019) specified their research in the context of the value-attitude-behavior model to investigate the elements that influence environmentally conscious behavior and the loyalty of tourists in developed nature-based tourism destinations. The research makes use of the value-attitude-behavior model to investigate the factors affecting environmentally conscious behavior and loyal tourists. By attending to economic benefits resulting from re-visits and recommendations from tourists, there is a potentially active stimulus for investment in environmental conservation or protective work and related educational efforts for both locals and tourists which will bring about long-term development and sustainable tourism over the long run. In line with this research, recent research has also brought out the role of environmental education. Particularly interesting is the fact that the research demonstrates that the altruistic values of tourists have a considerable impact on the construction of their attitudes towards eco-tourism, which in turn contributes to a more pleasant travel experience. Environmental education is defined by its transient and dispersive nature, according to Yu, et al. (2024) their research's findings provide insight on the distinctive mechanism by which environmental education for tourists differs from that of schooling and civic education, demonstrating how fleeting environmental education in popular tourist destinations influences the tendency toward ERB by making visitors feel instantly good or bad about their actions and intentions regarding the preservation or destruction of nature.

Next category on Social & Personal Norms, sustainable growth of natural scenic locations relies on maintaining a healthy ecological environment, but existing norm-based regulations do not sufficiently address the subjective experiences of tourists when it comes to reducing their negative impact on the environment and increasing their positive impact. To promote sustainable environmental growth, beautiful sites can try to guide tourists' pro-environmental actions through both a rational planning path and an embodied emotion path, according to Cao et al. (2022). Following these categories are others from various research fields, such as destination social responsibility research (DSR). Sustainable tourism development requires DSR to minimize environmental consequences and help ecotourism communities economically and socially. Tourist attitudes and behaviors matter because they are special stakeholders in tourism destinations. Research shows that tourists spontaneously protect the environment. Stimulating tourists' spontaneous environmental protection improves the tourism environment and helps tourism management authorities boost tourists' pro-environmental behaviors (Li, Wu & Deng, 2022). The last category on others, on Meng & Choi (2015), focuses on slow tourism and the purchase of slow products or services with an emphasis on adjustments. To explain the formation of individuals' intentions to choose slow-tourism sites, the theory of planned behavior (TPB) was applied. To be more specific, the research had two essential components that investigated the roles that

individuals' authentic perception and environmental concern play in the creation of their intentions. When compared to the first TPB, the extended TPB that was presented here accounted for a greater amount of variation in intention. As a result, the additional constructions, when utilized in conjunction with the variables that are already present in the TPB, appear to be helpful in better describing the decision-making processes that individuals go through when purchasing slow-moving products or services.

4. Conclusion

As a result of this research, the findings of this research have provided a significant amount of information regarding tourist behavior and the environment. Regarding the current topic, 62 journal articles have been identified as relevant and published in the Scopus database with journal rank Q1 – Q3 between the years 2014 – 2024 using the PRISMA protocol. Systematic Literature Review (SLR) that is being used in this research not only helps to ensure that the results of the research are more objective and of higher quality, but it also helps to ensure that the choices that are being made are more advantageous when compared to the traditional literature review. Key findings in this research are 1) The highest number of relevant topic is 14 articles in year 2022; 2) Publication with most articles is in The journal of Sustainable Tourism by 10 articles; 3) Commonly using keywords include "pro-environmental behavior," "environmental behavior," "tourist behavior," "pro-environmental tourist behavior," and "environmentally responsible behavior"; 4) Articles divided by four category: Tourist Environmental Behavior, Environmental Education and Knowledge, Social and Personal Norms and Others. General theory to examine tourist behavior towards the environment based on the theory of TPB, TERB and PEB.

It is essential to acknowledge that the research being conducted here has a few challenging aspects. As an example, the limited keyword of the related topic in this research and period may have limited the scope of data collection. Every single article that is made during the research process is made using the Watase Uake application. For future research, it is possible to make use of the *publish or perish* and *VOSviewer* applications to widen the data collection and enhance bibliometric analysis.

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The Influence Mechanism of Virtual Influencers on Destination Brand Attachment: An Analysis Based on the Elaboration Likelihood Model (ELM)

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Abstract: This study aims to evaluate, through central and peripheral paths, how Virtual influencers (VIs) affect users' brand attachment towards destinations. Based on the Elaboration Likelihood Model (ELM), this research analyses how the attributes of Virtual Influencers (VIs), such as personalisation and anthropomorphism, influence users' brand trust and perceived enjoyment, which in turn impact brand attachment. The analysis is based on 388 valid questionnaire responses using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results indicate that the information quality and interaction quality provided by VIs significantly enhance users' brand trust, while personalisation and anthropomorphism boost perceived enjoyment, thus facilitating the formation of brand attachment. Furthermore, the studies confirm the moderating effect of brand self-congruity in the link between brand attachment and trust. Based on the findings, the study also offers recommendations for Destination Marketing Organizations (DMOs), suggesting that DMOs should emphasize the development of personalization and anthropomorphic characteristics in virtual influencer (VI) marketing to increase user brand loyalty.

Keywords: *Virtual Influencer, Destination Brand Attachment, Elaboration Likelihood Model (ELM), Destination Brand Self-Congruence.*

1. Introduction and Background

The tourism marketing sector has been significantly impacted by the rapid advancement of artificial intelligence (AI) technologies in recent years. Against this backdrop, a noteworthy phenomenon is the rise of virtual influencers (Vis) (Bulchand-Gidumal et al., 2024; Gaur et al., 2021; Sharma et al., 2022). VIs are digital characters created through AI technology and computer-generated imagery (CGI), garnering significant attention on social media platforms (Yu et al., 2024). In the tourism sector, VIs have emerged as brand ambassadors, helping to shape destination brands, attract substantial attention to tourist destinations, and foster brand loyalty (Choi et al., 2024).

In China's social media area, VIs have emerged as a new cultural phenomenon and are gradually permeating various fields, including the marketing of tourist destinations (Luo & Kim, 2023). Many well-known tourist destinations and cities have begun creating and operating their exclusive VIs to promote their unique features effectively (Conti et al., 2022; Meng et al., 2025). For instance, "Tianyu" serves as the virtual ambassador for the renowned tourist destination of the Mogao Caves in Dunhuang, Gansu Province, with her image design closely integrated with the cultural essence of the Mogao Caves (Yuan & Anuar, 2024).

Therefore, as "ambassadors" for tourist destinations, VIs not only help to shape a more appealing brand image but also enhance tourists' engagement and loyalty, which is conducive to forming positive brand attachments (Kim & Park, 2023; Na et al., 2023). In the research field related to VI marketing, scholars have primarily focused on analysing the influence of VIs, attempting to quantify their performance on social media, including follower counts, engagement rates, and content quality (De Brito Silva et al., 2022; Melnychuk et al., 2024; Stein et al., 2022). Additionally, user acceptance and perception are other important areas of study, with a focus on how VIs, as Key Opinion Leaders (KOLs) on social media, impact tourists' cognition and thereby promote awareness and preference for tourist destinations (De Cicco et al., 2024; Liu & Lee, 2024).

However, there are some gaps in these studies. On one hand, most current research is limited to descriptive analysis and lacks a systematic theoretical framework to comprehensively explain the mechanisms by which VIs endorse the image of tourist destinations (Meng et al., 2025; Xie-Carson et al., 2023). On the other hand, existing research often overlooks the differences in cognitive processing that audiences exhibit when handling

information conveyed by VIs (Park et al., 2024). Different audiences may process information through different paths depending on their psychological states, leading to varying attitude changes (Farivar et al., 2023). Furthermore, how to delve deeper into the psychological mechanisms behind VI endorsements and how these mechanisms affect brand attachment to destination brands is an issue that is often neglected in research (Zhou et al., 2024).

The study examined how VIs influence the degree of brand attachment to tourist destinations from both central route and peripheral route viewpoints, considering the research gaps based on the ELM. Employing PLS-SEM aims to address the current research's lack of a comprehensive theoretical framework, providing a more holistic model that reveals the specific psychological mechanisms through which VI endorsements enhance brand attachment to tourist destinations. Additionally, the study examined the moderating role of Destination Brand Self-Congruence in this process. The study aims to enhance the research community's understanding of the psychological mechanisms underlying virtual influencer (VI) endorsements for tourist destinations, thereby providing strategic guidance for Destination Marketing Organizations. The insights are expected to strengthen destination brand influence, enhance visitor experiences, and promote the adoption and innovation of VIs within the tourism marketing industry.

2. Literature Review

A VI is a digital character created through Computer-Generated Imagery (CGI) and AI technologies, primarily interacting with audiences via social media platforms, and has gradually become a new form of digital marketing tool (Allal-Chérif et al., 2024; Sookkaew & Saephoo, 2021; Yu et al., 2024). Compared to traditional influencers, VIs possess a high degree of malleability and controllability. Not only can their image designs be tailored to meet specific brand requirements, but their behaviours can also be optimised through algorithms and 3D modelling, thereby enhancing marketing effectiveness (Laszkiewicz & Kalinska-Kula, 2023). In recent years, academic research on VIs in the field of digital marketing has been increasing, with many studies focusing on the recognition of their identities and the credibility of the information they generate (Lou et al., 2024). Research indicates that, although VIs are not real individuals, their image design and behavioural patterns can win the trust of audiences through highly anthropomorphic expressions (Arsenyan & Mirowska, 2021; Lee et al., 2024). Researchers have explored various influencing factors, such as the visual realism of the VI, the authenticity of the information, and the interactivity with followers (Lou et al., 2023; Yu et al., 2024). Additionally, research has also examined whether brands establish a VI identity that aligns with user expectations when using VIs for brand promotion (Arsenyan & Mirowska, 2021; Koles et al., 2024).

About the emotional and cognitive dimensions of virtual influencers (VIs), research suggests that they not only attract audiences visually but also influence their emotional experiences and cognitive responses through multi-level emotional interactions and content presentation (Ham et al., 2024; Lim & Lee, 2023). Scholars have also explored how VIs enhance the interactivity between brands and audiences, thereby increasing the cognitive and emotional value of the brand and improving marketing effectiveness (De Cicco et al., 2024; Ozdemir et al., 2023). Specifically, the personification of the brand and the formation of brand attachment play crucial roles in this process (De Brito Silva et al., 2022; H. Kim & Park, 2023).

Although academic studies on VIs have advanced, some research gaps still need to be addressed. Much of the current literature on virtual influencers (VIs) tends to emphasise consumers' initial perceptions, while giving relatively limited attention to the longer-term implications of these perceptions. Moreover, how VIs contribute to brand attachment and loyalty, especially through distinct psychological processes, remains underexplored and calls for further empirical investigation.

The ELM, proposed by Petty and Cacioppo in the 1980s, serves as a dual-process model for explaining the persuasion process ("The Elaboration Likelihood Model of Persuasion," 1986). The core idea of the ELM is that when people receive persuasive messages, there are two distinct cognitive routes: the central route and the peripheral route (Andrews & Shimp, 1990). Through the central route, the persuasive message undergoes cognitive processing, and the audience evaluates the message based on its quality and relevance. In contrast, through the peripheral route, the audience relies more on external cues, such as attractiveness or simple emotional responses, to make judgments with less cognitive processing (Petty & Cacioppo, 2012).

In the field of tourism marketing, studies employ the ELM model to examine how consumers process information related to tourist destinations. When consumers choose a tourist destination, they may make decisions based on detailed descriptions and travel reviews, which are typical characteristics of the central route (Guo & Pesonen, 2022). When attractive visuals or celebrity endorsements influence consumers in destination advertisements, they may rely more on the peripheral route for decision-making (El Hedhli et al., 2021). In applying the ELM model, tourism marketing researchers often explore the impact of different routes on consumer attitudes. Some studies suggest that information processed through the central route is more likely to result in enduring attitude changes, which significantly affect loyalty to the tourist destination (Dedeoğlu et al., 2021). While the peripheral route may lead to short-term attitude changes, its durability and persuasiveness are relatively weaker (Petty et al., 1999). Therefore, establishing good tourism marketing strategies depends on knowing the route choices of consumers under various conditions.

Like traditional human influencers, VIs can influence consumer attitudes and behaviours through various channels (Meng et al., 2025). On the central route, VIs can prompt deep thinking and the formation of stable attitudes by providing high-quality information, such as detailed travel guides and destination recommendations (Park et al., 2024). When processing information through the peripheral route, consumers may be impacted by virtual influencers (VIs) who present visually engaging, interactive, and human-like characteristics. These surface-level cues can subtly shape emotional responses and influence behavioural intentions (Yang et al., 2024). Within this context, the Elaboration Likelihood Model (ELM) provides a useful conceptual framework for exploring the nuanced ways in which VIs exert influence across different levels of consumer engagement.

AI-generated Information Quality (GQ) refers to the performance of content generated by artificial intelligence algorithms across multiple dimensions. The core idea is to use AI algorithms to generate content that is both creative and of high quality (Cao et al., 2023; Du et al., 2023). In the study of VIs, the quality of AI-generated information is considered a crucial indicator of the credibility of the information source (Allal-Chérif et al., 2024; Yu et al., 2024). Information produced by advanced AI systems, when of high quality, tends to demonstrate strong accuracy and contextual relevance. Such content not only addresses the informational needs of users but also promotes clearer understanding and greater trust through its coherent and accessible presentation (Sands et al., 2022). Prior research further suggests that the perceived credibility of a source is frequently linked to the quality of the information it provides, with higher quality often reinforcing trust in the source (Khan & Mishra, 2024). Specifically, when AI-generated information excels in accuracy and relevance, the audience is more likely to perceive it as a trustworthy source (Kim et al., 2022). This study proposes the following hypotheses, grounded in theoretical frameworks and prior empirical research.
H1: There is a positive correlation between AI-generated information quality and trustworthiness.

AI Interactive Quality(IQ) refers to the responsiveness, naturalness of interaction, and overall user satisfaction exhibited by an artificial intelligence system when interacting with users (Pelau et al., 2021). In the context of human influencers, interaction quality is considered a key factor in building trust (Jun & Yi, 2020). For VIs, engaging in personalised and real-time interactions with users through AI technology not only enhances user engagement but also increases trust in the VI (Yang et al., 2023). For VIs, engaging in personalised and real-time interactions with users through AI technology not only enhances user engagement but also increases trust in the VI (Jun & Yi, 2020). Consequently, this study posits the hypothesis:
H2: There is a positive correlation between AI interactive quality and trustworthiness.

The core of Personalisation (PS) lies in tailoring the image and interactive content to resonate with the audience's needs and interests, thereby enhancing their sense of identification and engagement (Chandra et al., 2022). In the realm of VIs, personalisation is not only reflected in content generation but also in the design and identity construction of the VI (Lim & Lee, 2023).

Research has shown that influencers can effectively bridge the gap with their fans and form a sense of attachment by creating personalised identities and images (Yan et al., 2024). The personalised construction of identity and visual representation not only reinforces users' psychological identification with the influencer but also elevates their sense of enjoyment during interactions (Stein et al., 2022). When influencers successfully present an identity that resonates with the audience through tailored self-expression, user engagement and

perceived enjoyment are notably heightened. This enhanced enjoyment, in turn, contributes to a greater willingness to interact and may extend to increased brand loyalty and emotional attachment. Drawing on established theoretical frameworks and previous empirical studies, the present research formulates the following hypotheses.

H3: There is a positive correlation between personalisation and perceived enjoyment.

Anthropomorphism (AT) refers to the phenomenon of attributing human characteristics, emotions, behaviours, or motivations to non-human entities (Złotowski et al., 2015). Human-computer interaction, especially user experience and trust has been strongly impacted by the advancement of technology, particularly anthropomorphism as a core concept (Troshani et al., 2021). Previous research has revealed that higher levels of anthropomorphism in virtual entities tend to elicit stronger users' emotional responses. The emotional arousal elicited by anthropomorphic design not only fosters deeper user engagement but also contributes to greater enjoyment in mediated interactions (Koike & Loughnan, 2021). When virtual influencers (VIs) are imbued with human-like attributes, users are more inclined to develop emotional bonds, which in turn enhances their perceived enjoyment of the interaction (Kim & Park, 2024). Hence, this study proposes the following hypotheses, grounded in theoretical frameworks and prior empirical research.

H4: There is a positive correlation between anthropomorphism and perceived enjoyment.

Destination Brand Attachment (DBA) is based on the Brand Attachment theory. As the field of tourism marketing has evolved, researchers have begun to focus on how tourists develop an attachment to a destination brand through their emotional experiences and identification with the destination (Huang et al., 2017; Shimul, 2022). Such emotional attachment has been found to shape tourists' intentions to revisit and further strengthen their loyalty and advocacy for the destination (Liu et al., 2020). Research has found that tourists' travel experiences, perceived value, brand trust, and perceived enjoyment are all important factors influencing destination brand attachment (Shang et al., 2020). Perceived pleasure refers to the positive emotions and feelings of pleasure that tourists experience during their interactions with a destination. Pleasant experiences at a destination often strengthen the emotional connection, thereby increasing brand attachment (Kim et al., 2019). However, brand trust (trustworthiness) is also regarded as a critical prerequisite for destination brand attachment. Hence, this study proposes the following hypotheses, grounded in theoretical frameworks and prior empirical research.

H5: Trustworthiness is exhibited in a positive relationship with destination brand attachment.

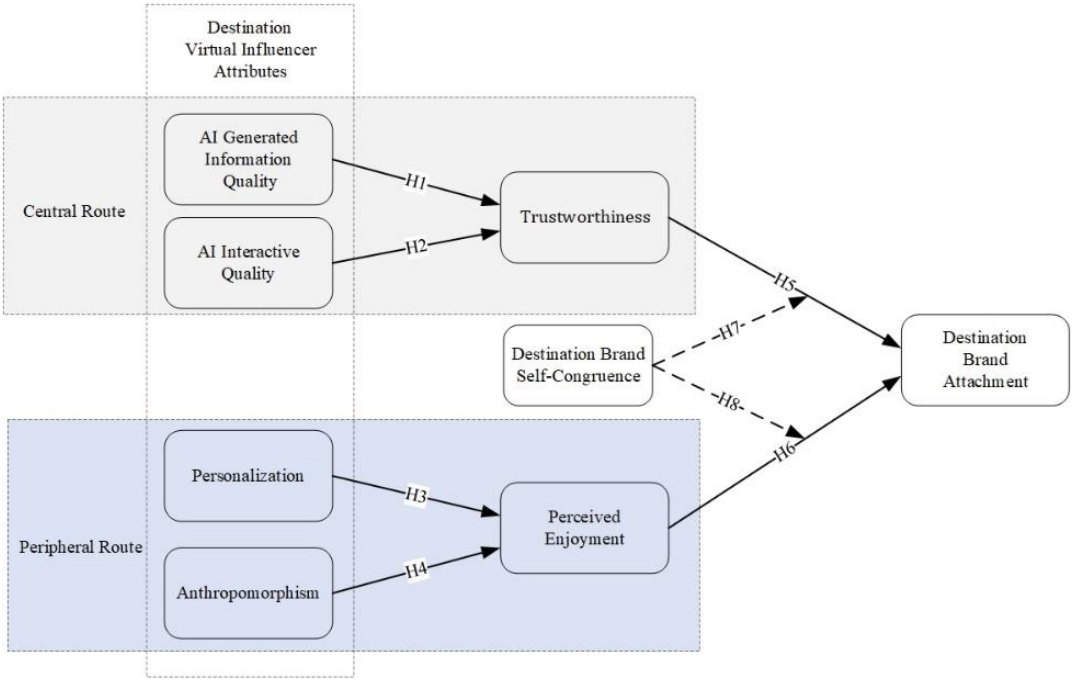
H6: Perceived enjoyment is positively correlated with destination brand attachment.

Destination Brand Self-Congruence (BC) refers to the degree of match between an individual's perceived destination brand image and their self-concept (Huang et al., 2017). Self-congruity theory posits that when individuals perceive external information as consistent with their self-concept, they are more likely to form positive cognitive evaluations and behavioural intentions (Wu et al., 2018). Destination brand self-congruence refers to the alignment between a tourist's perceptions of their values, interests, and lifestyle and the brand image of a specific tourist destination (Yang et al., 2022). Research has shown that higher levels of BC can enhance tourists' satisfaction and loyalty. Trust is widely recognized as a crucial factor in establishing long-term relationships between consumers and brands (Ahn et al., 2013). If the destination brand accurately reflects the tourist's self-concept, this self-congruence may amplify the positive effects of perceived enjoyment (Huang et al., 2017). This study proposes the following hypotheses, grounded in theoretical frameworks and prior empirical research.

H7: The relationship between trustworthiness and destination brand attachment is positively moderated by destination brand self-congruence.

H8: The relationship between perceived enjoyment and destination brand attachment is positively moderated by destination brand self-congruence.

Figure 2: Conceptual Framework



3. Research Methodology

This study employed a quantitative research method and utilised PLS-SEM techniques. To ensure the reliability and validity of the data, we designed and distributed a questionnaire to collect the data. The questionnaire included necessary scale items, all of which were derived from well-validated scales in previous studies, ensuring the effectiveness and reliability of the measurement tools(Clark & Watson, 2019). A 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree," was used to evaluate respondents' responses to various questions in the questionnaire. The questionnaire was designed and distributed using the professional online survey platform (Questionnaire Star), and the data collection procedure was conducted entirely online. Additionally, social media platforms were fully utilised to disseminate the questionnaire link more widely, increasing the diversity and representativeness of the sample. The online respondents were primarily from Zhejiang and Jiangxi provinces in China. A total of 405 questionnaires were distributed, and 388 valid responses were ultimately received.

The gender distribution of the final respondents was as follows: female respondents accounted for 53.86% of the total, while male respondents accounted for 46.13%, as indicated by the fundamental information. In terms of age structure, the sample was predominantly concentrated among individuals between the ages of 18 and 34, with the 18-24 age group being the largest, accounting for 32.73%. The data suggest that the sample was primarily composed of younger adults. The majority of respondents reported a monthly income of less than RMB 8,000, with the largest proportion earning below RMB 3,000. The sample was predominantly composed of students (32.99%) and employed individuals (31.70%). In terms of marital status, most participants were unmarried, accounting for 71.39% of the total sample, while married individuals comprised 28.60%. Overall, the sample was mainly composed of young, well-educated individuals who were mostly unmarried and had relatively lower incomes, with a diverse but predominantly student and employed population.

Common Method Variance (CMV) was evaluated in this investigation. The systematic error induced by the characteristics of the data collection method is referred to as CMV, which can distort research results and lead to inaccurate estimates of the relationships between variables (Tehseen et al., 2017). The study utilised the Variance Inflation Factor (VIF), a statistical measure that assesses multicollinearity, or the correlation between one explanatory variable and other explanatory variables (Daoud, 2017). High VIF values suggest a high degree

of correlation among variables, which may be the result of common method bias. Generally, a variable is considered to have a severe multicollinearity problem if its VIF value exceeds 10 (Kim, 2019). However, it is often suggested that when VIF > 3.3, we should pay attention to whether the relationships among these variables are affected by common method bias. The VIF values ranged from 1.026 to 3.779, indicating that there were no serious issues with multicollinearity.

Table 1: Demographic and Geographic Profile

Characteristics	Description	Count	Percentage
Gender	Male	179	46.13
	Female	209	53.86
Age	18-24	127	32.73
	25-29	93	23.97
	30-34	79	20.36
	35-39	69	17.78
	40-44	13	3.35
	45-49	7	1.80
Personal Total Income (per month)	Under RMB 3000	128	32.99
	RMB 3,001- RMB 5,000	83	21.39
	RMB 5,001- RMB 8,000	87	22.42
	RMB 8,001- RMB 12,000	66	17.01
	RMB 12,000 and above	24	6.19
Professions	Employed	123	31.70
	Student	128	32.99
	Freelance	46	11.86
	Unemployed	41	10.57
	Others	50	12.87
Marital Status	Single	277	71.39
	Married	111	28.60
Education Background	Primary/Middle School	22	5.67
	High School	68	17.52
	College degree	77	19.85
	Bachelor's	135	34.79
	Master / PhD	86	22.16

4. Results and Findings

The study conducted a comprehensive assessment of the measurement model to guarantee the quality and reliability of the survey data. This assessment included tests of Composite Reliability (CR), Average Variance Extracted (AVE), and item loadings (Hair et al., 2012). In particular, the CR values for all latent variables exceeded the recommended threshold of 0.7, suggesting that our measurement model has strong internal consistency (Hair et al., 2021). Furthermore, the AVE values were either equal to or greater than 0.5, indicating that each latent variable effectively captured more than half of the variance of its measurement items. Consequently, the measurement model exhibited sufficient convergent validity (Hair et al., 2014). The internal structure of the measurement model is further supported by the fact that all standardised loadings were substantially greater than 0.7 from the perspective of item loadings. Hair et al. (2019) suggest that each item is highly correlated with its respective latent variable. Additionally, the study performed discriminant validity assessments by contrasting the correlations among latent variables with the square roots of their corresponding average variance extracted (AVE) values. The findings indicated that the square roots of AVEs typically exceeded the correlations, thus affirming that the latent variables possess strong discriminant validity (Hair et al., 2019; Hair et al., 2014).

Table 2: Results of Factor Analysis

Item	loading	Alpha	CR	AVE	Sources
AI-generated information quality		0.861	0.763	0.678	Perez-Vega et al. (2018)
The travel information of the VI is understandable.	0.828				
The travel information of the VI is clear.	0.776				
The travel information provided by the VI is of high quality.	0.850				
AI Interactive Quality		0.866	0.766	0.682	Cheung et.al., (2019)
It is easy to communicate with the VI to convey my point.	0.845				
It is possible to have a two-way interaction with VI	0.772				
VI would respond to me quickly and efficiently.	0.820				
Personalisation		0.871	0.771	0.687	Baabdullah et al. (2022)
The information and answers sent to me by the VI are customised according to my requests and questions.	0.856				
VI makes me feel that I am a unique customer.	0.797				
VI offers a customised travel information search.	0.856				
Anthropomorphism		0.853	0.755	0.67	Balakrishnan et al. (2022)
VI is natural; I do not feel fake about it.	0.866				
VI feel lifelike and not artificial.	0.769				
VI is conscious of its actions.	0.833				
Trustworthiness		0.856	0.756	0.672	Masuda et al., (2022)
The VI is honest.	0.831				
This VI is trustworthy.	0.793				
The content provided by this VI is authentic.	0.851				
Perceived Enjoyment		0.869	0.769	0.685	Pereira et al., (2021)
I like to chat with a VI	0.831				
It is fun to share a conversation with a VI	0.788				
Interacting with VI is exciting.	0.862				
Destination Brand Self-Congruence		0.886	0.785	0.7	Chen et al. (2020)
The personality of this destination brand aligns with my perception of myself.	0.853				
The personality of this destination brand reflects me	0.774				
The personality of this destination brand aligns closely with my own.	0.857				
Destination Brand Attachment		0.843	0.743	0.661	Rather et al., (2020)
I am attached to this VI endorsement destination.	0.846				
I feel affection for this VI endorsement destination.	0.778				
I am connected with this VI endorsement destination.	0.834				

Structural Model Assessment

In this study, we evaluated the provided theoretical hypotheses by examining the structural model and conducting a comprehensive analysis using statistical indicators, including path coefficients, t-statistics, and p-values (Hair et al., 2021; Sarstedt et al., 2020). Path coefficients indicate the magnitude of the influence of

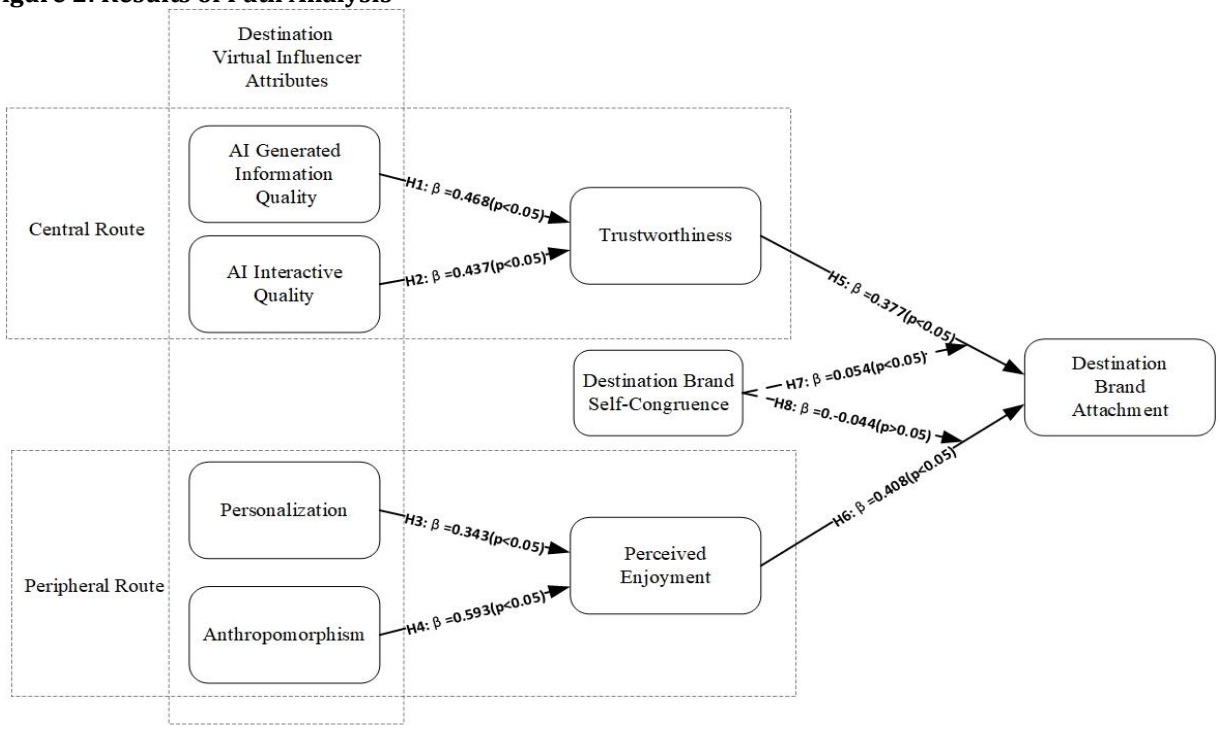
independent factors on dependent variables, whereas t-statistics and their associated p-values assess the significance of the path coefficients (Hair et al., 2013).

The results showed that all proposed hypotheses (H1 to H6) were supported, indicating statistical significance ($p < 0.05$). Specifically, for hypothesis H4 (AT→PE), which posits the effect of Anthropomorphism on Perceived Enjoyment, the path coefficient was 0.593, with a t-statistic of 10.447 and a p-value of 0, indicating a strongly significant relationship. Similarly, hypotheses H1 (GQ→TW), H2 (IQ→TW), H6 (PE→BA), H3 (PS→PE), and H5 (TW→BA) also demonstrated significant path relationships. The path coefficients were 0.486, 0.437, 0.408, 0.343, and 0.377, respectively, with corresponding t-statistics of 8.771, 8.14, 7.017, 5.905, and 5.832, and p-values of 0, indicating that the relationships among these variables are statistically significant.

Table 3: Hypothesis Testing

Hypothesis	Relationship	Path coefficients	T statistics	P values	Remark
H1	**GQ → TW**	0.486	8.771	0.000	Supported
H2	**IQ → TW**	0.437	8.14	0.000	Supported
H3	**PS → PE**	0.343	5.905	0.000	Supported
H4	**AT → PE**	0.593	10.447	0.000	Supported
H5	**TW→ BA**	0.377	5.832	0.000	Supported
H6	**PE → BA**	0.408	7.017	0.000	Supported

Figure 2: Results of Path Analysis



Moderation Effect Analysis

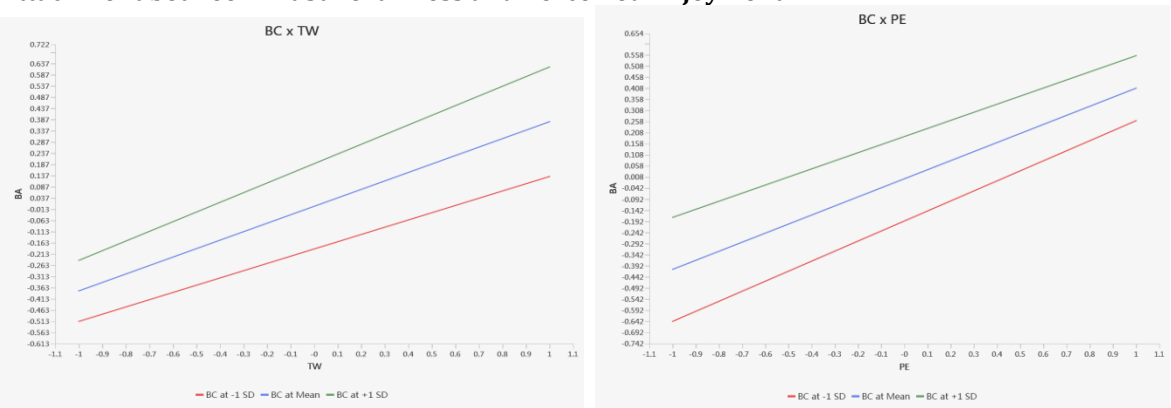
To evaluate the role of potential moderating variables, researchers conducted a moderation analysis to explore how direct effects vary under different conditions (Matthews et al., 2018). The analysis specifically examined the interaction effect between BC (Destination Brand Self-Congruence) and TW (Trustworthiness) on BA (Destination Brand Attachment), as well as the interaction effect between BC and PE (Perceived Enjoyment) on BA. The findings indicated that the path coefficient for the interaction term between BC and TW on BA was

0.054, accompanied by a t-statistic of 2.605 and a p-value of 0.004, signifying a substantial moderating impact. The data suggest that when considering BC, the positive impact of TW on BA varies with different levels of BC, meaning that BC enhances the positive effect of TW on BA. The result provides strong support for Hypothesis BC x TW -> BA. However, when examining the interaction term between BC and PE on BA, the path coefficient was -0.044, with a t-statistic of 0.486 and a p-value of 0.627, indicating that this moderation effect is not significant. Therefore, Hypothesis BC x PE→BA was not supported, suggesting that BC does not alter the manner or strength of the effect of PE on BA.

Table 4: The Results of the Moderating Effect

	Path coefficients	T statistics	P values	Remarks
BC x TW → BA	0.054	2.605	0.004	Supported
BC x PE → BA	-0.044	0.486	0.627	Unsupported

Figure 3: The moderating effect of Destination Brand Self-Congruence on the Destination Brand Attachment between Trustworthiness and Perceived Enjoyment



Discussion

This study employed PLS-SEM to incorporate the ELM and examine how VIs influence destination brand attachment via both central and peripheral channels. The main findings validated the positive impact of VIs' AI-generated information quality, AI interactive quality, personalisation, and anthropomorphism on trustworthiness and perceived enjoyment. These findings not only support the hypothesised path relationships but also further reveal the promotional role of VI endorsements in fostering destination brand attachment.

The findings demonstrate a substantial positive link between the quality of AI-generated material and the audience's faith in VIs, aligning with the current literature. Likewise, interactive quality was demonstrated to be a significant influence in augmenting trust. VIs, through timely responses and personalised interactions, increased user engagement and satisfaction, thereby strengthening their attachment to the brand. Additionally, personalisation and anthropomorphism significantly enhanced users' perceived enjoyment. By incorporating anthropomorphic characteristics and delivering personalised, interactive content, virtual influencers (VIs) effectively enhance users' emotional engagement, which in turn facilitates a stronger emotional attachment to the destination brand. The study reveals that perceived enjoyment not only increases brand attachment but also enhances users' intentions to revisit and brand loyalty.

The study investigated the moderating effect of destination brand self-congruence on the links among trust, subjective enjoyment, and brand attachment. The results showed that brand self-congruence significantly enhances the positive effect of trust on brand attachment, indicating that when the destination brand image is highly congruent with users' self-concepts, increased trust further promotes brand attachment. Nonetheless, the interaction study between brand self-congruence and reported enjoyment revealed no significant moderating influence. This indicates that the humanistic characteristics of virtual agents independently enhance reported happiness without a significant correlation with self-congruence.

5. Conclusion

By introducing the ELM model in the study, the findings systematically reveal how VIs affect users' perceptions and brand attachment through both central and peripheral routes. The central route primarily involves the transmission of high-quality information, leading to deep cognitive processing and more enduring attitude changes. Conversely, the peripheral route leverages external characteristics of VIs, such as visual appeal and interactivity, to prompt emotional decisions. Through this theoretical framework, the study systematises the dual-path persuasion mechanism of VIs for the first time, deepening our understanding of the psychological mechanisms at play under different paths. This research examines particular characteristics of virtual influencers, including personalisation and anthropomorphism, and illustrates their substantial effect on users' perceived satisfaction and brand trust. These findings not only enhance the current study on the impact of VIs but also establish a robust theoretical framework for further investigation into how these characteristics influence user psychology and behaviour. The study also presents the moderating influence of destination brand self-congruence in VI marketing. This theoretical contribution deepens our understanding of the connection between consumers' self-concepts and brand attachment, particularly in the context of virtual brand interactions. It highlights the significance of the alignment between the destination brand image and users' self-concepts on brand loyalty and the inclination to revisit.

From a practical viewpoint, this study offers several insights for DMOs. Firstly, when leveraging VIs for marketing, DMOs should focus on enhancing the information quality and interactivity of these VIs to strengthen users' trust and engagement. By engaging in effective personalised interactions with users, VIs can increase perceived enjoyment and emotional connections, thereby enhancing brand attachment. Additionally, DMOs should concentrate on the self-congruence between the destination brand image and the target tourists. By designing virtual endorsers that align with the self-concepts of the tourists, DMOs can further enhance the brand's appeal and user loyalty. According to the findings of this study, the anthropomorphic features of VIs are crucial in enhancing brand attachment. Therefore, DMOs should focus on the authenticity and attractiveness of the anthropomorphic characteristics when designing VIs to boost tourists' emotional identification and enjoyment.

The ELM is suited for analysing information processing and persuasion pathways, even though this study used it as a theoretical framework to investigate how VIs impact consumers' perceptions and brand attachment through both central and peripheral channels. The study lacks broader foundational theoretical support in some respects. Additionally, certain aspects of the study's findings were not as robust as expected. While the study validated the impact of personalisation and anthropomorphism on perceived enjoyment and brand attachment, the influence of some variables did not meet expectations in different contexts. This may be related to the varying characteristics of VIs, platform features, or differences in user backgrounds. The sample in this study was predominantly derived from specific regions in China. It was primarily composed of younger, well-educated individuals, with a lack of comprehensive coverage of other cultural backgrounds and age groups. This sample selection may influence the external validity of the research conclusions.

To verify the generalizability of the findings, future research should expand the sample to include a more diverse audience and participants from different cultural backgrounds. Furthermore, studies could integrate theories from AI and virtual reality to explore the role of VIs in an evolving technological landscape. The integration of these technologies and theories can not only fill existing theoretical gaps but also drive innovative applications of VIs in brand marketing.

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Digital Bites: Unpacking UiTM Students' Appetite for Viral Food Trends Driven by Social Media

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Abstract: This study takes a closer look at how social media marketing shapes students' views on viral food trends at UiTM Shah Alam. The focus is on three major aspects—social media influence, pricing perception, and brand familiarity. Since university students are avid social media users, understanding their responses to digital food promotions can offer practical insights for marketers. Using a survey completed by 430 students, the study uncovers how content on platforms like Instagram and Facebook boosts curiosity and influences food trial decisions. The research also shows that students care deeply about perceived value for money, making price a decisive factor in their choices. Well-known brands, meanwhile, tend to earn more trust and engagement. The findings indicated the importance of well-targeted digital marketing strategies and underscore the potential of using brand power and cost appeal to drive student interest in trending food products. Future studies should widen the participant pool to explore whether these results hold for other demographics.

Keywords: *Brand Recognition, Consumer Behavior, Price Sensitivity, Social Media Marketing, Viral Food Products.*

1. Introduction and Background

Social media has revolutionized many industries, and the food sector is no exception. From mouth-watering food reels to viral dishes, today's consumers, especially the younger crowd, often discover new food products online rather than in person. These products leverage social media platforms for marketing, utilizing the visual and viral nature of platforms like Instagram and Facebook to captivate audiences and increase brand visibility (Hasan & Sohail, 2020; Schivinski et al., 2019). The growth of these viral food trends has led to changes in how consumers discover, share, and interact with food brands, ultimately shaping consumer behavior and purchasing decisions.

Specifically, students at UiTM Shah Alam have shown growing enthusiasm for these viral food trends. They constantly engage with such content and often get easily influenced by what their friends share and what influencers promote. The way these students perceive and interact with viral food content on social media can provide substantive input into the effectiveness of various marketing strategies. According to Salleh et al. (2021), students' choices regarding food are often influenced by what their peers suggest, what is trending on social media, and how attractive a brand appears to them. Building on this, Weber et al. (2023) note that smartphones now play a central role in how people discover and purchase food. Their findings highlight how prolonged exposure to food content on social media platforms can contribute meaningfully to the formation of consumer habits and decisions.

Despite social media's apparent impact on food purchasing decisions, there is a dearth of academic research specifically focused on university students' perceptions of viral food products. Most existing studies generalize young consumers without considering the unique characteristics and behaviors of university students, who may exhibit distinct consumption patterns due to their social environment and economic constraints. Several studies contribute to the understanding of social media's influence on consumer behavior. Among others, Onorati and Giardullo (2020) highlight the prevalence of sharing restaurant reviews on travel-oriented social media platforms, and Ali et al. (2022) examine the impact of social media features on the purchasing decisions of youth. Sankar (2019) demonstrates that the impact of social media on buying behavior is not one-size-fits-all. In other words, it can vary significantly depending on the platform. The current research highlights this noticeable gap, particularly in understanding how university students respond to viral food trends on social media. With the constant stream of food content flooding platforms like Instagram and TikTok, students stand out as a group of crucial audience group. Their frequent and active use of social media does not just make them

consumers—it makes them trendsetters who help shape how others perceive these food fads.

The role of social media in the food industry has become increasingly pivotal, serving as a primary marketing channel for promoting viral food products. Platforms like Instagram, Facebook, and YouTube have enabled food businesses to connect with a broad audience by displaying aesthetically appealing dishes, sharing recipes, and fostering customer interactions to build brand loyalty (Ao et al., 2023; Salleh et al., 2021). Despite its effectiveness, the specific impact of social media marketing on consumer behaviors, particularly regarding viral food products among university students, remains underexplored. Understanding the dynamics influencing consumer decisions, such as willingness to pay, taste perceptions, and purchase intentions, is crucial among the student population at Universiti Teknologi MARA (UiTM) Shah Alam, Malaysia.

This study addresses the problem of limited understanding regarding the impact of social media marketing on the perceptions of viral food products among university students. It examines how various social media strategies, including influencers, hashtags, and product placements, affect students' perceptions of food quality, pricing, convenience, and brand recognition (Canet et al., 2021). The research aims to provide empirical evidence and actionable insights for food companies to enhance their social media marketing efforts. The findings aim to bridge the theoretical gap in understanding specific social media influences on consumer behavior and the practical gap in optimizing marketing strategies for the young adult demographic.

2. Literature Review

Social Media Marketing

In this era, social media marketing has become a cornerstone strategy for the food industry. Its ability to reach massive audiences and foster real-time interaction makes it a powerful tool for engaging customers. Research shows that platforms like Instagram and TikTok play a major role in shaping what people, especially young adults, want to eat. A visually striking food item can unexpectedly go viral in a matter of hours, sparking amazing trends and influencing buying decisions almost instantly (Chuang & Lin, 2021). As Ao et al. (2023) pointed out, features like polls, live streams, and interactive contests have increased brand visibility and deepened customer engagement, finally translating into stronger brand loyalty.

However, it is not just about flashy visuals—social media also affects how safe, healthy, and trustworthy people perceive a food product to be. Studies by Dwivedi et al. (2021), Martinez-Ruiz et al. (2023), and Salleh et al. (2021) all underscore the role of social media in building consumer trust. More than just a marketing channel, social platforms create communities where people connect over shared tastes and values. This aligns with findings from Faisal and Ekawanto (2022), who note that customers are more likely to follow and stay loyal to brands that reflect their interests and lifestyles. Additionally, Luong and Ho (2023) emphasize how peer influence and endorsements from popular content creators make consumers more open to trying new food items. Based on the above, we propose the following hypothesis:

H1: There is a significant relationship between social media marketing and the impact of the perception of viral food products.

Price

How people perceive price plays a major role in how they respond to viral food trends. Tan and Ng (2018) found that young adults, in particular, are often willing to spend more on food items that seem unique or high-quality, especially when those items gain popularity online. That “viral” status often gives products a perceived edge, making them feel more exclusive or worth the splurge. For brands, this means pricing strategies need to be carefully thought out. If a product feels fresh, exciting, and well-made, people are more likely to accept a higher price tag. Lee and Johnson (2022) echo this idea, noting that the appeal of novelty and perceived quality can drive up what consumers are willing to pay.

Interestingly, many buyers also use price as a shortcut when deciding if something is worth trying. Faisal and Ekawanto (2022) explain that consumers often link higher prices to better quality, even if they have not tasted the product yet. Nevertheless, how much weight they place on price can depend on how invested they are in the product. Konuk (2019) notes that consumers who are more engaged or interested in a food category tend to rely more on price as a sign of quality. On the flip side, those who know more about that product type may

not be as easily swayed by price alone. Luong and Ho (2023) reinforce this by showing that savvy buyers often consider other factors before jumping to conclusions based on cost. Finally, where and how the product is promoted—especially on different social media platforms—can subtly shape how much consumers are willing to spend. Based on these insights, the following hypothesis was developed:
H2: There is a significant relationship between the price of viral food products and the perception of viral food products.

Brand Recognition
When it comes to choosing what to eat, a recognizable brand name can go a long way. In the food world, brand recognition is not just about remembering a logo—it is about trust, familiarity, and comfort. Consumers are far more likely to try something new if it is from a brand they already know and associate with quality. Smith and Taylor (2022) point out that this sense of familiarity builds confidence, especially when it comes to products like food, where safety and quality are personal and immediate concerns. Hasan and Sohail (2020) found that when people recognize a brand on social media, they are more likely to follow through with a purchase. Viral content helps in this regard, turning ordinary products into memorable moments that stick in consumers' minds. Moreover, it is not just about visibility—research shows that a strong visual identity can help people recall a brand more easily, which in turn influences their buying decisions (Schivinski et al., 2019).

Faisal and Ekawanto (2022), along with Azzahara and Yafiz (2024), emphasize that brand strength is a major reason why some food items perform better than others online. It also helps companies stand out in a crowded space where consumers are flooded with choices. In short, people tend to stick with what they know, especially when that brand has earned their trust through consistent messaging and quality. Given these observations, the following hypothesis was proposed:
H3: There is a significant relationship between the level of brand recognition and the perception of viral food products.

The Impact of Viral Marketing
Viral marketing shares a similar core principle with word-of-mouth communication, which disseminates general knowledge, environmental information, and news (Puriwat & Tripopsakul, 2021). However, it is also known to be a highly effective and essential marketing strategy (Oraedu et al., 2020). This approach leverages the rapid and transformative spread of information characteristic of viruses, reaching vast audiences in a short period (Motoki et al., 2022). Viral marketing in the food sector accelerates consumer interest at an exponential rate through the leverage of social media's network effects, which ultimately enhances brand exposure. It has been confirmed that effective viral marketing strategies must utilize influencers, hashtags, and user-generated content to enhance product awareness and desirability significantly (Jiang et al., 2023). The visual and communal aspects of food consumption are amplified in digital spaces, where consumers are encouraged to share their experiences and participate in the broader food culture promoted by these viral campaigns. This phenomenon drives immediate product popularity and can establish long-term consumer relationships and brand loyalty.

3. Research Methodology

Research Design
A quantitative research approach is used in this study to get a clear and measurable understanding of how students at UiTM Shah Alam perceive viral food products. By focusing on numerical data, this research could assess how three key factors—social media marketing, pricing, and brand recognition—influence student opinions. A structured survey was primarily used to discover patterns and statistically analyze the connections between the variables (Creswell & Creswell, 2018).

Population and Sample
The population of this study is all students from Universiti Teknologi MARA (UiTM) Shah Alam. This campus was chosen because its student body reflects a wide mix of young adults who are typically very active on social media and responsive to digital marketing. With around 17,000 students enrolled, the sample size was calculated to ensure accuracy—a 95% confidence level and a 5% margin of error required at least 377 participants. To account for any drop-offs or incomplete responses, that number was intentionally increased

to 430 (Israel, 2013).

Sampling Technique

To make sure every voice had a fair chance of being heard, the study used stratified random sampling. The student population was grouped based on their faculty, like Engineering, Business, Arts, and Science. Students from each group were randomly selected in proportion to their faculty size to ensure the results would reflect the full diversity of the campus and reduce the chances of any one group being over- or under-represented (Lohr, 2019).

Data Collection Process

The survey was built using Google Forms and designed with user-friendliness in mind. It included clear, closed-ended questions using a 5-point Likert scale, along with some demographic questions to better understand who was responding. To reach as many students as possible, the survey link was shared through university emails and on social media platforms like WhatsApp, Facebook, and Instagram—places where students already spend much time (Groves et al., 2011). The survey ran for four weeks, giving students plenty of time to respond. Weekly reminders helped keep engagement up. Using an online format turned out to be especially effective—not only did it suit students' digital habits, but it also made the whole process faster, more flexible, and cost-effective compared to traditional paper-based surveys.

4. Results

Demographic Profile of Respondents

The demographic data collected from the 430 respondents reveal a diverse student population at UiTM Shah Alam. These demographic profiles provide a breakdown of respondents' faculty affiliation, age group, and gender, highlighting the diverse nature of the sample. The sample involved students from various faculties of the whole campus. This diversity ensures a comprehensive insight into the perceptions across different academic disciplines.

Table 1: Demographic Distribution of Respondents

Variable	Category	Frequency	Percentage (%)
Faculty	Art and Design	72	16.7
	Architecture and Engineering	71	16.5
	Computer Science	70	16.3
	Business	70	16.3
	Law	41	9.5
	Communication	37	8.6
	Theatre	39	9.1
	Applied Science	30	7
		430	**100%**
Age group	18 – 22	249	57.9
	23 – 27	180	41.6
	28 – 32	1	0.5
	32 and above	0	0
		430	**100%**
Gender	Female	239	55.8
	Male	191	44.2
		430	**100%**

An analysis of the respondents' faculties revealed that the Faculty of Art and Design had the highest representation, with 72 respondents (16.7%). The Faculty of Architecture and Engineering (n=71, 16.5%) follows the frequency. The Faculty of Computer Science and the Faculty of Business shared the same data, resulting in 70 respondents each (16.3%). The Faculty of Law (n=41, 9.5%), Faculty of Communication (n=37, 8.6%), Faculty of Theater (n=39, 9.1%), and Faculty of Applied Science (n=30, 7.0%) constituted the remaining respondents.

The survey targeted young adults and adults. The age range options for "young adults" were 18-22 years old and 23-27 years old, while the options for "adults" were 28-32 years old and above 32 years old. The majority of respondents fell within the young adult category, with 57.9% (249 respondents) being between 18 and 22 years old and 41.6% (180 respondents) being between 23 and 27 years old. There was minimal representation from the adult age groups, with only 0.5% (1 respondent) falling within the 28-32 age range and none falling above 32 years old. In terms of gender, the survey sample leaned slightly female, with 55.8% (239 respondents) identifying as female and 44.2% (191 respondents) identifying as male.

Descriptive Analysis

Table 2 provides insights into the specific marketing factors influencing student perceptions. The findings reveal that engaging content encountered on social media platforms, such as Instagram and Facebook, significantly impacts students' interest and willingness to try viral food products. Price also emerged as a crucial factor in shaping perceptions. The finding suggests that, although students in general are open to trying viral food products, their ultimate decision is significantly influenced by the perceived value for money. Products considered to offer a good balance between price and quality were met with higher acceptance rates among the respondents. Finally, brand recognition emerged as another critical determinant. Well-established brands tend to be viewed more favorably, suggesting that familiarity with a brand can significantly impact consumer behavior toward viral food trends.

Table 2: Overall mean score of the variables

		N	Minimum	Maximum	Mean	SD
1.	Social media	430	1	5	4.316	.368
2.	Price	430	1	5	4.155	.519
3.	Branding	430	1	5	4.368	.444
4.	Perception	430	1	5	4.652	.305

Note: The items were measured on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree)

Regression Analysis

Regression analysis is a powerful statistical tool for constructing mathematical models that elucidate potential relationships and functional associations between variables. In this study, the research objectives and hypotheses were used in this analysis. The findings of the regression analyses are presented in the following table, providing a comprehensive overview of the results. The researchers employed multiple regression analysis to analyze all the independent variables (social media marketing, price, and brand recognition) simultaneously with the dependent variable (students' perception of viral food products), as presented in Table 3. The analysis yielded statistically significant positive relationships between each independent variable and the dependent variable, supporting the hypotheses (H1, H2, and H3) formulated earlier in the study. Hence, the regression analysis identified brand recognition as the factor exerting the strongest influence on student perception, followed by price and social media marketing. A detailed summary of the hypothesis testing is presented in Table 4.

Table 3: Summary of regression analysis

		B	SE B	β
1.	(Constant)	-.164	.134	
2.	Social media	.127	.042	.127**
3.	Price	.180	.058	.138**
4.	Branding	.748	.056	.668***

*Note: r^2 = .795, **p < .005, ***p < .001.*

Table 4: Summary of Hypothesis Testing

	Hypotheses	B	Results
1.	H1: There is a significant relationship between social media marketing and the impact of the perception of a viral food product	0.127	Achieved
2.	H2: There is a significant relationship between the price of viral food products	0.138	Achieved

	and the perception of viral food products		
3.	H3: There is a significant relationship between the level of brand recognition and the perception of viral food products	0.668	Achieved

Discussion

This research investigates the perceptions of UiTM Shah Alam students towards viral food products heavily marketed on social media platforms. The study specifically examines the influence of three key factors: marketing strategies employed on social media, pricing strategies, and brand recognition. The findings, as detailed in Table 3, provide statistical support for the hypothesis that these factors significantly predict student perceptions of viral food products. Furthermore, the analysis reveals that these factors collectively explain a substantial portion of the variance in student perceptions. This underscores the critical importance of marketers prioritizing these elements when crafting promotional strategies for food products within a university environment.

The first objective of this study was to determine the impact of social media marketing on students' perception of viral food products (β= 0.127, p< .005). This finding aligns with prior research by Zhang (2023), who demonstrated a significant influence of social media marketing on consumer behavior related to food products. Their study suggests that social media marketing strategies foster positive attitudes toward food items and purchase intentions. Similarly, Saom et al. (2023) provide further support, highlighting the positive contribution of social media marketing to consumer trust in food products. This trust is likely built through information sharing on the products' quality, safety, and health benefits. Additionally, Irshad et al. (2020) link social media marketing to increased consumer purchase intention, while Zheng (2023) emphasizes the significant role of social media platforms in promoting food-related practices. Collectively, these studies suggest that consumers are more likely to experiment with new food products endorsed by social media influencers or shared by their peers on these platforms.

The findings further support the achievement of the second objective, revealing a significant positive relationship between the price of viral food products and students' perception of them (β= 0.138, p< .005). Various factors, including cultural background, can influence this association between price and perceived quality (Faisal & Ekawanto, 2022). Building on prior research by Büyükdağ (2021), the study suggests that consumers often utilize price as a heuristic to assess food product quality. Furthermore, research indicates that highly engaged consumers are more likely to rely on price as a quality indicator compared to those with lower engagement levels. Therefore, marketers crafting pricing strategies, particularly for novel or unfamiliar products, should consider the target audience's level of involvement (Ao et al., 2023). Konuk (2019) further emphasizes this point, highlighting that consumer price assessments are shaped by the context in which products are presented. Schivinski et al. (2019) contribute by demonstrating that individuals with greater knowledge about a product category are less likely to rely solely on price as a quality indicator. Their research suggests that consumers perceive food items as higher quality when presented in upscale settings, even if the price remains constant compared to less luxurious environments.

The study's findings also support the achievement of the third objective, demonstrating a strong positive relationship between brand recognition and students' perceptions of viral food products (β = 0.668, p < .001). Brand recognition refers to the degree of consumer familiarity with a food product's brand, encompassing their ability to recall and remember the brand name and its associated products (Hasan & Sohail, 2020). Likewise, the study's findings align with prior research highlighting the positive influence of effective viral marketing initiatives on brand recognition among target audiences (Mustikasari & Widaningsih, 2018; Nguyen & Nguyen, 2020; Puriwat & Tripopsakul, 2021). The results also demonstrate that effective viral marketing can have a significant and positive impact on brand preference among targeted audiences. This finding is similar to those reported by Wang (2019) and Arici and Arici (2021), who highlighted the positive impact of viral marketing on customer-based brand equity and purchase intention. Finally, recognition refers to a consumer's ability to identify a brand name when presented with it (Azzahara & Yafiz, 2024). Moreover, Ao et al. (2023) further emphasize the potential of brand recognition to drive sales and expand market share. Therefore, this study highlights the crucial role of establishing brand recognition in promoting customer loyalty and maintaining a competitive edge, particularly within the food industry.

5. Conclusion and Recommendations

This study examines UiTM Shah Alam students' perception of viral food products, revealing their significant impact on student preferences. Social media platforms, particularly Instagram and TikTok, heavily influence students. These platforms serve as primary showcases for viral food products, where visually appealing and unique features capture students' attention and spark curiosity. Consequently, students perceive viral food products as trendy, exciting, and worthy of exploration. The power of social media in promoting these products cannot be understated, as it demonstrably shapes student perceptions and influences purchasing decisions. However, it is important to acknowledge that individual preferences and past experiences also contribute to shaping overall perception. In conclusion, the study highlights the substantial influence of social media and the desire to be part of current food trends on UiTM Shah Alam students' perception of viral food products.

This study is not without its limitations. First, the main limitation lies in the sample population, whereby the focus is on UiTM Shah Alam students, which reduces the generalizability of the findings. Future research should consider a broader scope, which includes students from a wider range of universities and geographical locations, to get a comprehensive understanding of student perceptions towards viral food products. Secondly, the study design could benefit from a more extensive data collection process. A wider variety of viewpoints could be captured through a more expansive data collection effort. Future research might consider employing alternative research methods, such as focus groups or in-depth interviews, to gather in-depth and complex data on students' perceptions. By analyzing student responses through these alternative methods, researchers could gain a deeper understanding of how students interact with and form their opinions on viral food trends. Addressing these limitations and pursuing further research in the recommended areas will ultimately contribute to a richer and more comprehensive understanding of student perceptions about viral food products.

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Malaysia's Tourism Destination Competitiveness: A Bibliometric Analysis

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Abstract: Over the past three decades, tourism has grown rapidly worldwide, gradually increasing the competition among tourism destinations. Coupled with the impact of COVID-19, Malaysia, as one of the countries in the Asia-Pacific region most affected by the epidemic, is in urgent need to adjust policies and measures to cope with fierce competition and quickly restore tourism. The aim of this article is thus to analyze the existing related research and to conclude the research trend and limitations. The articles collected from Scopus and Google Scholar were analyzed using a dual-software approach: Excel facilitated data organization, while VOSviewer enabled statistical and co-keyword analysis through its visualization capabilities. 33 articles meet the inclusion criteria used to conduct a bibliometric review of existing articles researched on the tourism destination competitiveness of Malaysia in the last decade, since 2012. The results show that previous studies focus on the destination competitiveness of rural tourism and eco-tourism, but few studies have focused on the comparison of tourism competition between Malaysia and other countries, which is insufficient in the comparison of international tourism competition. Furthermore, discussion and recommendations for future studies are made in the discussion and recommendations. This article, on the one hand, provides knowledge support for filling the gap in the literature review of the competitiveness of tourism destinations in Malaysia. On the other hand, it offers a practical background for helping the Malaysian government to adjust the implementation of policies and gain the advantages of tourism competition, to cope with the complexity and uncertainties in the future.

Keywords: *Malaysia, Tourism destination competitiveness, Bibliometric analysis*

1. Introduction and Background

Over the past three decades, tourism has grown rapidly worldwide, gradually increasing the competition among tourism destinations (Goffi, Cucculelli and Del Chiappa, 2023). Destination competitiveness has become a popular topic for research after the outbreak of COVID-19 (Aguiar-Barbosa, Chim-Miki and Kozak, 2020). Destination competitiveness constitutes a critical determinant of sustainable growth and economic vitality in tourism locales (Cronjé and du Plessis, 2020b). Competitiveness is still essential for a company to succeed, regardless of industry (Porter, 1980). Melville et al. (2014) echoed that this principle is applicable in the tourism industry especially for tourism destinations. Since the 1990s, competitiveness has been a central topic in tourism research (Pérez Romero et al., 2021).

Numerous scholars have conducted extensive research, ranging from definitions to theories and models, which has resulted in a series of remarkable findings and endeavors to place their countries at the forefront of the global tourism competition (Amanda de Paula Aguiar-Barbosa, 2022; Aguiar-Barbosa, Chim-Miki and Kozak, 2020b). In the context of the current tourism crisis and economic recovery, emphasizing the study of tourism destination competitiveness is crucial for Malaysia and the tourism industry. One of the key contributors to the expansion of Malaysia's economy is the tourism and hospitality industry (Balasubramanian and Hanafiah, 2022). In 2018, there were 25.8 million tourists in Malaysia, and the industry made up 13.3% of the country's GDP. The world's alarming coronavirus infection (COVID-19) outbreak has been particularly devastating to the tourism and hospitality sectors (Khan and Hashim, 2020). In 2020, the tourist sector will have lost $2.7 trillion around the world. The Asia-Pacific area, with 63.4 million people unemployed, is the region most severely affected (Salinas Fernández et al., 2022). What is worse, one of the nations most impacted by the outbreak in the Asia-Pacific area was Malaysia, which saw 4.33 million foreign visitor arrivals in 2020—a decrease of 83.4% from 26 million in 2019 (Tourism Malaysia, 2021).

Considering the current tourism crisis and ensuing recovery, it is crucial to intensify research into tourism destination competitiveness. To achieve a speedy recovery of the tourism industry and meet the upcoming challenges, Malaysia must obtain a competitive advantage in the Southeast Asian tourism market. It is

important to note that competitiveness is the tourism crisis's antidote. The future of tourism is unknown, and the true long-term impact of the epidemic has yet to be assessed. We must target ongoing research on tourism destinations' competitiveness and comprehend the current state of existing research to generate valuable knowledge to drive reforms to strengthen and make the tourism industry more competitive (Lew, 2020; Sigala, 2020). Otherwise, tourism will experience a series of crises. In comparison to other nations, research on tourism competitiveness in Malaysia remains relatively fragmented. In the past, no articles have analyzed and summarized Malaysia's tourism competitiveness using bibliometric techniques. Then, it is impossible to determine which areas of research must be bolstered to inform the government's policy formulation, swiftly addressing the challenges posed by increased tourism competition. Therefore, this study's bibliometric compilation of the literature about Malaysia's tourism destination competitiveness from the past decade fills the knowledge gap and has a practical contribution to the tourism industry..

2. Literature Review

The term competitiveness derives from the Latin word "competer" and refers to the rivalry between businesses (Zeng et al, 2021). Porter (1980) was the first researcher to look at the concept from the perspective of the firm and research on tourism competitiveness did not commence until 1993. Identifying four essential principles for competitive success, including environment first, quality first, breakthrough innovations, and strengthening competitors' strategic position, Pan (1993) was the first researcher to reexamine the competitiveness of the tourism industry. Since the 1990s, tourism expansion and intensifying market rivalry have positioned competitive advantage as a dominant paradigm in the tourism field (Dwyer and Kim, 2003; Cronjé and du Plessis, 2020a; Enright and Newton, 2004). Models, theoretical frameworks, empirical research, and conceptual definitions are the four primary areas in which this body of knowledge has been examined.

Despite the diversity of definitions of tourism competitiveness in the tourism field, the definition from Crouch and Ritchie (1999) has been recognized and adapted by other authors. According to Dupeyras and Maccallum (2013), tourism competitiveness is the capacity to raise tourism spending, draw more visitors while giving them a satisfying and memorable experience, and do so profitably while improving the quality of life for locals and protecting the destination's natural capital for future generations. Although the debate over the definition of tourism competitiveness has never ended, there remain some commonalities. Tourism competitiveness initially focused on attractiveness, quality of performance, and market perspectives. Subsequently the terms like sustainability and quality of life are used more frequently, and the research is increasingly concerned with the welfare of the residents, including the creation of new jobs and an improvement of residents' life (de Paula Aguiar-Barbosa and Chim-Miki, 2022).

Given competitiveness's multidimensional intricate and multifaceted nature, researchers continue developing varied assessment protocols to capture this elusive phenomenon. Among them, the Ritchie and Crouch (2003) Destination Competitiveness Model has been most recognized out of all the models that have been put out. Due to the model's extensiveness and comprehensiveness, it is frequently recognized as the foundational work in the field of destination competitiveness. It provides the basis for subsequent conceptual models. This framework holds significant value not only because it facilitates the examination of numerous factors driving tourism destination competitiveness. Moreover, it effectively elucidates the diverse elements that define the competitive landscape within this sector (Cronjé and du Plessis, 2020b). A defining feature of each integrated model is its presentation of an exhaustive array of determinants that represent the core forces and factors underpinning destination competitiveness (Andrades-Caldito et al., 2014; Abooali et al., 2015). However, there has always been disagreement over the model. In the later stage, scholars also questioned whether these indicators are equally important and whether these indicators need to be weighed, and also proposed that there is not a single set of competitiveness indicators can be measured and assessed for different types of destinations, destinations in different life cycle stages, or destinations in different market segments (Abreu-Novais, Ruhanen and Arcodia, 2016).

Considering that competitiveness is essential to the success of a tourism destination, measuring tourism competitiveness becomes important. When measuring the tourist destinations' competitiveness, a particular country or region is frequently utilized as a case study, with the majority of studies focusing on European nations such as Spain, France, Serbia, and Slovenia and others (Cronjé and du Plessis, 2020b). It is important to

note that when referring to the methodologies employed to measure, most of the existing studies are limited to developing simple or composite indicators, which can lead to either confusion or inapplicability in the case study. As a result, the research results are inflated and unreliable, such as missing data, not non-significant correlation among variables. In other words, most of the measurement approach is abstract and imprecise (Crouch, 2011). Effective measurement of most destination competitiveness indicators requires a combination of quantitative and qualitative measures. Apart from that, as there are few socially pertinent variables in the monitoring of tourism competitiveness, most surveys were conducted from a supply or demand perspective, ignoring the opinions of residents. Future metrics for destination competitiveness must originate from tourism-affected communities' perspectives. This necessitates a paradigm shift: replacing productivity-centered frameworks with sociocultural dimension-based assessment systems. To date, there have already been some literature reviews in this research field that focus on definitions, indicators, and models(Cronjé & du Plessis, 2020a; Kubickova & Lee, 2018; Croes et al., 2022). Very limited researchers have combed Malaysia's tourism destination competitiveness. This aspect is particularly critical because it will help to clarify the current research situation on Malaysia's tourism destination competitiveness, identify the previous research limitations, and propose what aspects should be explored further.

3. Research Methodology

Bibliometrics Analysis

Based on the published documents searched in specific academic fields, bibliometrics analysis refers to an application made using mathematical and statistical methods (Seguí-Amortegui et al., 2019) (Sampaio et al., 2023), with the output of a series of categorized graphs. Bibliometrics analysis not only contributes to understanding the core knowledge of the field and how this topic has been approached (Su, Li and Kang, 2019) so that it concludes potential research trends (Fahimnia, Sarkis and Davarzani, 2015), but also assesses the research performance and influence, characterizing the institutions, researchers, and countries fully (Sampaio et al., 2023). Having applied in several subfields of the tourism industry (Sampaio et al., 2023; Cavalcante et al., 2021;Jiménez-García et al., 2020; Bastidas-Manzano et al., 2021). Bibliometrics could be applied in this article.

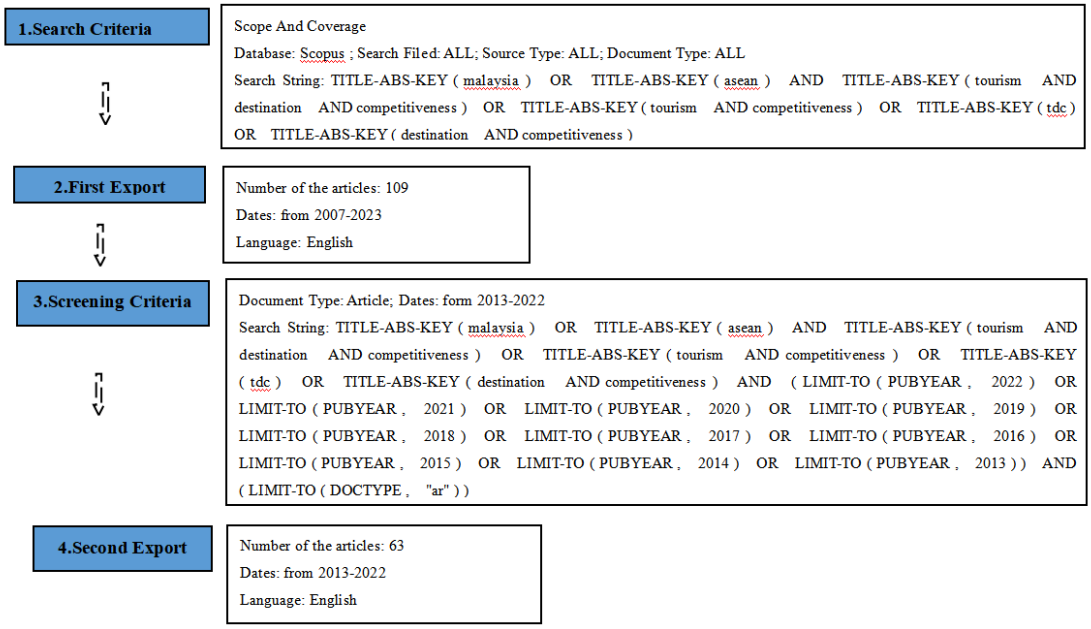
Search Sources

Since the outcomes of the bibliometric analyses rely on the data of the selected articles Scopus Database as one of the comprehensive, multidisciplinary, trusted databases including articles, was used as the primary database in this article and Google Scholar as the secondary platform. And the data retrieval process was explained in Figure 1.

Procedures

Two searches are being conducted. Firstly, the author searched through the Scopus Database, on the terms of TITLE-ABS-KEY (Malaysia) and TITLE-ABS-KEY (tourism destination competitiveness) yielding 109 results. Then, considering the article document type and publication time from 2013 to 2022, we narrowed the Scopus Database down from 109 documents to 63 documents. The search process and results are shown in Figure 1.

Figure 1: Searching process in Scopus Database (Source: Authors)



The second research process was employed on Google Scholar. To further expand the search scope and find more potentially relevant articles, the researcher used Google Scholar. In Google Scholar, by applying different keywords and adding the author's name (which has been found that the author has already published several related articles in the Scopus Database), there are more than 46 articles have been found. Excel was used to compile the titles of the resulting articles. Subsequent deduplication yielded a set of unique titles, which were then subjected to eligibility screening. (Table 1).

Table 1: Searching results (Source: Authors)

Databases	Document results
Scopus Database	63
Google Scholar	46
Total	109

Inclusion and exclusion criteria

For the meta-review, pertinent data from eligible papers—specifically title, authorship, year of publication, geographic focus, research methods, and principal findings—were systematically entered into Microsoft Excel. To ensure alignment with the introductory objectives and to reduce bias risks, inclusion and exclusion criteria were subsequently defined. This process refined the selected documents before data collection and analysis. The selected paper contained data on: (1) was directly relevant to Tourism Destination Competitiveness; (2) the case study was only in Malaysia; (3) only an Article journal (excluding conference paper/ book/chapter/note); (4) published in English; (5) The publication year is in 2013-2022. Thus, the papers were selected, and two reviewers confirmed their relevance. There is a total of 33 articles that were used for bibliometric analysis.

Statistical analysis

After article selection, the statistical analysis was carried out with Microsoft Excel and VOSviewer software. Microsoft Excel is a useful tool for organizing, analyzing, visualizing, sharing, and managing data to reach decisions or conclusions that are more solidly supported by data (Niglas, 2007). In this article, the author uses Excel to achieve the review analysis according to publication by year, articles distribution of publications in journals, articles published by author's affiliation or institution, the Methodological approaches catalog, and the Top 5 most cited papers in Google Scholar in the selected articles (the results were shown from section 4.1 to section 4.3). Based on any type of network data, VOSviewer enables to presentation of the data in a visual

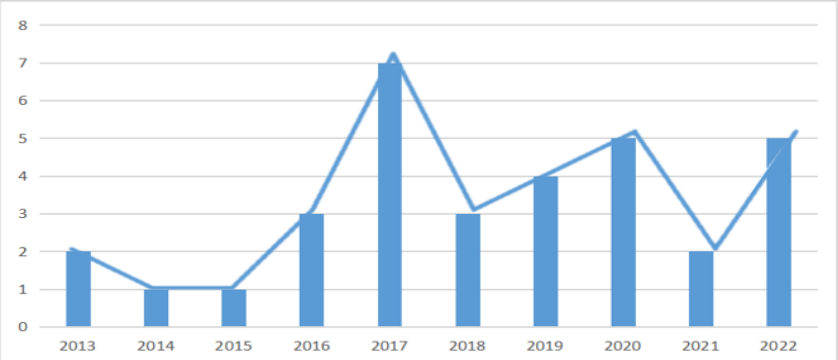
way, by exploring the co-relationship and creating the map (Arruda et al., 2022). The results reveal the main research trends and the development situation, which help academics and professionals systematically and deeply understand the field of Malaysia tourism destination competitiveness (Cavalcante, Coelho and Bairrada, 2021). Therefore, the Co-occurrence of the keywords provided by the paper's authors was analyzed using the VOSviewer Software (shown in section 4).

4. Results

Publication Overview

The chosen 33 papers published on Malaysia's tourism destination over time are illustrated in Figure 2. During the ten years, an average of three papers per year were published. In 2017, the largest number of papers was published, totaling 7, which also shows the interest of scholars in this research topic during this period. In 2014, the papers published in 2015 were the fewest and gradually increased in the later period. The increase in publications enables researchers to observe the prevalence and growth pattern of research topics.

Figure 2: Total Publications by Year (Source: Authors)



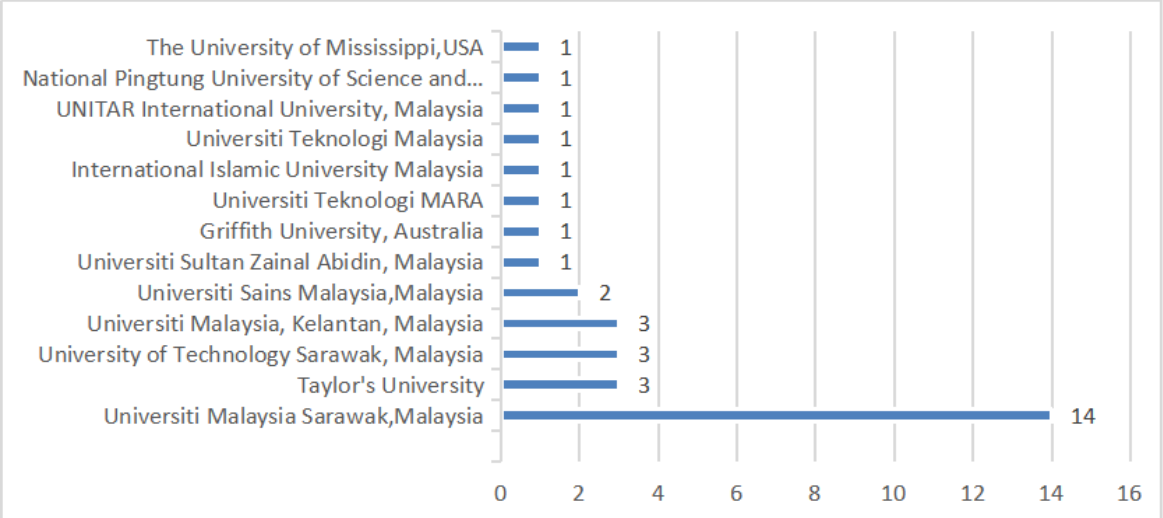
The selected articles originated from 27 different journals. Notably, 16 articles came from 16 journals that held a Q1 to Q4 ranking in the 2022 Scimago Journal & Country Rank (SJR) (Table 2). There are only nine high-quality articles in Q1, indicating that high-quality articles are limited at present.

Table 2: Distribution of publications in the journal

Journal	Number of publications	JSR 2022
Asia Pacific Journal of Tourism Research	2	
Current issues in tourism	2	
Journal of Destination Marketing & Management	1	
Tourism and Hospitality Research	1	Q1
Tourism Management Perspectives	1	
Tourism Planning & Development	1	
Tourism Review	1	
Anatolia	1	
Asian Journal of Business Research	1	Q2
Economics and Sociology	1	
Asian Academy of Management Journal	2	
Geojournal of Tourism and Geosites	1	
International Journal of Business & Society	2	Q3
Iranian Journal of Public Health	1	
Tourism Analysis	1	
Enlightening Tourism	1	Q4

4 affiliations had at least 3 papers published. The largest institution studying Malaysia's tourism destination combativeness is Universiti Malaysia Sarawak, Malaysia, with 14 articles total reflecting the research advantage of East Malaysia in this field. At Universiti Malaysia Sarawak, there are two authors contributing substantial research results, named Chee-Hua Chin and May-Chiun Lo, from the Faculty of Economics and Business. Then it was followed by Taylor's University (3 papers), University of Technology Sarawak, Malaysia (3 papers), and University Malaysia, Kelantan (3 papers).

Figure 3: Article published by author's affiliation/institution (Source: Authors)



Research methodology design

In terms of research methodology, the quantitative approach (n=29) was applied to the research domain most frequently. A total of 4 papers used secondary data, coming from The World Bank, The Travel & Tourism Competitiveness Report, World Travel and Tourism Council, etc. However, most of the researchers preferred to collect data through questionnaires. Respondents include tourists who have visited the selected case study area and the local communities. Other than that, mixed method designs (n=3) were found to be less prevalent. And only one study used qualitative methodology, conducting semi-structured interviews with stakeholders (Shariffuddin et al., 2020).

Table 3: Methodological approaches (Source : Authors)

Research design	Count	Percentage (%)
Quantitative method	29	87.8
Mixed mode	3	9.2%
Qualitative method	1	3%
Total	33	100

Citation numbers ranking

Among 33 study sample papers, the top 5 articles cited in Google Scholar are indicated in Table 4. The paper entitled "Rural tourism destination competitiveness: a study on Annah Rais Longhouse Homestay, Sarawak," authored by Chee-Hua Chin and others, published in Procedia - Social and Behavioral Sciences, received the most attention among scholars with 140 cited times (Chin et al., 2014). Followed by the paper of Leung, Xi Yu; Baloglu, Seyhmus, entitled "Tourism Competitiveness of Asia Pacific Destinations", with 99 citations(Sarwar et al., 2013).

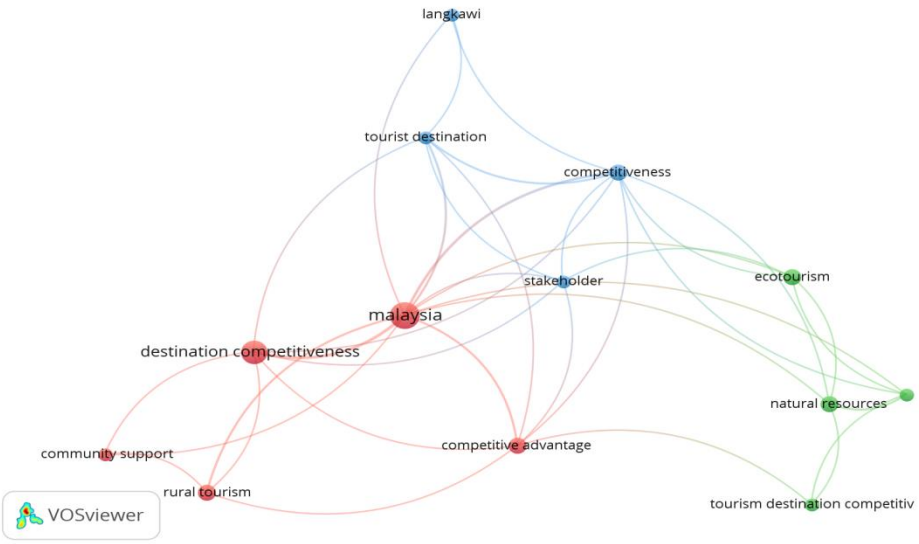
Table 4: Top 5 most cited papers in Google Scholar in the sample

Title	Number of Citations on Google Scholar	Author/Year
Rural tourism destination competitiveness: a study on Annah Rais Longhouse Homestay, Sarawak	140	(Chin et al., 2014)
Tourism Competitiveness of Asia Pacific Destinations	99	(Sarwar et al., 2013)
The influence of destination competitiveness on customer-based brand equity	87	(Wong and Teoh, 2015)
Medical tourism in Malaysia: Prospects and challenges	70	(Sarwar, 2013)
Tourists' perspectives on hard and soft services toward rural tourism destination competitiveness: Community support as a moderator	66	(Lo, Chin and Law, 2019)

Keyword Co-occurrence Analysis

The researcher carefully selected the keywords that would best represent the research's central topic and content. Therefore, keyword co-occurrence can reveal trends in research and the most significant topics within a particular research field. In this section, the Keywords provided by the authors of the paper appeared together. In this way, the Occurrences attribute provides information about the frequency with which a keyword appears in a set of documents (Eck and Waltman, 2019). Figure 4 demonstrates how VOSviewer visualizes this information by employing the keywords present in the 33 filtered papers.

Figure 4: Bibliometric analysis of the keywords co-occurrence (Source: Authors)



Through the network visualization map, there are three main clusters, as indicated by three colors: destination competitiveness (red cluster), ecotourism (green cluster), and competitiveness (blue cluster). The size of the nodes indicates the frequency of each keyword. Besides, the distance represents the number of co-occurrences of the two keywords in one paper, whereas the thickness of the curve indicates the linkage of the two keywords (Yu et al., 2020). The results indicate that the topic of "rural tourism" frequently involves "community support" indicators and "competitiveness advantages", and that ecotourism is linked to natural resources for research. Besides, the keyword "destination competitiveness" was utilized frequently and Langkawi, as the most popular tourism destination in Malaysia, was the focus of most researchers.

5. Discussion

Overall, there isn't much research on Malaysia's competitiveness as a tourist destination, either in terms of the number or quality. There were only 16 articles published in journals ranked from Q1 to Q4. Most published articles addressed Sarawak and Langkawi as a case study, studying the tourism competitiveness of rural tourism. Current literature exhibits significant lacunae regarding the competitive dynamics of Malaysian tourism, demanding systematic investigation. Regarding the research methodology, the result from the bibliometric analysis reveals that the quantitative method is more frequent (n=29, 87.8%). The authors propose that future research prioritize qualitative and mixed-method approaches. Expanded research on Malaysia's destination competitiveness is necessary due to the increased focus on the country's tourist development. The following recommendations for the future are founded on the remaining issues: Firstly, focusing on the demand perspective is important, as the supply of tourism goods and services is important to meet the tourism needs of tourists (Saiman, 2013). However, most of the current research in Malaysia is conducted from the perspective of the supply side. More researches considering diverse perspectives contribute to a better understanding of tourism destination competitiveness(Cronjé and du Plessis, 2020a). For instance, according to Tourism Malaysia, the top 3 tourist arrivals by country to Malaysia in 2019 were Singapore, Indonesia, and China, so understanding their needs will make Malaysia's tourism more competitive. Secondly, the tourism competitiveness model adopted by Malaysian scholars pays less attention to the indicators of sustainability.

In the existing international tourism journals, more and more scholars propose the influence of the well-being of residents, employment opportunities, and the ability of local professionals on the competitiveness of tourist destinations (Kubickova & Li, 2017; Kubickova & Lee, 2018). It is anticipated that Malaysian scholars will prioritize the welfare of residents. The tourist destination competitiveness model is mainly studied empirically in developed countries. Combined with the literature review mentioned, no set of indicators can be fully applicable to all countries, as different types of tourism destinations (Abreu-Novais, Ruhanen and Arcodia, 2016). This means that it is necessary to develop a model to investigate and measure the tourist destination competition in Malaysia. Last but not least, research about how to strengthen government decision-making should be considered(Airey and Chong, 2010). Issues such as visa, the Malaysia My Second Home policy, and accessibility should be of concern. The research findings will do a lot for the government by providing effective information.

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The Relationship Between the Motivation of Medical Visits among Millennial Tourists in Penang and Revisit Intention

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Abstract: This study focuses on the relationship between millennial medical tourists' motivations for visiting Penang and their intention to revisit. This study seeks to discover major variables of satisfaction and loyalty within this market group by investigating the factors that influence millennials' choice of Penang for medical tourism. Data were collected via Google Form surveys from millennial medical tourists in Penang. The findings will provide a comprehensive understanding of this demographic. The findings will also identify the relationship between the motivation of medical visits among millennial tourists in Penang and revisit intention.

Keywords: *Medical tourism, Millennial tourists, Motivation, Revisit intention.*

1. Introduction and Background

Medical tourism has emerged as a key segment of the global tourism business. Understanding the elements that drive medical tourists' decisions is critical for countries hoping to recruit and maintain this demographic. This study focuses on millennial medical tourists visiting Penang, Malaysia, to examine the relationship between their motivations for choosing Penang as a medical tourism destination and their intention to revisit Penang. With Penang evolving into a medical tourism hub, this study aims to provide useful insights into millennial tourist motivations in Penang and their revisit intentions. The millennial tourists are the targeted demographic due to their significant influence on consumer trends and involvement in healthcare decision-making. The findings of this study will add to the knowledge on medical tourism and have practical consequences for healthcare professionals, tourism stakeholders, and Penang authorities.

The factors influencing millennials' choice of Penang for medical tourism are categorized into push and pull factors. Push factors include limited healthcare options at home, affordable treatment in Penang, and a desire for holistic health experiences (Chen & Chen, 2015). Pull factors encompass Penang's reputation for quality medical services, accessibility, cultural appeal, and tourist attractions (Chen & Chen, 2015). Understanding these dynamics is crucial for Penang's medical tourism industry. Teo et al. (2017) found a positive link between destination image, satisfaction, and loyalty, suggesting that tailored experiences could enhance return visits. Khan and Alam (2014) noted the growing demand for comprehensive medical and holistic health services, which Penang uniquely offers.

Ensuring top-tier medical care, efficient service, and patient communication enhances satisfaction and loyalty, pivotal for Penang's medical tourism growth. By understanding millennials' motivations and adapting offerings accordingly, Penang can solidify its position as a preferred destination, fostering loyalty and industry expansion. Success hinges on exceeding expectations, focusing on affordability, quality care, cultural appeal, and overall positive experiences.

Medical tourism in Malaysia has grown into a significant industry, driven by factors such as high costs and long waiting times in wealthier countries, alongside shortcomings in the healthcare systems of less affluent nations. This growth presents opportunities for governments seeking economic benefits. However, Salmi (2019) indicates that challenges persist, including communication issues between patients and doctors, infrastructure deficits in emerging medical tourism destinations like Manipur, India, and varying healthcare standards across hospitals in Malaysia. These issues impact patient satisfaction and trust, influencing the decisions of medical tourists, particularly millennials. Additionally, according to the New Straits Times (2020), COVID-19 has posed further barriers to medical tourism in regions like Penang, underscoring the need for research to explore the motivations and revisit intentions of millennial medical tourists in this context.

2. Literature Review

High-quality healthcare facilities can either meet or exceed the patient expectations of millennial tourists. Meeting or exceeding such expectations leads increase in the probability of return visits (Pulungan, 2021; Kang et al., 2019). Price transparency also significantly impacts millennials' revisit intentions. Recent literature has shown that when tourists perceive they received fair pricing, they are more likely to have positive impressions and consider repeat visits (Cho et al., 2020; Wu et al., 2023). Additionally, tourists who travel for relaxation would likely have positive feedback for destinations with relaxation-focused activities, such as wellness programs, which positively influence revisit intentions (Barnes et al., 2019; Han, Kim, & Kim, 2018; Kim et al., 2011). Millennial tourists often rely on accessibility, as ease of transport contributes to overall satisfaction and trust, ultimately strengthening revisit intentions (Cham et al., 2020). Finally, tangible aspects such as local cuisine and culture also enhance satisfaction, as well as fostering revisit intentions (Chang et al., 2022; Huyghebaert et al., 2020; Lugosi, 2021; Chih et al., 2023). Together, these elements—facilities, price awareness, relaxation, accessibility, and tangible factors—shape millennials' medical tourism experiences and positively influence their intentions to revisit.

The availability of high-quality healthcare facilities is a critical factor influencing millennials' decisions to return to a medical tourism destination. Facilities offering advanced treatments or specialized care that are unavailable or inaccessible in the tourists' home countries contribute significantly to patient satisfaction and loyalty. Studies indicate that meeting or exceeding tourist expectations in healthcare services can lead to increased satisfaction, strengthening revisit intentions (Kang et al., 2019). This relationship underscores the importance of high-quality healthcare facilities in fostering millennials' intentions to return for follow-up treatments or other healthcare needs (Pohan, 2015; Pulungan, 2021).
H1: There is a positive relationship between facilities and revisit intention among millennial medical tourists to Penang.

Additionally, price transparency and awareness significantly impact revisit intentions among millennial medical tourists. Millennials are more likely to form positive impressions and consider repeat visits when they perceive that they have received good value for their money (Cho et al., 2020). Research suggests that higher prices often lead to higher perceived value. Good perception of value often leads to tourist loyalty, as they feel as if they are receiving worthwhile experiences (Wu et al., 2023). This perception of value and fair pricing leads to favorable memories, which further increase the likelihood of revisiting the destination (Eugenio & Mody, 2022).
H2: The relationship between price awareness and revisit intention among millennial medical tourists to Penang.

Providing relaxation-oriented activities, such as wellness programs such as spa treatments are positively associated with revisit intentions in medical tourism. Millennials increasingly seek destinations that promote physical and mental well-being, as relaxation effectively reduces stress and anxiety, thus enhancing overall satisfaction (Barnes et al., 2019; Han, Kim, & Kim, 2018). These factors contribute significantly to fostering a sense of well-being and encouraging future visits. Additionally, millennials have diverse preferences for relaxation. Many millennials favor calm environments and others prefer active wellness activities, making it essential for service providers to cater to varied relaxation needs (Hashemi et al., 2015).
H3: The relationship between relaxation and revisit intention among millennial medical tourists to Penang.

Transportation infrastructure and cultural inclusivity, significantly shape millennial tourists' revisit intentions for medical tourism destinations. Well-connected destinations with reliable transport networks and culturally sensitive communication, such as language translations and religious accommodations, enhance tourist satisfaction and build trust among millennials, which strengthens their revisit intentions (Marrocu & Paci, 2013; Massidda & Etzo, 2012). This approach reduces anxiety and fosters a sense of being valued, which, as studies suggest, encourages return visits (Aref & Gill, 2009; Goffi, 2013).
H4: The relationship between accessibility and revisit intention among millennial medical tourists to Penang.

Tangible elements—such as local cuisine, traditional crafts, and culturally significant architecture—play an influential role in millennials' intentions to revisit a destination. Research indicates that these physical

aspects evoke emotional responses and help form lasting memories, fostering a desire to return (Chang et al., 2022; Huyghebaert et al., 2020). Studies from other sectors demonstrate that tangible factors, like souvenirs and distinctive environments, enhance satisfaction and loyalty, ultimately encouraging repeat visits (Lugosi, 2021; Chih et al., 2023).

H5: The relationship between tangible and revisit intention among millennial medical tourists to Penang.

3. Research Methodology

This study investigates the relationship between the motivations for medical visits among millennial tourists in Penang influence their revisit intentions. This study employs quantitative methods to gather and analyze empirical data through surveys. Specifically, the study uses correlation analysis to examine the relationship between these motivations and revisit intentions. It uses a cross-sectional approach to collect data from individual tourists visiting hospitals in Penang at a single time point. To collect data, Google Forms surveys were utilized due to their accessibility on mobile devices, which encourages higher participation rates. The survey questions will be adapted from previous studies relevant to our research topic.

Quantitative studies depend on accurate generalizations from population and sampling data. Penang's medical tourism has shown substantial growth, with a 138% increase in Long Term Activity Pass (LTAPP) arrivals in the first half of 2023 compared to 2022. This study focuses on millennial tourists aged 28-43 who engage in medical tourism in Penang. Snowball sampling was used to gather data from at least 314 respondents visiting Penang hospitals through self-administered questionnaires.

Primary data were collected using questionnaires adapted from existing research. These surveys were tailored to the variables identified in our literature review framework. Both the independent and dependent variables were based on previous studies and adjusted to suit the study's objectives. The table below outlines the dimensions that were applied to the questionnaire.

Table 1: Instrument Questions

Dimensions	Items	Sources
Demographic profile	5 items	Researcher
	Independent Variable	
Relaxation	5 items	(Ashton, 2018)
Accessibility	5 items	(Cham et al., 2020)
Facilities	5 items	(Cham et al., 2020)
Price Awareness	5 items	(Cham et al., 2020)
Tangible	5 items	(Lee and Kim,2019)
	Dependent Variable	
Revisit Intention	5 items	(Cham et al., 2020)

The pilot test involved millennials between the ages of 28 to 43 years old engaged in medical tourism in Penang to assess their relevance to the research goals. Starting with 52 respondents for the pilot test, following G-Power software guidelines allowed for focused observation and data collection without the risks and costs of a larger rollout. The sampling technique used was snowball sampling, where respondents were recruited through referrals from existing participants. Upon collecting the responses, the data were tested using Cronbach's Alpha to test reliability before the actual study began. Additionally, descriptive analysis, focusing on mean scores and standard deviation, and regression analysis were used as needed to address the study's objectives, research questions, and hypotheses.

4. Results

This section presents sets of results relating to the profile of respondents who took part in the study by answering the online questionnaire. The statistics include the total sample and the comparison of participants

regarding their experience based on the demographic and geographic characteristics (gender, age, level of education, and region).

Profile of Respondents: Table 2 displays the demographic information of respondents who participated in the study.

Table 2: Demographic and Geographic Information About the Study

VARIABLE	FREQUENCY	PERCENTAGE
GENDER		
Male	181	57.6
Female	133	42.4
Total	**314**	**100%**
AGE		
28-35	28 - 35	191
35-43	35 - 43	123
Total	**314**	**100%**
OCCUPATION		
Government Sector	70	22.3
Private Sector	125	39.8
Private Business	25	8.0
Entrepreneur	37	11.8
Other	57	18.2
Total	**314**	**100%**
MARITAL STATUS		
Single	163	51.9
Married	151	48.1
Total	**314**	**100%**
CONFIRMATION OF MEDICAL VISIT TO PENANG		
Yes	314	100.%
No	0	0%
Total	**314**	**100%**
STATE OF ORIGIN		
Johor	12	3.8
Kedah	98	31.2
Kelantan	7	2.2
Kuala Lumpur	1	0.3
Melaka	7	2.2
Negeri Sembilan	1	0.3
Penang	73	23.2
Perak	50	15.9
Perlis	15	4.8
Selangor	40	12.7
Terengganu	4	1.3
Pahang	6	1.9
TOTAL	**314**	**100%**

Descriptive Statistics: The descriptive statistics for the variables Facilities, Price Awareness, Relaxation, Accessibility, Tangible, and Revisit Intention in the context of Medical Tourism provide the level of participation from respondents in answering the survey, as well as the variability in their perceptions.

Table 3: Descriptive Statistics

Descriptive Statistics			
Variable		**Mean**	**Std. Dev.**
IV1	Facilities	4.2100	0.7300
IV2	Price Awareness	4.3300	0.7270
IV3	Relaxation	4.3700	0.7420
IV4	Accessibility	4.3900	0.7230
IV5	Tangibles	4.4100	0.7240
DV	revisit intention among millennial medical tourists to Penang.	4.3100	0.7310

The descriptive statistics for Facilities, Price Awareness, Relaxation, Accessibility, Tangible, and Revisit Intention in the context of Medical Tourism display a high level of satisfaction among respondents overall. The mean scores indicate that, on average, respondents agreed with the items in the research instrument, falling on the scale of 4. This suggests a positive reception across the various factors assessed, indicating that respondents feel positive about the services and facilities offered during their medical tourism experience.

The mean scores for Facilities (M=4.21, SD=0.730), Price Awareness (M=4.33, SD=0.727)), Relaxation (M=4.37, SD=0.742) Accessibility (M=4.39, SD=0.723)), and Tangible (M=4.41, SD=0.724) all indicate a high level of agreement and satisfaction among participants. The same can be said for the dependent variable, Revisit Intention among millennial medical tourists to Penang (M=4.31, SD=0.731). Although the standard deviations show some variability in responses, overall, most respondents expressed positive experiences. These results point to the importance of these factors in shaping tourist satisfaction and potentially influencing their decision to revisit. The positive mean scores for Revisit Intention further underline the likelihood of respondents returning to the medical tourism facility based on their overall positive experience.

The Model Summary shows a robust regression model. The R value of.917 indicates a strong positive correlation between the predictors (facilities, price awareness, relaxation, accessibility, and tangible) and the dependent variable. Based on a R Square of.841, it can be deduced that 84.1% of the variability observed in the dependent variable is explained by the predictors. The Adjusted R Square (.839) accounts for the number of predictors and corrects for possible overfitting. The Standard Error of the Estimate (.26466) displays the average difference between the actual and predicted numbers. Overall, the model has strong explanatory power and prediction accuracy.

Table 4: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917[a]	.841	.839	.26466

Independent Variables	se	Beta	t	Sig.
Facilities	.040	.003	.047	.941
Price Awareness	.046	.15	3.199	.002
Relaxation	.060	.036	.590	.556
Accessibilities	.063	.318	5.130	.000
Tangible	.056	.460	8.055	.000

(*p<0.05; **p<0.001)

Dependent Variable: Revisit Intention for Medical Tourism in Penang.

Table 4 presents regression coefficients and standard errors. Multiple regressions were run to predict the overall motivation of medical visits among millennial tourists in Penang and revisit intention from four predictors: facilities, price awareness, relaxation, accessibility, and tangible factors. The correlation matrix shows how the variables are related to one another. Significant at the 0.01 level, the DV shows high positive associations with facilities (r = 0.679), price awareness (r = 0.798), relaxation (r = 0.848), accessibility (r = 0.885) and tangible (r = 0.895).

Table 5: Hypotheses Summary

Hypothesis		Result
H1	There is a positive relationship between facilities and revisit intention among millennial medical tourists to Penang.	Not supported
H2	The relationship between price awareness and revisit intention among millennial medical tourists to Penang.	Supported
H3	There is a positive relationship between relaxation and revisit intention among millennial medical tourists to Penang.	Not Supported
H4	There is a positive relationship between accessibility and revisit intention among millennial medical tourists to Penang.	Supported
H5	There is a positive relationship between tangible and revisit intention among millennial medical tourists to Penang.	Supported

Discussion

The first objective of this research is to find out a significant relationship between the motivations of medical tourism and revisit intention among Malaysian millennial tourists in Penang through the factors (Facilities, Price Awareness, Relaxation, Accessibility, and Tangible). Based on the findings obtained through the hypothesis, it is observed that there is a significant relationship between 5 factors (Facilities, Price Awareness, Relaxation, Accessibility, and Tangible) that affect the motivations of medical visits and revisit intention among millennial tourists in Penang.

H1*:* There is a positive relationship between facilities and revisit intention among millennial medical tourists to Penang.

For the first hypothesis, **H1,** there is no positive relationship between facilities and revisit intention among millennial visitors in Penang. According to (Kang et al., 2019; Pulungan, 2021), the location offers specialized medical centers for a variety of conditions, attracting individuals looking for unique or sophisticated therapies that are not available elsewhere. This can nurture loyalty and encourage return visits for further treatment, or future needs related to the same circumstances. For young tourists, the availability of such facilities can affect their choice of destination (Beladi et al., 2019). In addition, patient satisfaction depends on the performance of the healthcare facility; meeting or exceeding expectations promotes satisfaction, while a deficiency leads to disappointment (Pohan, 2015). Unfortunately, the current study discovered no relationship between facilities and revisit intention among millennial tourists in Penang. In this context, regarding Table 4.4.2, it can be determined that research hypothesis **H1** is not supported because the Facilities coefficient of (0.941, $p > 0.05$) indicates that it does not have a positive relationship that impacts revisit intention on medical visits among millennials in Penang.

H2*:* There is a positive relationship between price awareness and revisit intention among millennial medical tourists to Penang.

Research hypothesis **H2** has a significant relationship between price awareness and revisit intention. Tourists often cherish revisiting their favorite destinations, driven by their attractions. Understanding how tourists' price sensitivity influences their likelihood of returning is crucial for fostering repeat visits. Research, such as studies by Cho et al. (2020), reveals that when tourists feel they received a fair price or a deal that exceeded expectations, they are more inclined to consider revisiting. Positive perceptions of value enhance their fond memories of the place and increase their openness to future visits. Conversely, feeling overcharged or excluded can deter them from returning. Wu et al. (2023) further support this by demonstrating that tourists who perceive good value, even at higher costs, are more inclined to revisit destinations. In this context, regarding Table 4.4.2, it can be determined that research hypothesis **H2** is supported because it shows the significant coefficients ($p< 0.002$). In this context, the price awareness has a coefficient of 0.145, which will be the motivation for medical tourism and revisit intention among Malaysian millennial tourists.

H3*:* There is a positive relationship between relaxation and revisit intention among millennial medical tourists to Penang.

For the research hypothesis **H3,** there is no supported relationship between relaxation and revisit intention. Activities such as massages, yoga, meditation, and outdoor experiences (Han et al., 2018; Han et al., 2020) contribute to enhancing relaxation. Medical tourism locations also provide unique cultural exchanges that

foster positive emotions and happiness, ultimately improving mood, reducing anxiety, and promoting overall well-being (Kang et al., 2019). Furthermore, a study adapted from Han et al (2020)) explored the relationship between mindfulness meditation and patient satisfaction, finding that patients practicing mindfulness during hospital stays reported higher satisfaction levels and a greater likelihood of returning to the same hospital for future care. Unfortunately, the current study discovered no relationship between relaxation and revisit intention. In this context, regarding Table 4.4.2, it can be determined that research hypothesis **H3** is not supported because the relaxation coefficient of 0.556, $p > 0.05$, indicates that it does not have a positive relationship that impacts revisit intention on medical visits among millennials in Penang.

H4*:* There is a positive relationship between accessibility and revisit intention among millennial medical tourists to Penang.
Research Hypothesis **H4** has a significant relationship between accessibility and revisit intention. According to Kang et al. (2019), accessibility encompasses not only physical access but also cultural and linguistic considerations. Offering translated materials, culturally sensitive communication, and religious accommodations builds trust and inclusivity. This reduces anxiety, enhances the overall experience, and makes patients feel valued and supported, thereby increasing the likelihood of them returning for future visits. Additionally, integrating relaxation techniques into accessible healthcare services can reinforce the connection between accessibility and the intention to revisit. In this context, regarding Table 4.4.2, it can be determined that research hypothesis **H4** is supported because it shows the significant coefficients ($p< 0.000$). In this context, the price awareness has a coefficient of 0.318, showing that millennial tourists are looking to put their motivation in accessibility to medical visits in Penang.

H5*:* There is a positive relationship between tangible and revisit intention among millennial medical tourists to Penang.
Research Hypothesis **H5** has a significant relationship between tangible and revisit intention. The physical aspects of a setting—like its environment, facilities, and amenities—directly influence consumers' experiences and satisfaction, impacting their likelihood to return. Research on fast food restaurants illustrates this connection, showing that high-quality meals, excellent service, and a pleasant environment increase customer satisfaction and the desire to revisit. This suggests that when physical elements, such as delicious food, culturally authentic souvenirs, and a clean, attractive setting, exceed expectations, customers are more satisfied and inclined to return. Another study (Soleimani & Einolahzadeh, 2018) exploring service quality in travel agencies further supports this relationship. In this context, regarding Table 4.4.2, it can be determined that research hypothesis **H5** is supported because it shows the significant coefficients ($p< 0.000$). In this context, the price awareness has a coefficient of 0.460, showing that it will be the motivation for medical tourism and revisit intention among Malaysian millennial tourists.

RQ2: Which motivation of medical tourism has the highest significant relationship with revisit intention among Malaysian millennial tourists?
The study shows that Tangible is the factor motivating medical tourism in Penang that has the highest significant relationship after Accessibility with revisit intention among Malaysian millennial tourists. The results showed that Tangible and Accessibility have a positive relationship with medical tourism in Penang, which is the motivation to revisit intention among Malaysian Millennial tourists. In this context, the Tangible shows the highest value of beta because the beta value is ($\beta=0.460$, $p=0.000$) and the second highest is Accessibilities with the beta value is ($\beta=0.318$, $p=0.000$). It is significantly positive because the p-value of 0.000 is below the significance level of 0.05 (0.05%), showing that the majority of Malaysian Millennials are looking for motivation to revisit intention in medical visits in Penang.

H4 & H5: The highest significant relationship with revisit intention among Malaysian millennial tourists
Based on 5.2.2, it shows that Tangible and Accessibility have the strongest relationship motivation with revisit intention among Malaysian millennial tourists. Table 4.4.2 determined that **(H4 & H5)** is supported because perceived Tangible has the highest coefficient value of 0.460 and the second highest in Accessibility with a value of 0.318 compared to perceived Facilities (0.003), Price Awareness (0.145), and Relaxation (0.036).

5. Managerial Implications and Recommendations

This study explores how and why millennials choose Penang for medical tourism and how these choices impact their likelihood to return to the medical tourism destination. It contributes to healthcare and tourism research by identifying key reasons millennials seek medical care in Penang, such as quality, cost, relaxation, accessibility, and cultural experiences. These findings enhance our understanding of consumer behavior in medical tourism and highlight factors influencing return visits. Surveying a representative sample sets a standard for future research exploring similar relationships in different settings. Thus, this study not only advances our knowledge of medical tourism but also sets a foundation for future research on millennials' behaviors and motivations in Penang.

Moreover, for practical implications, understanding why millennials choose Penang for medical tourism and how it impacts their likelihood to return is crucial for various stakeholders. Healthcare providers and tourism professionals in Penang can use this knowledge to tailor their services and offerings to better suit millennial medical tourists. In addition, Marketing efforts can also benefit from insights into whether positive medical outcomes or cultural experiences drive return visits, allowing for more targeted strategies.

The study faced some challenges. Firstly, the study's validity could be compromised because of the sample size and representativeness of participants. A small sample does not accurately reflect diverse demographics or experiences in medical tourism, therefore, the findings may not apply broadly to all millennial visitors in Penang. Secondly, there's a risk of sample bias if participants are recruited from specific medical facilities or tourist spots, potentially skewing the results towards a particular subset of tourists. Additionally, using self-reported data to measure motivation and revisit intentions introduces biases like social desirability bias, where respondents may answer in ways they perceive as socially acceptable rather than reflecting their true feelings or intentions. Moreover, the methods used to gauge motivation and revisit intentions might not capture the complexity of decision-making among tourists. Finally, the study faced challenges due to millennials' varying levels of familiarity and proficiency with using Google Forms for survey responses.

Based on this study, there are some recommendations for future research. Firstly, a qualitative approach can be utilized via interviews with millennial travelers to understand their decision-making process and what factors influence their choice of Penang for medical tourism. The existing empirical data can be supported with qualitative evidence and vice versa. Secondly, conduct longitudinal studies that track millennial visitors over time to see how motivations evolve and whether positive early experiences lead to repeat visits. Additionally, future studies could focus on specific groups, such as particular regions or age groups, to simplify data collection. Collaborating with healthcare providers, travel agencies, and visitors in Penang would enhance the study's credibility and help implement its findings effectively. These steps can improve understanding and support strategies to enhance Penang's appeal as a medical tourism destination for millennials.

Conclusion

The findings of this study highlight the relationship of price awareness, convenience, accessibility, and significant elements in influencing the motivation among millennial tourists and their intention to revisit medical tourism destinations in Penang. The findings of the study show that, although convenience and flexibility are important in attracting first-time medical tourists, the variables but the results of our study show that they are not significant. While facilities and price awareness are important in encouraging first-time tourists, our findings show that these criteria do not significantly predict whether a tourist will return for future medical care or holidays; instead, the study emphasizes the relevance of other factors.

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The Impact of Guest Experience and e-WOM Intention Towards Five-Star-Rated Hotels in Kuala Lumpur

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Abstract: In the digital age, e-WOM shared by experienced hospitality guests is highly valuable, as its perceived authenticity helps reduce potential consumers' uncertainty when selecting accommodation. The purpose of this study is to evaluate the characteristics of guest experience that contribute to electronic word-of-mouth (e-WOM) intention at Five-star rated hotels in Kuala Lumpur. It entails examining aspects like entertaining, educational, aesthetic and escapist. Data for this study were gathered through self-administered questionnaires on 130 hotel guests who had experienced staying in Five-star rated hotels in Kuala Lumpur. SPSS was used to analyze the proposed hypotheses. This highlights the importance for key stakeholders in the hotel industry, particularly the Ministry of Tourism, Arts and Culture Malaysia (MOTAC), as well as hotel managers and operators, to prioritize these factors to gain a competitive edge and secure long-term profitability.

Keywords: *e-WOM, Guest Experience, Entertaining Experience, Educational Experience, Esthetic Experience, Escapist Experience*

1. Introduction and Background

In 2023, Tourism Malaysia reported 20.14 million international visitors, a remarkable 100% increase from 2022's 10.07 million visitors, generating RM71.3 billion in tourism revenue. Despite this growth, the number of visitors is still 22.8% below the pre-pandemic figures of 2019, when Malaysia welcomed 26.1 million visitors (The Edge Malaysia, 2024). This highlights the critical role of the hotel industry in accommodating diverse traveler needs. The hotel industry is highly competitive, with guest satisfaction being a key determinant of success (Razli et al., 2022). Online reviews on platforms such as Booking.com and TripAdvisor.com significantly influence travelers' decisions (Anastasiei et al., 2019). One way to measure the quality of a hotel's services is via electronic word of mouth or known as e-WOM. According to Salah et al. (2023), it has had a significant influence on the hotel sector in recent years. This is because social media and online review platforms have made it easier for consumers to share their particular experiences with others.

According to Becker and Jaakkola (2020), the idea of customer experience is still poorly understood, with much uncertainty regarding its origins, implications, and bounds. Consumers are increasingly relying on e-WOM to influence their purchase decisions, taking advantage of numerous online shopping possibilities and comprehensive customer feedback (Lee et al., 2021). Social media influencers shape positive e-WOM by distributing brand-related material on their platforms and influencing audience attitudes via personal experiences (Kapoor et al., 2021). However, there is still a lack of understanding of e-WOM behavior from a managerial perspective (Ngarmwongnoi et al., 2020). It is crucial for managers and practitioners to effectively harness e-WOM to influence customer journeys and enhance brand performance. According to Verma and Dewani (2020), the credibility of e-WOM messages is more influenced by the substance of the content rather than the identity of the source.

There is also a concern about customer experience and online expression, as highlighted by Anastasiei et al. (2019). Sustainable marketing not only aims to boost brand awareness and sales but also encourages consumers to support ethical companies. Some hotels, however, raise expectations by not publishing e-WOM on their websites. Therefore, understanding how online feedback on OTAs, including satisfaction and recommendation ratings, correlates with business success is vital (Tseng et al., 2020). Therefore, the primary objective of this study is to examine the e-WOM intention of hotel guests towards their experience at a five-star hotel in Kuala Lumpur.

2. Literature Review

Entertaining Experiences and e-WOM Intention

The guest experience is defined as the perceptions of consumers or users, conscious and subconscious, of their relationship with the brand as a result of all interactions during the life cycle. According to (Ali et al., 2022; Su et al., 2022), a positive experience for guests has to be created by direct or indirect interactions between guests and service providers through multi-dimensional responses such as cognitive, emotional, physical, sensorial, and social factors during their stay in the hotel. According to Kim et al. (2022), guest experience is a complicated issue for hospitality businesses, regardless of its critical position in company strategy to fulfill customer, brand, and business-related goals. More precisely, the experiential focus of the hospitality experience is crucial for memorability, which develops a behavioral intention for consumers to return or suggest.

Positive recommendations are usually less expensive and more successful than other forms of advertising (Kurdi et al., 2022). According to Parolin et al. (2019), in the case of electronic word-of-mouth (e-WOM), elements like sharing one's image with other customers, feeling good about oneself, and projecting one's social image while expressing thoughts have become more common and significant variables impacting buying decisions. Rasoolimanesh et al. (2021) also mentioned that it is important to have a memorable experience since it may encourage travelers to share, compare, and assess their experiences on social media or other online platforms. Hence, the hypothesis proposed:
H1a: There is a relationship between entertaining experiences and e-WOM intention.

Educational Experiences and e-WOM Intention

According to Hwang et al. (2019) and Ali et al. (2022), travel provides a learning experience like no other. It inspires people to seek out new places, keeping their pool of knowledge constantly topped up. It's a great way to not only learn new things and immerse yourself in a new culture, but it also provides a constant urge to continue learning. Improving your confidence enables you to deal with the challenges of higher education.

Ismagilova et al. (2021) stated that researchers contend that users will be more inclined to share their experiences and the website with others if they are knowledgeable of the importance of trusting user-generated media when using it. Generally speaking, educational experiences that actively engage visitors' minds, pique their curiosity, and inspire them to learn something new are crucial for achieving satisfaction, encouraging positive behavior, and spreading good word of mouth (Ali & Gaber, 2022).
H1b: There is a relationship between educational experiences and e-WOM intention.

Aesthetic Experiences and e-WOM Intention

According to Han et al. (2020), an aesthetic experience is connected to visitors' propensity to recognize and value the beauty and harmony of the physical surroundings. Examples of these include the atmosphere of a resort hotel, the hotel's aesthetics, which include eye-catching paintings, endearing wall décor, excellent lighting, calming music, a convenient and comfortable temperature, and an easily navigable layout. Loureiro et al. (2017) stated that, according to earlier theories, brand engagement and e-WOM may be mediated by satisfaction. Hence, the hypothesis proposed:
H1c: There is a relationship between aesthetic experiences and e-WOM intention.

Escapist Experiences and e-WOM Intention

Garrod and Dowell (2020) said that breaking away from everyday life is beneficial to people's health as well as the welfare of society as a whole. Kim et al. (2020) stated that one of the most well-acknowledged motivators in the travel literature is escapism. The modern world is seeing the monetization of culture and a growing disconnection from the natural world. In addition to these beneficial impacts, it was shown that e-WOM volume amplifies the effect of increased e-WOM valence in raising consumers' willingness to pay for hotel services. Thus, the hypothesis proposed:
H1d: There is a relationship between escapist experiences and e-WOM intention.

3. Research Methodology

The subject of this research study focuses on hotel guests who have experienced stays in Five-star rated hotels in Kuala Lumpur. Data for this study were gathered through self-administered questionnaires. Of the 135 questionnaires distributed, only 130 questionnaires were returned and 5 questionnaires were found to be unusable because of incomplete information or the respondents were not the subject of focus in this study. Therefore, 130 questionnaires were coded and analyzed. The non-probability convenience sampling was used to select the sample for this study. The convenience sampling is categorized into two major types, which are purposive sampling and judgmental sampling. In this study, purposive sampling was used because of the filtering questions in the questionnaire and the selection of the respondents was described. In answering the research objectives of this study, the statistical tool used in this study was the Statistical Product and Service Solutions (SPSS).

4. Results

Descriptive Analysis

The demographic features of the present study include gender, age, nationality, marital status, purpose of stay, travel composition, number of stays and length of stay. As presented in Table 1, the results indicated that out of the 130 respondents, 84 were male.

Table 1: Summary of Demographic Profile

Demographic variables	Categories	Frequencies	Percentages
Gender	Female	84	64.6
	Male	46	35.4
Age	18-20 years old	14	10.8
	21-25 years old	79	60.8
	30-40 years old	24	18.5
	41 years old and above	13	10.0
Nationality	Malaysian	127	97.7
	Foreign	3	2.3
Marital status	Single	88	67.7
	Married	42	32.3
Purpose of stay	Business trip	11	8.5
	Family trip	41	31.5
	Medical purposes	3	2.3
	Shopping	18	13.8
	Traveling	57	43.8
Travel composition	Alone	28	21.5
	Family members	60	46.2
	Friends	39	30.0
	Others	3	2.3
Times of stay	More than 3 times	10	7.7
	First time	67	51.5
	3 times	15	11.5
	2 times	38	29.2
Length of stay	1 night	51	39.2
	2 nights	72	55.4
	3 nights	6	4.6
	More than 3 nights	1	0.8

Mean and Standard Deviation of Study Variables

Table 2 shows that the research variables' means varied from 3.50 to 3.76. Participants in this study acknowledged that e-WOM intention towards Kuala Lumpur's Five-star rated hotels was influenced by the guest experience.

Table 2: Mean for Study Variables (n=130)

Variable	n	Mean (M)	Std. Deviation (SD)
e-WOM Intention	130	3.76	1.06
Guest Experience			
• Entertaining Experience	130	3.55	0.99
• Educational Experience	130	3.50	1.14
• Aesthetic Experience	130	3.75	0.97
• Escapist Experience	130	3.75	0.96

Pearson Correlation

Table 3 exhibits the results of a correlational research design between variables. Strength of correlation as follows: r=1 was a perfect relationship, r≥0.7 with a strong relationship, meanwhile 0.5<r <0.7 as a moderate relationship, Next r ≤ 0.5 was a weak relationship, the last strength was r=0 means no relationship (Bhandari, 2022).

Table 3: Summary Correlations Analysis of Guest Experience and e-WOM Intention

		e-WOM Intention	Entertaining	Educational	Aesthetic	Escapist
e-WOM Intention	Pearson Correlation	1	.787**	.757**	.795**	.785**
	Sig. (1-tailed)		.000	.000	.000	.000
	N	130	130	130	130	130
Entertaining	Pearson Correlation	.787**	1	.813**	.825**	.822**
	Sig. (1-tailed)	.000		.000	.000	.000
	N	130	130	130	130	130
Educational	Pearson Correlation	.757**	.813**	1	.801**	.780**
	Sig. (1-tailed)	.000	.000		.000	.000
	N	130	130	130	130	130
Esthetic	Pearson Correlation	.795**	.825**	.801**	1	.848**
	Sig. (1-tailed)	.000	.000	.000		.000
	N	130	130	130	130	130
Escapist	Pearson Correlation	.785**	.822**	.780**	.848**	1
	Sig. (1-tailed)	.000	.000	.000	.000	
	N	130	130	130	130	130

From Table 3, the results showed a value to be r = 0.787 and p < 0.001, which was regarded as strong. It demonstrates that there is a favorable association between entertaining experience and e-WOM intention. Therefore, hypothesis 1 was supported.

Additionally, the table shows that the correlation coefficient was r = 0.757 with a p-value of < 0.001, implying that there is a strong association between e-WOM intention and educational experience at the Five-star rated hotel in Kuala Lumpur. Thus, hypothesis 2 is justified.

Hence, the results revealed a correlation coefficient of r = 0.795 and a p-value <0.001 less than 0.01, which demonstrates a strong relationship between the goal of esthetic experience and e-WOM intention. Consequently, hypothesis 3 is validated.

The findings, which showed a substantial association between escapist experience and e-WOM intention, were conclusive and included a correlation coefficient of r = 0.785 and a p-value < 0.001. Thus, hypothesis 4 is fully supported.

Discussion

This study investigates the predictors of e-WOM intention. Specifically, it examined the relationship between hotel guest experience and e-WOM intention towards Five-star rated hotels in Kuala Lumpur.

Based on the findings of this study, entertainment experience has given impact on e-WOM intention. Entertainment is one of the necessities of human life. As the world is experiencing more technological advancements, more ways of entertainment are coming into play in the daily lives of human beings. These findings were aligned with Su et al. (2022) and Ahn et al. (2019), enjoying various amenities, activities, facilities, or events can produce entertaining experiences that engender life satisfaction during hotel stays.

Additionally, there is a significant relationship between the educational experience and e-WOM intention. This finding is aligned with the statement mentioned by Hwang et al. (2019) and Ali et al. (2022) that educational experiences that pique visitors' interest, stimulate their curiosity, and encourage learning are essential for fostering positive behavior, positive word-of-mouth and visitor satisfaction. The findings indicate that the hotel guests enhance their interest in learning, novel skills or knowledge during their stay.

Moreover, the aesthetic experience has a significant relationship with e-WOM intention. As discussed by Loureiro et al. (2017) and Han et al. (2020), spending time in an aesthetically pleasing environment can help lower stress levels and alleviate symptoms of depression. Hotel guests are inclined to appreciate the hotel's atmosphere when they focus on the smaller design details. The visual experience creates an initial impression of the hotel, such as eye-catching paintings, endearing wall décor, excellent lighting, calming music, a convenient and comfortable temperature, and an easily navigable layout.

In addition, the majority of respondents expressed that they felt at home during their stay, particularly when reflecting on the escapist experience. Many associate comfort, security and safety with the feeling of "home." These emotional connections play a significant role in the goal of electronic word-of-mouth (e-WOM), encouraging visitors to share their opinions about the hotel. Given the hotel's affordable rates and family-friendly atmosphere, guests are likely to recommend it to friends. They will also share their experiences, including photos and videos, on social media, which further amplifies their importance (Kim et al., 2020 & Garrod et al., 2020).

5. Conclusion and Future Research

According to the research findings, guest experiences at hotels significantly impact electronic word-of-mouth (e-WOM). Whether a guest's experience is highly positive or disappointing directly affects the type of review they leave. Positive experiences generally lead to favorable reviews, while negative ones result in critical feedback. Consequently, the experiences shared through review platforms are crucial in shaping a hotel's reputation and influencing future guests' booking decisions. Hopefully, this study benefited and offered strong evidence for recognizing the impact of guest experience and e-WOM intention towards Five-star rated hotels

in Kuala Lumpur. The findings and suggestions can also be used to inform future research and the growth of future e-WOM intention.

From a theoretical perspective, this study aims to contribute to the existing body of knowledge on guest experience and e-WOM intention within the context of the hotel industry. By analyzing the impact of these factors on hotel guests in Kuala Lumpur, the study can provide valuable insights into consumer behavior and decision-making processes, thus enriching the academic literature on hospitality management and marketing. From a practical perspective, this research study can offer practical implications for improving service delivery, customer engagement, and management reputation. By understanding the impact of guest experience and e-WOM intention, the Malaysian government, especially the Ministry of Tourism, Art and Culture Malaysia (MOTAC), hotel managers and operators and industry players can identify areas for improvement and develop targeted strategies to enhance the overall guest experience and encourage positive online reviews and recommendations.

A number of shortcomings have been identified in the study. The researchers' collected data is limited in scope and primarily focuses on that specific location. As a result, the future should widen the scope by concentrating on another state in Malaysia. Another drawback is that the survey only looked at the perspective of hotel guests. As a consequence, beforehand spreading the survey, the future researcher might conduct a focus group with industry players, hotel management, and hotel providers to confirm the dimensions for each hotel guest experience.

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Sustaining Heritage Through Culinary Tourism: Exploring International Tourists' Ethnic Dining Experiences in Kuala Lumpur, Malaysia

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Abstract: Ethnic restaurants have emerged as popular venues for cultural and culinary exploration, offering authentic ethnic cuisine and distinctive cultural experiences. In Malaysia, these restaurants serve as valuable spaces for tourists to engage with the multicultural landscape, shaped by Malay, Chinese, Indian, and indigenous culinary traditions. This study aims to understand the motivations driving international tourists to dine at Malaysian ethnic restaurants and to explore their dining experiences in the Kuala Lumpur area. A qualitative approach was employed, involving semi-structured interviews with 15 international tourists in key tourist areas. Data were recorded, coded, and analyzed through thematic analysis to gain insight into these tourists' experiences and perceptions. Findings reveal that tourists are primarily motivated by a desire to explore new flavors, cultural authenticity, economic considerations, and the influence of social and digital recommendations. The study further identifies elements that shape dining experiences, including taste preferences, educational aspects within the restaurant, entertainment, cultural immersion, and post-dining reflections. These sensory and social components create a comprehensive, immersive experience that enhances satisfaction and influences tourists' intent to revisit and recommend ethnic dining venues. This study provides insights for restaurant owners and tourism stakeholders, underscoring the value of authentic decor, diverse menu options, and culturally resonant symbols that enrich the dining environment. By understanding the factors that drive tourist satisfaction, restaurants can refine their offerings to meet tourists' expectations, fostering deeper cultural connections and contributing to Malaysia's identity as a culturally rich tourist destination. The findings support strategies to improve service quality and cultural engagement in ethnic restaurants, strengthening their role in Malaysia's tourism sector.

Keywords: *Dining experience, Ethnic restaurant, International tourist, Cultural experiences, Heritage dining*

1. Introduction and Background

Ethnic restaurants have become an integral part of the global dining scene, particularly among consumers drawn to the unique cultural experiences and diverse culinary offerings that these establishments provide. In Malaysia, a nation celebrated for its multicultural identity and rich heritage, ethnic restaurants held a distinctive role, reflecting the fusion of culinary traditions shaped by centuries of interaction among Malay, Chinese, Indian, and various indigenous communities. With an estimated population of 32.68 million in 2020, Malaysia's demography—predominantly Malay (69.3%), followed by Chinese (22.8%) and Indian (6.9%) communities, alongside smaller ethnic groups—underpinned the country's reputation as a "melting pot of Asia" (Kee & Abdullah, 2018; Yusoff & Soltani, 2013). The fourteen states that have in Malaysia have contributed a unique culinary tradition, creating a gastronomic landscape that is rich in regional diversity and cultural depth.

In the multicultural environment, ethnic restaurants served as important channels for both cultural exchange and culinary exploration. These restaurants offered more than food; they created a setting for immersive experiences where people could encounter cultural stories, traditional ingredients, and authentic cooking methods from various ethnic backgrounds. Dining at these ethnic restaurants often provides international tourists with an accessible form of cultural immersion, described as "tourism at home" (Cohen & Avieli, 2004). Such experiences allowed tourists to engage with a different culture within a familiar setting, fostering a deeper appreciation for Malaysia's diverse heritage.

The ethnic dining restaurants seem to reflect broader trends in global tourism, where food has become a focal point of travel, with tourists dedicating substantial portions of their budgets to experiencing local and regional cuisines (Ting et al., 2019). According to a few authors, tourists' attraction to ethnic restaurants was not solely based on the novelty of the food but also on the opportunity to gain cultural insight, get into the social

connections, and fulfil a desire for authenticity (Bell et al., 1994; Gaytán, 2008; Sukalakamala & Boyce, 2007). Ethnic restaurants met these needs by creating environments where cultural education and sensory satisfaction intertwined, satisfying tourists' cravings for new and memorable experiences. Moreover, tourism behaviors often align with dining experiences, as they encompass motivations related to escapism, social interaction, and the reflection of post-experience (Jang & Eves, 2019; Jeong & Jang, 2011).

The tourists' incoming intentions also affected the experiential appeal of ethnic dining, including repeat visits and positive recommendations, and these often inspired them to travel to the cuisine's country of origin. Thus, ethnic restaurants that have in Malaysia represent a merging of tourism and culinary exploration, providing tourists with taste and cultural experience without leaving the country (Liu & Mattila, 2015). Understanding the elements that drove international tourists' interest in ethnic dining not only informed restaurant management and marketing strategies but also enhanced Malaysia's reputation as a culinary destination that celebrated cultural diversity through its food.

This study addressed the motivations and experiential aspects that drew international tourists to ethnic restaurants in Malaysia, providing insights into how sensory engagement, cultural authenticity, and social interactions shaped the appeal of these establishments. By examining these dimensions, the research contributed to the development of strategies aimed at enhancing the cultural and culinary experiences offered by ethnic restaurants, supporting Malaysia's positioning as a distinctive and culturally rich destination for global tourists.

2. Literature Review

The Concept of Ethnic Restaurants

Ethnic groups are generally defined by distinct cultural markers such as language, attire, and culinary practices, which differentiate them from other communities and are often deeply tied to their regions of origin (Hirschman, 2001). This concept is critical in understanding the framework of ethnic restaurants, which serve as cultural and culinary representations of these groups. Marinković et al. (2015) stated that "ethnic restaurant" is sometimes synonymous with themed establishments that provide consumers with distinctive and often unfamiliar culinary experiences within an atmosphere carefully crafted to reflect the ethos of the represented culture. These restaurants aim to offer an immersive dining experience that encapsulates the cultural and gastronomic essence of a particular ethnic group, enabling patrons to engage with elements of a unique heritage through taste, ambiance, and service.

A defining characteristic of ethnic restaurants is their ability to cater not only to diners but also to potential customers drawn in by various sensory cues—from the establishment's name and menu to the aromas wafting from the kitchen and traditional music playing inside. Tsai and Lu (2012) suggest that ethnic restaurants often diverge from prevailing trends in the restaurant industry, grounded as they are in deeply rooted cultural customs. This emphasis on authenticity is reflected in findings that such establishments balance sophistication with a relaxed atmosphere, creating an experience both unique and enduring (Marinkovi et al., 2015). Moreover, researchers argue that the authenticity and longevity of ethnic restaurants depend on maintaining high standards in culinary and service quality (Tsai & Lu, 2012). Consequently, ethnic restaurant operators are advised to conceptualize their establishments to deliver not only a satisfying dining experience but also a culturally resonant ambiance. Elements such as decor, furniture, lighting, and seating arrangements significantly influence customers' perceptions, with research showing that cohesive alignment among a restaurant's name, interior, and menu effectively conveys its ethnic theme (Marinkovi et al., 2015).

Motivation to Visit Ethnic Restaurants

Motivations to attend an ethnic restaurant are often based on the three constructs, namely, pre-experience, during-experience, and post-experience (Nguyen et al., 2020). Before the experience, motivations for experience include seeking novelty, culture exploring, learning and authenticity (Jang, 2017). Identified motives are also met by frequenting ethnic restaurants, as they provide a culturally authentic experience related to the origin of the cuisine and a taste of the unknown in terms of flavours and traditions to be experienced. Yet, as unfamiliarity could be regarded as a potential uncertainty threat on the part of some, this further complicates the decision-making process (Youn & Kim, 2018).

Consumer attitudes toward dining in ethnic restaurants are shaped by multiple factors, including perceived quality, social value, and the establishment's reputation. These attitudes significantly impact the overall enjoyment and satisfaction of the dining experience (Lee & Chung, 2019). Research indicates that motivations for ethnic dining are influenced by factors such as cultural knowledge, perceived cultural distance, and previous experiences, with past encounters playing a particularly prominent role in shaping future dining preferences (Lee & Chung, 2019).

Moreover, a reliable source of information on one hand, such as through media, recommendations from someone, or direct experience creates familiarity and on the other side has an impact on intention to use ethnic restaurants or not. In doing so, these information channels educate diners on the cultural and culinary context of the ethnic dining environment and hence reduce their perceived risks to engage in the ethnic dining experience (Lim et al., 2020) more fully. As a result, previous experiences tend to be critical for service encounters, since they establish expectations in regard to important characteristics such as the quality of food, the ambience and the service have a greater effect on customer attitudes and inclinations than other factors (Jang, 2017).

Post-Dining Experiences

Post-dining behaviors in ethnic restaurants are shaped by the interplay of cuisine, service quality, ambiance, and social interactions (Ingerson & Kim, 2016). These elements collectively influence how patrons perceive authenticity, with ethnic restaurants often regarded as “tourism-at-home” experiences that offer cultural immersion without travel. Authenticity in these settings is key, as it fulfills both curiosity and sensory expectations, providing a satisfying experience that is deeply tied to the cultural origins of the cuisine (Sukalakamala & Boyce, 2007).

The perceived authenticity and quality of the experience play a significant role in enhancing satisfaction, influencing long-term behaviors such as recommendations, repeat visits, and even a desire to travel to the cuisine’s native country (Youn & Kim, 2018; Lu et al., 2015). Positive experiences often lead patrons to incorporate elements of ethnic cuisine into their own lives, whether through experimenting with recipes or using specific ingredients, which strengthens their connection to the culture (Hwang et al, 2018). The unique motivations behind ethnic dining, particularly the quest for cultural authenticity, amplify its impact on future behavior. These experiences act as gateways to ongoing cultural exploration, where ethnic dining becomes more than a meal—it cultivates sustained interest and a deeper engagement with the culture itself.

3. Research Methodology

This study employed a qualitative research design to explore the motivations and experiences of international tourists dining at ethnic restaurants in Malaysia. Guided by a conceptual framework focused on tourists' reasons for choosing ethnic dining and their related experiences, the study developed in-depth, semi-structured interview questions. In-depth interviews allowed for a nuanced examination of individual perspectives, offering flexibility to explore emerging themes based on participant responses. This approach provided the structure needed to capture rich insights into the complex motives and expectations associated with ethnic dining.

Purposive sampling is a popular method in qualitative research, which, as mentioned by Soebagyo et al. (2021), allows for the inclusion of participants who fit the requirements of the study. International tourists who had dined in ethnic restaurants featuring local Malaysian or culturally representative cuisine were selected from well-known tourist locations in Kuala Lumpur, including KLCC, Pasar Seni, and Bukit Bintang. Researchers selected these tourist attractions as recruitment sites to facilitate access to informants. Data saturation determined the sample size, initially set at ten participants, but expanded to fifteen as needed to achieve comprehensive thematic coverage.

Data were collected through semi-structured interviews and recorded with consent, a method noted for its adaptability in qualitative research (George, 2022). Thematic analysis helped to identify, organize, code, and categorize data into patterns, which allow for a unified interpretation of participant experiences. To enhance the credibility of the study (Cresswell, 2014). Triangulation was performed involving different sources of data

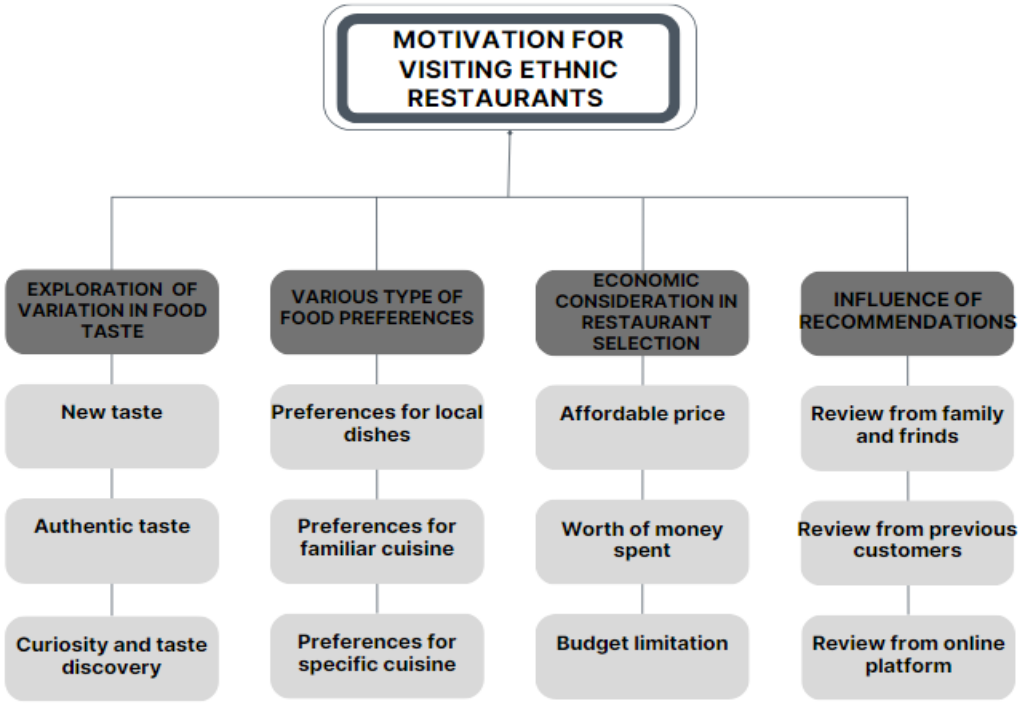
and the results were compared with those of other researchers to avoid some possible biases (Abdalla et al., 2018). Direct quotes and contextual details were incorporated to ensure validity and offer a realistic portrayal of international tourists' motivations, supporting a deeper understanding of ethnic dining as a culturally immersive experience within Malaysian tourism.

4. Findings and Discussion

Motivations for Visiting Ethnic Restaurants in Malaysia

Analysis of interviews with international tourists revealed several key motivations for dining in ethnic restaurants in Malaysia. These include the desire to explore a variety of food flavors, preferences for specific cuisines, economic considerations, and the influence of social and digital recommendations on dining choices, as shown in Figure 1.

Figure 1: Findings on motivation for visiting ethnic restaurants



Exploration of New Food Tastes

For many tourists, the search for novelty and adventure is a strong motivator. Dining in an ethnic restaurant offers an opportunity to experience flavors, textures, and ingredients that deviate from their usual diet. The pursuit of new culinary experiences allows individuals to "get a change" from their everyday meals, reflecting a desire for cultural exploration and connection. Interviewees reported that tasting unfamiliar dishes provided insights into local customs, with many, like the Japanese and Indonesian respondents, expressing enthusiasm for contrasting their home cuisine with Malaysian offerings. This drive aligns with tourism motivation theories, where novelty-seeking is pivotal (Jang & Namkung, 2009). The experience of discovering unique yet relatable flavors, as mentioned by respondents from Myanmar, further illustrates how exploring novel tastes can foster a sense of cultural engagement and enjoyment.

"I like to taste food. I would like to try a new taste of food from Malaysia because I would like to know what the difference is between the taste of Malaysian and Japanese food." (I9, Japan)
"Yeah, of course. We want to try food that we haven't tried before so we can know how it tastes." (I1, Indonesia)
"Similar dishes but different tastes make me interested and motivated." (I12, Myanmar)

Varied Food Preferences

The diversity of food in Malaysia allows tourists to indulge specific preferences, ranging from local Malay dishes to familiar cuisines with a regional twist. Respondents expressed interest in trying iconic dishes like nasi lemak and rendang, which have become cultural symbols representing Malaysian heritage. Preferences were also guided by familiarity and comfort; some respondents sought flavors that closely resembled their home cuisine, choosing dishes that felt like "safe options". Others appreciated the availability of Chinese and Indian cuisine, finding familiarity in flavors that echo elements of their own culture. The attraction to specific, well-known Malaysian dishes demonstrates how food serves as a medium for cultural connection, where tourists can encounter local identity through iconic flavors (Polat & Polat, 2020).

"I prefer choosing dishes that I have never tried before because for me, I travel so far, so why would I eat food that I can buy at home?" (I2, Indonesia)

"I think the biggest reason is because it is close to my actual cuisine in my hometown, like ordering rendang. It's like a safe option." (I15, Indonesia)

Economic Considerations

Economic factors significantly influence dining choices, with many tourists seeking affordability while ensuring quality. As Steptoe et al. (1995) assert, financial considerations play a crucial role in consumers' food choices. Interviewees mentioned the importance of balancing quality and price, particularly those from countries with a lower currency value compared to the Malaysian ringgit. For instance, a tourist from Nigeria highlighted the need to find budget-friendly options while ensuring the dining experience was worthwhile. This focus on economic value, aligned with previous research (Choe & Kim, 2018), shows how price sensitivity shapes tourists' decisions, with affordability and perceived quality driving repeat visits to specific restaurants.

"The price range, but if the food is worth trying, I would like to spend my money on it without doubting it." (I9, Japan)

"So the price is very important, but the quality also matters to me. Even if the price is low, sometimes I don't prefer certain places because quality is more important than price." (I14, Iran)

"I have to look for the cheapest ethnic restaurants to manage my budget since my country's currency is lower." (I13, Nigeria)

Influence of Recommendations

Social and digital recommendations play a central role in tourists' dining decisions, with word-of-mouth (WOM) and electronic word-of-mouth (eWOM) significantly impacting restaurant choice. Many respondents mentioned relying on recommendations from friends, family, and online reviews to guide their dining experiences. For instance, a Japanese tourist noted the influence of her father's advice, given his long-term residence in Malaysia, which offered insight into local dining. Similarly, Indonesian tourists reported consulting platforms like TikTok and Instagram, where visual recommendations sparked interest and influenced their choice of restaurants. eWOM from past customers on online platforms reinforced the value of social proof, with respondents frequently reading reviews to gauge the quality and authenticity of ethnic dining options.

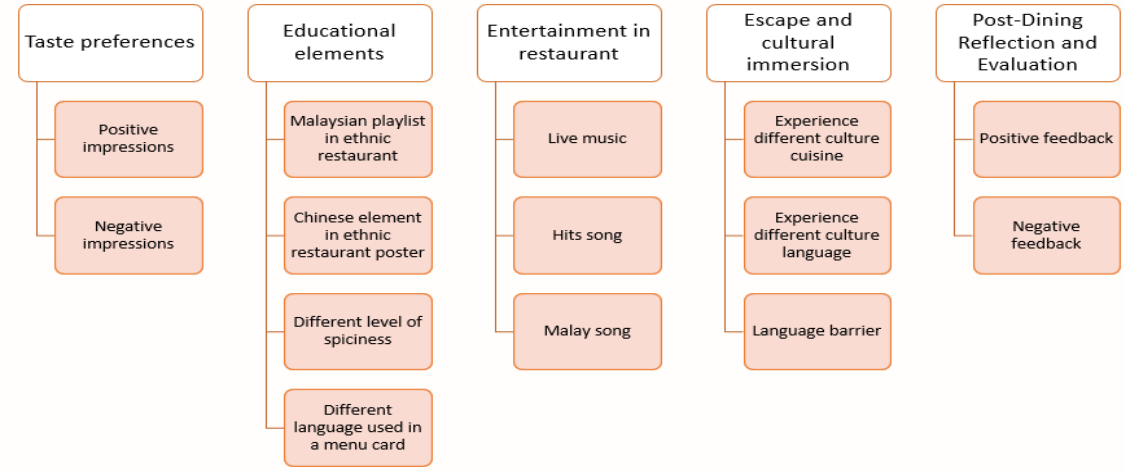
"We always find videos or reviews from the internet... and listen to our Malaysian friends' recommendations." (I1, Indonesia)

"I usually read the reviews before trying it because from there I know if the restaurant has good reviews." (I9, Japan)

International Tourists' Dining Experiences

As shown in Figure 2, international tourists' dining experiences in ethnic restaurants in Malaysia were shaped by factors including taste preferences, educational elements, entertainment, cultural immersion, and post-dining reflections.

Figure 2: International tourists' dining experience at ethnic restaurants



Taste Preferences

The sensory experiences associated with taste strongly influenced tourists' perceptions of ethnic restaurants. Many respondents expressed positive reactions to the flavors, highlighting the enjoyment of the distinctive tastes they encountered. However, not all experiences were favorable; for instance, some tourists felt that certain Malaysian dishes were too sweet compared to their home cuisine, which impacted their satisfaction. This interplay between positive and negative taste experiences reflects the broader challenge of meeting diverse international preferences within ethnic restaurant settings.

"Feeling great to know the taste of different cuisine rather than my cuisine." (I11, Thailand)
"I didn't enjoy the experience because the food here is more sugary than in my country." (I13, Nigeria)

Educational Elements

Ethnic restaurants also provided educational opportunities, as tourists encountered various cultural symbols and practices within the dining environment. Examples included listening to local music, observing traditional decor, and reading multilingual menu items, which collectively conveyed cultural authenticity and depth. Tourists noted that the presence of Malay songs, Chinese calligraphy, and Tamil menu descriptions added educational value, allowing them to experience facets of Malaysian culture through their meal.

"Posters in the restaurant sometimes show where the food comes from, like a Chinese restaurant with Chinese elements or writing." (I2, Indonesia)
"In Mandarin or Tamil restaurants, they have explanations on the menu card, but we usually ask the waiter because we don't understand." (I1, Indonesia)

Entertainment in the Dining Environment

Entertainment, particularly through music, enhanced the cultural experience by setting an immersive atmosphere. Respondents noted that live music or playlists featuring Malaysian hits elevated their dining experience, fostering a sense of place. This use of music as a cultural bridge was appreciated by tourists who saved Malaysian songs to remember their experience. Thoughtfully selected music, which resonated with the cultural theme of the restaurant, transformed a meal into a multisensory experience, leaving tourists with lasting memories.

"Usually, music...they will have live music. It adds to the experience." (I1, Indonesia)

Cultural Immersion

Dining in ethnic restaurants served as an immersion in a culture, allowing tourists to experience and learn about local traditions, customs, and languages within a familiar environment. Informants from countries like Turkey and Japan described ethnic dining as a cultural experience, where the ambiance, decor, and staff attire provided a window into Malaysian culture. The language differences also added to this feeling of immersion, creating an experience of "tourism-at-home" (Cohen & Avieli, 2004). This is evident in many ethnic restaurant

strategies, where the management places significant emphasis on the décor to strengthen the cultural identity through the physical environment (Ishak et al, 2023).

"You get to experience different cultures from parts of the world, and you are exposed to what you weren't exposed to before." (I6, Turkey)
"The language also makes me feel like I escaped from my own culture." (I7, Jordan)

Post-Dining Reflection and Evaluation

In the post-dining phase, tourists generally reflected positively on their experiences, with satisfaction linked to factors such as food quality, service, and hygiene. Respondents often reported feeling satisfied, and many stated that cleanliness was a key component of their dining experience. Negative feedback was generally linked to specific taste preferences that did not align with their culinary norms.

"I felt satisfied." (I9, Japan)
"Mostly I was satisfied with those restaurants." (I10, Myanmar)
"If the restaurant is clean and hygienic, I feel good because cleanliness is essential for me." (I14, Iran)

5. Conclusion

This study has provided insights into the motivations and dining experiences of international tourists in Malaysia's ethnic restaurants, revealing how a blend of sensory, cultural, and practical factors influences their choices and satisfaction. Tourists are drawn to ethnic dining for various reasons, including the novelty of exploring unfamiliar flavors, textures, and presentation styles, as well as the opportunity to engage with local customs and traditions through cuisine. The immersive environment of ethnic restaurants—enhanced by cultural decor, traditional music, language elements, and service—allows tourists to feel as though they are participating in a cultural experience, often described as a "tourism-at-home" encounter. These elements, combined with affordability and positive recommendations from both social and digital sources, collectively shape tourists' dining decisions. Their post-dining reflections, shaped by criteria like taste, ambiance, and service quality, reveal that ethnic dining in Malaysia offers a rich, multifaceted experience, connecting tourists with the country's multicultural heritage in meaningful ways.

Theoretically, this study enhances our understanding of tourist dining behaviors in ethnic restaurant contexts, particularly in multicultural settings like Malaysia. By identifying key motivations, such as novelty-seeking, cultural immersion, and practical considerations, this research contributes to the broader literature on cultural tourism and consumer behavior, offering a nuanced perspective on how ethnic dining serves as both a culinary experience and a form of cultural engagement. The study highlights how ethnic restaurants function as cultural spaces that allow tourists to encounter and appreciate local heritage, broadening the scope of cultural tourism research and advancing knowledge on the intersection of food, culture, and tourism.

Practically, the findings provide valuable insights for restaurant owners and tourism stakeholders aiming to enhance their offerings to meet the needs of international tourists. Restaurants can leverage these findings by focusing on elements that align with tourists' expectations, such as creating an authentic ambiance, offering diverse menu options that highlight unique local flavors, and engaging with cultural symbols that enhance the dining environment. By crafting immersive dining experiences that showcase Malaysia's multicultural richness, ethnic restaurants can attract and satisfy tourists, positioning ethnic dining as a cornerstone of the tourist experience and supporting Malaysia's broader tourism objectives by encouraging repeat visits and longer stays. Despite its contributions, the study faced certain limitations, particularly in participant recruitment and data collection. Conducting in-depth interviews with tourists posed challenges due to their limited availability during vacations, and the interview sessions often conflicted with their travel itineraries, leading to lower participation rates. Additionally, while some tourists initially agreed to participate in online follow-ups, response rates were low, reducing consistency in data collection and potentially introducing bias into the findings. This limitation restricts the generalizability of the study, as the limited sample size may not fully represent the diversity of international tourists visiting Malaysia.

To address these limitations, future research might consider alternative data collection methods, such as

shorter surveys conducted directly at restaurants or via social media platforms. These methods could increase tourist participation by minimizing time demands and improving response rates. Clear communication regarding the research purpose and time commitment may also help encourage participation. Targeted recruitment through online forums and social media, with concise and engaging messages that highlight the study's value, could attract a broader and more diverse participant pool. Additionally, while this study utilized qualitative methods to capture in-depth insights, future research could benefit from integrating quantitative methods. Surveys with larger samples could quantify the prevalence of certain motivations and satisfaction factors among tourists, enhancing generalizability and providing a more comprehensive picture of tourists' dining behaviors in ethnic restaurants. Quantitative data could complement the rich qualitative insights gained here, creating a balanced approach that strengthens understanding and supports practical recommendations for the tourism and hospitality sectors.

In conclusion, while these limitations present challenges, they also underscore the importance of adaptable and accessible research approaches in understanding tourist behavior. By employing flexible data collection strategies, integrating quantitative methods, and expanding recruitment efforts, future research can build on this study to gather richer and more reliable insights into how ethnic dining influences the experiences of international tourists, further contributing to the fields of cultural tourism, consumer behavior, and hospitality.

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Conservation and Preservation of Historical Structures in Batu Gajah, Perak

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Abstract: The preservation and restoration of historic buildings are essential for promoting sustainable development and preserving cultural heritage. This paper delves into a case study of the challenges and endeavors associated with preserving and conserving historical structures in Batu Gajah, Perak, a town renowned for its extensive architectural heritage. The objective of the investigation is to evaluate the current restoration and preservation practices, as well as to identify the deficiencies of the structural components and the appropriate materials for their replacement. A qualitative case study, which encompassed interviews, site surveys, and archival analysis, was implemented to acquire data and insights. The results indicate that Batu Gajah is treasure-rich in historical structures that represent distinct architectural styles and eras. These structures are of significant and symbolic to the cultural, historical, and artistic value, as they serve as a testament to the town's development over time. Nevertheless, dilapidation, deterioration, and urbanization pressures pose a threat to many of these poor and forgotten structures. The results of the investigation highlight the challenges that historically significant structures face in terms of preservation and conservation, including inadequate legislative frameworks, insufficient financial resources, and inadequate public awareness and appreciation. This investigation proposes successful conservation strategies and solutions that have been implemented at other heritage sites, thereby offering valuable insights for Batu Gajah.

Keywords: *Conservation, Preservation, Historical Structures, Batu Gajah*

1. Introduction and Background

The study of historical structures is mainly important in the world because it serves as a witness to humanity's rich cultural past and highlights architectural marvels that have stood the test of time. These structures, which span several historical periods, were built with a purpose in mind and represent the workmanship, design ideas, and societal ideals of their eras. Over a quarter of all European buildings were built before the 1950s; we can presume that many of them have cultural, architectural, social, and legacy qualities (Buda et al., 2021). In terms of preserving the heritage, efforts have been made to comprehend and interpret the heritage to demonstrate how the world was before us (Taher Tolou Del et al., 2020). Take, for example, the ancient ruins of Pompeii in Italy. Houses, temples, and theatres that have been preserved provide a vivid portrait of life in a Roman city during the first century. These ruins help us understand the Roman way of life, including its social structure, urban planning, and aesthetic manifestations. By conserving and preserving these structures, we can unearth a wealth of historical information that will aid us in piecing together the complex fabric of human history.

Historic structures must be conserved and preserved for a variety of reasons. For starters, historical structures serve as educational resources, providing significant insights into a specific era's history, art, and architecture. The proper incorporation of World Heritage sites into educational programs is critical. A historical monument can contribute to this value by participating in civic education (Rosado Correia & Walliman, 2014). We ensure that future generations may appreciate and learn from these structures by preserving them, promoting a feeling of cultural continuity and identity. Second, historical structures can greatly contribute to the tourism business. Domestic and foreign tourists are lured to the fascination of learning history and immersing themselves in the unique experiences these sites provide. Preserving historical sites can enhance tourist footfall, which benefits the local economy by producing cash from tourism-related activities such as lodging, restaurants, and local businesses.

Historical structures have a profound impact on the public in terms of tourism, economy, and cultural value. These architectural marvels draw visitors from all around the world, providing a window into the past and enriching their travel experiences. Tourism growth supports economic growth in nearby areas, producing jobs

and stimulating other sectors. For heritage sites, tourism can produce revenue and employ ancillary sectors such as hotels, transportation, and so on (Taher Tolou Del et al., 2020). Furthermore, historical landmarks provide a visible link to a community's history, preserving cultural traditions and architectural styles for future generations. They are transformed into educational resources, promoting understanding of history, architecture, and societal standards. These structures unify communities and serve as gathering places for celebrations, as symbols of local identity and pride.

There has been an increasing understanding of the need to protect historical structures during the last few decades. Despite this, the conservation figures show a stable trend. With the number of properties inscribed on the World Heritage List increasing over time, it is necessary to compare the percentage of properties reported each year to the overall number of properties inscribed at the time. This information would indicate the percentage of World Heritage properties that are threatened each year. Although quickly expanding until 1993, the number of World Heritage assets subject to a State of Conservation (SOC) report has remained relatively steady after 2003, at 18.5% on average. As stated, the number of SOC reports climbed fast between 1979 (1 report) and 2004, but has been rather consistent since then, with an average of 154 SOC reports per year (Veillon, 2014).

Despite their endurance, historical structures are not immune to the impacts of time. Natural forces like freezing and thawing, heating and cooling, salt weathering, and acidic rainfall all play a role in monument degradation (Momeni et al., 2015). These problems can worsen if sufficient maintenance and conservation efforts are not implemented, resulting in significant damage and structural instability. As preservation entails preserving a cultural asset's integrity, identity, and functional efficiency, the rehabilitation process may present an opportunity to increase active functionality while avoiding decay of our physical heritage. Furthermore, historical structures are subject to abandonment when they are neglected, endure financial issues, or lose their original roles. Vandalism, theft, and unauthorized changes are all potential risks to abandoned buildings. It is vital to remember that the heritage loss in these circumstances includes not just the building and its fabric, but also its contents, such as furnishings and pieces of art that cannot be restored (Garcia-Castillo et al., 2023).

In Malaysia, historical structures play an important role in forming and defining the culture and identity of a multiracial and multicultural country. With a complex tapestry of varied nationalities, faiths, and traditions, these ancient structures serve as emblems of the nation's shared legacy and collective history. They give a tangible link to the past, providing significant insights into the architectural styles, customs, and societal values that have defined Malaysia over the years. Despite their historical value, many Malaysian historical structures have not received the recognition and attention they deserve. For example, the Sultan Abdul Samad landmark in Kuala Lumpur is a historical landmark in Malaysia that is underappreciated. Despite its spectacular Moorish design and historical significance as a former British colonial administrative centre, the structure is threatened by urban growth and a lack of maintenance. From the standpoint of Malaysia, development schemes for historic cities revolve around the concept of introducing new modern development to historic areas, revitalization of the areas, and refurbishment of historic buildings, which are frequently referred to as tools for city improvement schemes. As a result of fast population increase, economic development, and urbanization, heritage cities in emerging countries, including Malaysia, are today facing exacerbated urban challenges (Said, 2018). As a result, this research examines the conservation and preservation approach and challenges for historical buildings.

2. Literature Review

Batu Gajah is a historic town located in the state of Perak, Malaysia. It is situated approximately 20 kilometers southeast of Ipoh, the capital city of Perak. The town is renowned for its rich history, vibrant cultural heritage, and significant contributions to the region's development. The term Batu Gajah, literally translating to "Stone Elephant" in Malay, is thought to originate from two large boulders resembling elephants discovered along the Kinta River. Local legend suggests that these elephant-shaped stones were created to scare elephants that were damaging villagers' sugar cane crops (Phillip, 2013).

Another narration describes that when tin ore was found in Batu Gajah, Buddhist merchants from Sumatra who worshipped idols sculpted two rocks in the Kinta River to look like elephants. People used these stones as

markers for trade, and they may have had religious meaning as well. A more imaginative story tells of a creature called the *kelembai* that can turn living things into stones as punishment (Jasbindar, 2019). The folks believe that the *kelembai* turned two elephants that were crossing into stone.

The history of Batu Gajah goes back to the 19th century, when British tin mining companies set up shop in Perak during the colonial period. The town's strategic location near the rich tin areas led to rapid expansion and development, which drew people from both near and faraway places. The economy of Batu Gajah was built on tin mining, which made it abundant and eventually turned it into a busy mining town. Batu Gajah was home to many well-known tin mining enterprises and rich mine owners during its peak (Masron et al., 2019). The town's environment was surrounded by monumental colonial-era buildings that portrayed how affluent and flourishing the mining sector was. Many of these structures are still standing until now. They display architectural styles that were influenced by British colonial and Chinese Peranakan civilizations (Ithnin, 2021). Batu Gajah still offers loads of historical beauty, and it shows retrospectively how lively it used to be. The Batu Gajah Museum, the British Residency, and Kellie's Castle are some of the town's historic buildings.

Types of Defects in Historical Buildings

Due to their age and exposure to numerous climatic variables, historical constructions are prone to a variety of faults that can impact various aspects of the building. Some of the most prevalent forms of flaws found in historical constructions are:

Cracking

The cracks vary in width, from small hairline fractures to 25 mm (Mansor et al., 2012). Even solid ground floors and foundations may have cracks, and walls may depart from vertical alignment. These cracks can appear unexpectedly, typically accompanied by audible disturbances, and may persist for a long time after the building was built. Some outward movement of the walls may also be observed. Beyond stretching from roofs to foundations, cracks in external walls might jeopardize a building's structural stability if they are deemed unsafe. Vertical or diagonal cracks in walls are classic signs of structural instability. Cracking is often classified according to its underlying causes, which include:

- Shrinkage and Durability Cracks.
- Cracks caused by structural distress.
- Cracks caused by structural settlement.

Spalling

Spalling, or the chipping, is a consequence of unchecked cracking. If cracks are not addressed, they can grow, resulting in the concrete becoming spalled. Several factors contribute to this spalling phenomenon. Firstly, when the steel reinforcement in the structure rusts and extreme weather fluctuations, such as rapid changes between hot and cold, can also cause concrete spalling. Additionally, exposure to chemical agents or materials can weaken the concrete over time, contributing to spalling (Hanafi et al., 2018). Finally, the use of unsuitable steel reinforcement or overloading can cause concrete to crack and spall, particularly if the reinforcement cannot support the tension load, leading to structural damage (Mansor et al., 2012).

Salt Attack

Different types of soluble salts, such as sodium chloride, carbonates, nitrates, and sulphates of calcium, potassium, sodium sulphate and magnesium chloride. They are known to harm building masonry. Salt-induced damage can take two forms depending on the building area affected (Ahmad et al., 2010). When salt penetrates the surface, leading to the formation of a white powder, it's known as efflorescence, while visually unpleasant, is generally harmless. However, if salt penetrates from below the surface and becomes crystallized, a more serious condition called sub-florescence occurs (Mansor et al., 2012). The pressure from the crystallization process can cause building materials to crumble, resulting in severe damage.

Peeling Paint

Peeling paint is common on building facades, particularly plastered walls, columns, and other locations that are subjected to severe rain and humidity.

Insects or Termite Infestation
Exposure to water, high moisture content, and excessive loading can cause timber to decay rapidly. Insect and termite infestations can damage wet and digestible timber in wall plates, rafters, beams, and trusses, as well as timbers put into damp walls.

Dampness
Dampness poses a significant concern, especially for buildings situated close to water sources. The primary cause of dampness is water entering the building through various pathways. Water penetration commonly occurs in walls exposed to persistent wet winds or rain (Mansor et al., 2012). In such scenarios, gravity facilitates water infiltration through capillaries or cracks between mortar joints, bricks, or blocks, ultimately accumulating moisture behind rigid renders. Dampness can also result from other factors, including leaking gutters or downpipes, faulty drains, burst plumbing, and condensation due to inadequate ventilation.

3. Research Methodology

The case study method is employed to assess and examine the issues of conservation and preservation of historical structures in Batu Gajah, Perak. Examining the defects associated with historical structure restoration activities closely aligns with the objectives. By employing qualitative research studies, researchers can look into the experiences and insights of developers, especially when analyzing the labor and materials used for construction activities. Observation and in-depth interviews with technicians are conducted to get insights into their, motivations, decision-making process and obstacles linked to conservation efforts. These interviews and observations can add value to the knowledge of conservation and preservation, allowing the information needed to understand the variables impacting developers' decisions.

4. Results

The findings of the conservation and preservation activities at the Batu Gajah District's House and Batu Gajah District and Land Office provide numerous critical insights into the challenges and techniques involved in protecting historical structures. One notable result is the importance of undertaking detailed assessments of the structural stability and historical relevance of these structures before beginning any conservation work.

Figure 1: The façade of Batu Gajah District's House (left) and Batu Gajah District and Land Office (right)




Types of Defects in Batu Gajah District's House and Batu Gajah District and Land Office
The conservation work at the Batu Gajah District's House and Batu Gajah District Land Office represents a crucial effort in preserving the historical and architectural heritage of the region. Situated in the heart of Batu Gajah, Perak, Malaysia, this building stands as a testament to the area's rich history and cultural significance. Through meticulous restoration and preservation work, the building's unique character and architectural features are being retained, contributing to the cultural landscape of Batu Gajah. However, the study explores the types of defects in both Batu Gajah District's House and Batu Gajah District Land Office.

Table 1: The observation of defects that were found in both the Batu Gajah District's House and the Batu Gajah District and Land Office

Batu Gajah District's House		Batu Gajah District and Land Office	
	**Spalling Exterior Walls** Spalling, the flaking or crumbling of masonry, threatens the structural integrity and aesthetics of heritage buildings.		**Mouldy Walls** Mould growth on walls, often due to moisture or poor ventilation, can damage heritage materials and harm indoor air quality.
	**Flaking Paint** Peeling paint, caused by moisture, age, or poor surface preparation, exposes heritage walls to further deterioration.		**Faded and Peeling Paint** Peeling paint, often resulting from moisture, aging, or inadequate surface preparation, leaves heritage walls vulnerable to further damage and decay.
	**Broken Timber Wall** Broken timber walls, often caused by decay, pests, or structural stress, compromise the integrity and authenticity of heritage buildings.		**Deteriorated Wooden Ceiling** A broken wooden ceiling, often caused by age, structural stress, or water damage, risks further deterioration and impacts the building's historical character.
	**Pest Infestation on Cornices** Insect infestations in cornices, typically caused by wood-boring pests, can weaken structural elements and decorative details.		**Damaged Roof Tiles** Broken roof tiles, often due to weathering or impact, compromise a building's weatherproofing and may lead to internal damage.
	**Cracked Wainscoting on the Wall** Broken wainscoting, caused by physical damage or decay, diminishes the aesthetic and structural appeal of interiors.		

Challenges Faced by Conservators During Conservation Work

Conserving and preserving historic structures pose challenges for conservators. The challenges encompass many aspects of the conservation process, ranging from technical expertise to resource constraints. In navigating these complexities, conservators must contend with issues such as a lack of specialized expertise among consultants and the inherent limitations of time and budget. Addressing these challenges effectively requires a complex understanding of conservation principles, collaborative efforts among stakeholders, and strategic planning to ensure the successful preservation of our built heritage.

Lack of Expertise

Conservation projects require a specific set of skills and knowledge that may not be readily available among consultants. Project consultants such as architects, engineers, and quantity surveyors (QS) rarely oversee these projects and may not have prior experience or training in conservation work. Therefore, there may be gaps in their knowledge of selecting appropriate historical building materials, construction techniques, and preservation methods. For instance, a QS may misquote costs or quantities due to a lack of familiarity with the unique requirements of conservation work. Similarly, architects and engineers may overlook important historical details or specifications, leading to suboptimal outcomes in the preservation process.

Time and Budget Constraints

More often than not, construction projects work under time pressure and tight budgets. This can lead to obstacles like unforeseen issues arising during the conservation process that are not outlined in the initial scope of work and cost. In any case where conservators start to conduct remedial work, he/she may uncover underlying deficiencies or hidden damage that could extend the time required and resources to address it properly. Therefore, there are high chances that the conservation work could contribute to project delays and budget overruns, and compromise the quality of conservation work or worse, shortcuts may be taken to meet the deadlines and confine within the budgetary limits.

Discussion

The conservation and preservation work at Batu Gajah District's House and Land Office sheds an important understanding of the problems and strategies for protecting historical structures. The main highlights of the findings include conducting a meticulous assessment of structural integrity and historical value before commencing any conservation work, which is consistent with previous studies that suggest performing critical assessments of conservation efforts (Tarrafa Silva & Pereira Roders, 2012). The major challenges that emerge include a lack of expertise among consultants, time pressure, and budget limitations, which hinder successful conservation work. These challenges offer an insight into the necessity for a comprehensive study that encompasses all conservation phases, establishes qualifications for consultants and mandates rigorous assessments and documentation. Well-defined frameworks can reduce planning errors, enhance resource allocation, and support effective conservation practice. The findings also suggest that integrating conventional techniques with modern strategies is necessary for enriching the comprehensive conservation standard. By addressing expertise gaps and resource constraints, such a standard can ensure the sustainable preservation of historical structures, foster cultural heritage for future generations, and enable communities to engage with their history in meaningful ways. This holistic approach not only safeguards the integrity of these structures but also promotes a deeper understanding and appreciation of cultural heritage among the public.

5. Managerial Implications and Recommendations

The observation of conservation techniques, structural defects and preservation efforts in historical structures highlights several key recommendations for enhanced heritage conservation. The heart of these efforts is the promotion of collaboration among academic institutions, government agencies, and local communities. Through this collaborative effort, we can potentially expand knowledge exchange, resource sharing, and problem-solving via platforms such as working groups, seminars, and online forums. Capacity-building initiatives are imperative in emphasizing the upskilling of architects, engineers, conservators, and heritage-related professions in conventional building techniques, material science and conservation ethics. Ongoing professional development ensures that conservation practices provide a high quality in integrating traditional expertise with modern innovation. Cooperation with government administrations and local authorities is crucial in securing grants, funding and supporting policy frameworks that are feasible for heritage

preservation. Besides, raising awareness of the valuable treasure of historical preservation can stimulate proactive engagement from these entities, supporting systematic, coordinated conservation protocols that conform to best practice. Thorough and meticulous documentation and research set the foundation for successful conservation efforts. Relevant datasets, including archival research, condition assessment, remedial reports, and photographic documentation, contribute to the preservation of the precious heritage and condition of historical structures. Likewise, substantial investment in research and development, studying innovative conservation materials and cutting-edge technologies, facilitates evidence-based practices and advances the body of knowledge in the field.

Conclusion

This research study serves as the cornerstone in assessing the structural defects and materials used in historical structures. Key challenges include damage, cracks, spalling, and pest infestation, which contribute to the deterioration of these historical structures rather than their longevity. In-depth knowledge of these defects and their causes enables accurate methods to reduce the deterioration further. Thorough guidelines are imperative to enhance further historical structure preservation initiatives. These comprise comprehensive assessments of structural defects, rigorous documentation of conservation activities, and specific requirements for hiring qualified consultants and contractors. Standardized processes and procedures ensure a systematic and effective conservation technique. This research also contributes to the larger vocation of historical preservation by handling structural challenges, appraising conservation techniques, and proposing actionable steps in remedial work on historical structures. It supports the interest of stakeholders in preserving historical facts and enriching the place identity for future generations.

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A Conceptual Framework of the Factors Affecting Customer Attitude towards Islamic Banking in Malaysia

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Abstract: Ever since the establishment of the first Islamic bank in the country, Islamic banks in Malaysia have been facing stiff competition against the conventional banks. Despite the dominance of Muslims in the population of the country, not all Muslims have subscribed to Islamic banking products and services. It is important to identify the factors that customer attitude towards Islamic banking in the country. Therefore, this research aims to explore the factors that could affect customer attitudes towards Islamic banking in Malaysia. Hence, this research presents a conceptual framework on the effect of awareness, Shariah compliance, individualism, and image on customer attitude towards Islamic banking. Research hypotheses are proposed based on the theorised relationship among the variables in this research. Significant effects are expected between awareness, Shariah compliance, individualism, image, and customer attitude towards Islamic banking. This research highlights the importance of Islamic banks to influence awareness, Shariah compliance, individualism, image, and customer attitude to enhance customer attitude towards them in the highly competitive banking industry.

Keywords: *Islamic Banking, Awareness, Shariah Compliance, Individualism, Image.*

1. Introduction

Islamic banking began in Malaysia with the establishment of the first Malaysian Islamic bank in July 1983, Bank Islam Berhad Malaysia (Bank Islam Malaysia Berhad, n.d.). Since then, Islamic banks have faced stiff competition from conventional banks, as both Islamic banks and conventional banks are operating in parallel in the Malaysian dual banking system. At present, customers have diverse options in getting banking services as there are 17 Islamic banks and 25 conventional banks operating in Malaysia (Bank Negara Malaysia, n.d.). The large number of banking institutions provides a huge option to the customers in selecting the preferred institutions that match their needs and wants. Despite the large number of Islamic banks in the country, only 65% of Malaysia's Muslim population use Islamic banking products and services (Hubbis, 2024). This demonstrates the need to identify the factors affecting customers' attitudes towards Islamic banking, as researchers examining the behavior of bank customers and their relationships with the banks have focused a great deal of attention on attitude because it is one of the fundamental aspects influencing consumers' buying behavior (Bashir & Madhavaiah, 2015). Therefore, Islamic banks need to identify and consider factors that influence consumers' attitudes toward choosing their products and services. It is the aim for the banks to attract both customers, Muslims and non-Muslim, will participate in Islamic banking and further enhance their market share and Islamic banking sustainability. Attitude can be defined as the emotions of an individual, either positive or negative, that can cause an inclination to purchase Islamic banking products and services (Souiden & Rani, 2015; Hoque et al., 2018). A person's attitude towards engaging in Islamic banking facilities will be positive if they believe that by doing so, it will lead to positive outcomes. Therefore, it is crucial to study the effects of possible determinants of customers' attitudes towards Islamic banking. This research has the following objectives:

Research objective 1: To identify the relationship between awareness and customers' attitudes towards Islamic banking.
Research objective 2: To identify the relationship between Shariah compliance and customers' attitudes towards Islamic banking.
Research objective 3: To identify the relationship between individualism and customers' attitudes towards Islamic banking.
Research objective 4: To propose the effect of image on customers' attitude towards Islamic banking.

2. Literature Review and Hypotheses Development

Theory of Reasoned Action

The Theory of Reasoned Action introduced by Fishbein dan Ajzen (1975) states that the attitude towards a behavior is shaped by the individual's beliefs towards the outcome of a behavior, and assessment towards the outcome. The Theory of Reasoned Action stresses that attitude is the main component influencing the intention to act, and subsequently the actual behavior.

Awareness refers to the extent of an individual's knowledge, understanding, and awareness of the existence and features of a product or service. According to the Theory of Reasoned Action, when someone possesses information or high awareness, most probably they will have a positive attitude towards the outcome of using a product or service, which in turn shapes a positive attitude towards it (Fishbein & Ajzen, 1975). In the context of Islamic banking, awareness about the principles, advantages, and Shariah compliance operation will increase the tendency of customers to have a positive perception towards Islamic banking.

Shariah compliance refers to the extent of compliance of a financial institution with Islamic principles. According to the Theory of Reasoned Action, when an individual believes that Shariah compliance contributes to a good outcome (blessing or justice), a positive assessment towards the outcome will shape a positive attitude towards Islamic banking (Lada et al., 2009). This attitude is formed through normative beliefs that Shariah compliance is important in practicing religion.

Individualism refers to a personal value that emphasizes freedom in making decisions and personal preference. According to the Theory of Reasoned Action, personal value influences trust towards behavioral outcomes and the assessment of the outcome. For individuals with an individualistic orientation, if they believe that choosing Islamic banking services will reflect autonomy, integrity, or a choice in line with personal values, their attitude towards Islamic banking will be positive (Triandis, 1995; Ajzen & Fishbein, 1980).

The image of a bank reflects customer perception towards reputation, professionalism, and value portrayed by the bank. According to the Theory of Reasoned Action, perception towards the outcome related to a positive image (such as trusted, authoritative, and quality) will influence trust towards the benefits of using the service. This will shape customers' positive attitude towards the bank (Fishbein & Ajzen, 1975).

Attitude

Attitude is often used in describing the social psychological sense, which refers to the stable, mental position held toward some ideas, objects, or persons. A widely held view is that every attitude is a combination of feelings, beliefs, and evaluations with some tendency to act adequately (Irving & Dickson, 2004). It was identified as the most crucial in terms of determining consumer acceptance. Attitude has long been shown to have a close relationship with intention and to play a key role in behavior formation (Ajzen & Fishbein, 1980; Smith et al., 2008). Likewise, few scholars are demonstrating that Islamic banks need to preserve their expansion in contradiction to encouraging development. The expansion can be implemented by capturing the diverse consumer demographic and delivering superior products (Fang, 2016). In those attempts, the consumers' attitude towards Islamic banking may be applied as a significant indicator of the participation among consumers and potentially contribute to improved market share and the performance of Islamic banking (Amin, 2013). Furthermore, an evaluation shall be made to measure the consumers' behavior in greater depth. By that, the Islamic banking industry could obtain a deeper comprehension of factors influencing consumers' attitudes towards Islamic banking (Hoque et al., 2018). In addition, attitude can also be considered a crucial part in discovering the most suitable technology in growing nations (Adesina & Ayo, 2010).

Moreover, the consumers' attitudes towards any system are closely related to the decision of the individuals in embracing new insights (Davis, 1989). Apart from that, attitudes can also be described as the outcome of either an appealing or negative emotion in the system and assess whether using an information system is worthwhile (Karjaluoto et al., 2002; Davis, 1989). Attitude is generated based on traits and the perceived significance of those traits in opting to act on (Adesina & Ayo, 2010). Furthermore, consumers' attitude has been commonly acknowledged to have in great effect on the use of technology, as some research has been conducted using consumers' attitude as a fundamental idea to determine the technology utilization and usage (Akinyemi et al., 2013; Adesina & Ayo, 2010; Karjaluoto et al., 2002; Davis, 1989). In a recent study by Hamadou et al. (2025), it

was found that attitude had a direct and significant effect on customers' intention to use Islamic banking products. The study also suggested that the bank could increase usage of Islamic banking products by promoting positive behavior through an educational campaign, as well as ethical and religious awareness, emphasizing the relative advantage of Islamic banking products compared to conventional banking products, and supporting social norms and religious motivation through society or religious organizations.

Awareness

Generally, awareness is commonly associated with someone's knowledge and understanding of certain things. Awareness of Islamic banking refers to understanding and knowledge of Islamic banking's concept, the content of products and services, as well as the Islamic banking functions (Ali et al., 2018). Numerous earlier studies have emphasized the effect of awareness and understanding of Islamic banking and consumers' attitudes towards patronizing Islamic banking. Awareness has become one of the factors that influence consumers' attitudes to deal with Islamic banking. For example, this can be proven through the study conducted by Sabirzyanov (2016). His study confirmed that awareness and attitude to deal with Islamic financial products are significantly correlated. Another study includes a study by Ayinde and Echchabi (2012) on consumers' willingness to adopt Islamic insurance services in Malaysia. The results of their study indicate that awareness has a positive influence on the adoption of Islamic insurance in Malaysia. On the other hand, a study by Md Husin and Ab Rahman (2016) on the intention of consumers to engage in takaful showed that attitude is significantly influenced by awareness. Additionally, Tara et al. (2014) examine the factors influencing the adoption of Islamic banking in Pakistan on several bases, such as religion, awareness, networking, advertisement, as well as reputation. Based on the study, they found that knowledge of Islamic financial concepts is the most crucial factor that influences the adoption of Islamic banking in Pakistan. More than half of the respondent groups, which are Muslim and non-Muslim, have indicated that if they have a thorough understanding of Islamic banking's operations, there is a probability of building a relationship with the Islamic bank (Haron et al., 1994). In a recent study by Abdel-Gadir and Billah (2025), it was found that awareness was one of the key drivers that influence customer relationship and loyalty towards Islamic banking institutions after perception and satisfaction. The study highlighted that there is a significant positive correlation between customer awareness and customer attachment to Islamic banks, indicating that as customers better understand the Islamic banking product, principles, and operations, they tend to patronise and retain with the Islamic bank. Abdel-Gadir and Billah (2025) also suggested that the Islamic banking institution should increase the awareness campaign by introducing the products, Shariah principles, and benefits that the customers could gain. Therefore, this study proposes the following hypothesis:

H_1: There is a significant relationship between awareness and customers' attitudes towards Islamic banking.

Shariah Compliance

Shariah compliance, as the most crucial element in choosing Islamic banks by the customers, refers to the practice of adhering to Islamic law based on the teachings of the Quran and Sunnah (Ullah, 2014). Compliance with Shariah means complying with the set of rules based on the principles of Shariah (Islamic law), which is avoiding any financial transactions that contain forbidden elements in Islam, such as riba (interest), gharar (uncertainty), and maysir (gambling) (Jamshed & Uluyol, 2024). The customers' perceptions regarding the transactions and operations of Islamic banking that are free from prohibited elements that have been mentioned in Shariah, based on the Quran and Sunnah, are referred to as Shariah compliance (Kaakeh et al., 2019). To maintain economic justice and the welfare of society, Muslim religious scholars and economic thinkers also urge all Muslims to avoid engaging in any transactions with prohibited elements like riba (interest), gharar (uncertainty), maysir (gambling), and haram products (Haque et al., 2017). According to Khir et al. (2008) and Kaakeh et al. (2019), there are two primary reasons for the establishment of Islamic banking, which are to meet an individual's need to accumulate money and to direct funds towards eligible transactions to ease the movement of funds in a manner that complies with Shariah. The Islamic banks are also the same as other banks that aim to make a profit while adhering to Islamic law (Kaakeh et al., 2019). Kamali (2008) stressed that Shariah is meant to safeguard humanity's interests, including mortgages. Furthermore, Usman et al. (2022) have found that individuals must have proper knowledge about Shariah and know how its principles apply to Islamic banking transactions to comprehend Shariah compliance. Earlier literature also outlines that Islamic banks can expand their reputation as well as the image of the bank through Shariah compliance because it has a unique feature that gives reliability to Islamic banks and differentiates them from their conventional counterparts and stimulates stakeholders' confidence (Ullah, 2014).

Shariah compliance is one of the significant elements that can affect consumers' attitudes towards Islamic banking. According to Souiden and Rani (2015), people's attitudes towards Islamic banks are more favorable if they fear divine punishment. This could improve religious consumers' attitude, reassure and comfort current consumers, and also attract customers from competitors. The study of Amin (2017) investigated religious elements as important determinants of Islamic consumer behavior for Islamic home financing in Malaysia, including perceived religiosity as well as perceived Maqasid Shariah. Although Erol and El-Bdour (1989) propose that religion is not a significant factor in bank selection, there is sufficient evidence that Shariah compliance is very crucial for Islamic financial institutions' clients, even at the expense of some return (Naser et al., 1999). Previous studies have also indicated that adherence to Shariah is a major determining factor in the selection and utilization of Islamic banking services (Jan & Shafiq, 2021; Kaakeh et al., 2019; Lee & Ullah, 2011). For example, the study conducted by Lee and Ullah (2011) found that customers have great respect regarding the Shariah compliance issue and will change their behavior accordingly if the Islamic banks do not maintain Shariah principles. Moreover, Amin and Abdul Hamid (2018), who conducted a study on the use of Tawarruq as a home financing mode in Malaysia, investigated the impact of perceived behavior, product attractiveness, attitude, financial recommendation, and adherence to Shariah principles on customer behavior. They discovered that each of the five criteria significantly influenced the decision-making of customers to accept or reject home financing under the Tawarruq model. According to another Tunisian study, Ltifi et al. (2016) found that customers consider several factors when selecting an Islamic bank, including the financial institution's service quality, trust, and compliance with Shariah law. In a recent study by Abdurrahman et al. (2025), it was found that Shariah compliance had a significant positive effect on customer intention to use Islamic mobile banking, as when customers perceived that the mobile banking application complied with Shariah, they tended to appreciate the service and its benefits. Abdurrahman et al. (2025) also highlighted that Shariah compliance is not just a moral proposition but also a critical component in influencing the intention and trust of the customers. It is therefore hypothesized that:

H_2: There is a significant relationship between Shariah compliance and customers' attitudes towards Islamic banking.

Individualism/Collectivism

According to Noordin and Jusoff (2010), the individualism-collectivism dimension describes the way a person views their relationship with the social group they belong to. Individualistic groups are self-centered, competitive rather than cooperative, have little attachment to the institutions they work for, achieve their objectives, are calculative, and have no desire to depend on others (Hofstede, 1984). Triandis (1995) said that they expect everyone to look out for themselves and do not think it is needed to put aside their own goals to help the welfare of others. Collectivists, on the other hand, place more value on connections, uphold them even at great personal expense, adhere to social norms, duties, and responsibilities placed on them by friends, family, and neighbors, and help others (Komarraju et al., 2008). They try not to look reckless or make others look bad since they are very worried about how they might present themselves (Hui & Triandis, 1986). A greater tendency for individualism implies a lesser level of collectivism, and vice versa, since individualism and collectivism are both extremes of a single dimension. Many researchers, however, felt that this one-dimensional perspective oversimplifies a more complicated process (Earley, 1989). Other than that, individualism and collectivism, according to Hui and Triandis (1986), reflect variations in personal preferences; as a result, some people are more collectivistic or more individualistic. Alternatively, individualism and collectivism can be examined as separate concepts rather than as opposing ideologies (Triandis, 1995).

In the context of banking industries, individualist customers, according to Donthu and Yoo (1998), are expecting that a service provider would value and care for them, express compassion, provide personalized attention, and show confidence in the services they are getting. Furthermore, because of their motivation and sense of self-reliance, individuals want the service provider to be effective and give an excellent level of responsiveness and dependability (Furrer et al., 2000). On the other hand, because they emphasize mutual dependency in their connections with service providers, collectivist customers place a strong emphasis on "we" (i.e., see both customers and service providers as one group). Customers who are collectivists will value understanding from service providers more than individualists do since they are more likely to form close and lasting relationships (Furrer et al., 2000). To date, nothing has been discovered about how culture influences disclosure in the setting of Islamic banking. The distinctive characteristics of Islamic Banking inspire many

international journals to investigate how culture affects disclosure in these organizations (El-Halaby et al., 2017). Gambling and Karim (1986) said that individuals' collective personalities create their culture; thus, if those people are Muslims, then both their individual and collective personalities are Islamic. Furthermore, Islamic belief is a matter of deed (Al-Faruqi, 1992). Therefore, it makes sense that the Islamic faith would have a major effect on Islamic banking cultural values (El-Halaby et al., 2017). Given the above arguments, the following hypothesis is formulated:

H_3: There is a significant relationship between individualism/collectivism and customers' attitudes towards Islamic banking.

Image

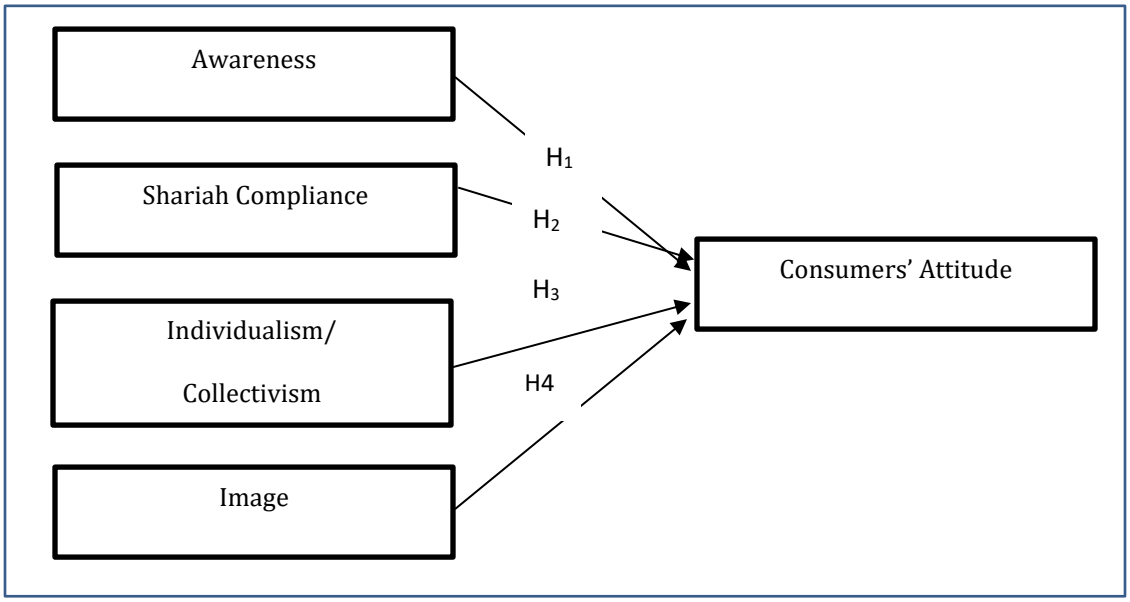
The image is originally taken from a Greek word (ikon), meaning verbally creating a visual depiction of anything in the mind's eye (Eshagi et al., 2022). Keller (2012) defines image as a customer's opinion of a brand that reflects brand associations and is retained in consumer memory. Besides that, Chinomona (2016) defines brand image as consumer perceptions of a brand that are represented in brand associations, which may be thought of as the essence of the product or service. Brand image is the depiction of a brand in the consumer's mind that is connected to an offering. In addition, brand image conceptually is the entirety of brand identities that includes the brand (Keller, 2012; Eshagi et al., 2022). Besides, an image is a multifaceted construct that represents how reality is seen (Eshagi et al., 2022). Moreover, consumers' opinions of a bank and its features as a brand image are made up from psychological associations that have certain typical consequences, such as satisfaction (Eshagi et al., 2022). Furthermore, according to a survey of the literature, researchers used four terminological definitions of image in bank marketing studies, including bank image, brand image, corporate image, and corporate brand image (Iqbal et al., 2018). Bank activity is not limited to the provision of services only, as the activity involves the building of a reputation, the image of the bank, and ensuring that it gets audience attention (Hamzah et al., 2015). For example, they would make a switch only in case the new banks provided better services and commodities compared to the other banks (Hamzah et al., 2015). At the same time, a survey done by Haque et al. (2009) indicated that a decision to open an account in any bank is determined by its corporate name and reputation. The image of the bank will, therefore, influence the level of satisfaction of its customers.

Corporate image is an intangible asset that aids business entities to be competitive in highly competitive markets such as banking. However, evidence shows that financial institutions tend to have weak branding and low customer awareness (Debling, 2000). Markets, however, continue to exhibit similar characteristics in that organizations pursue more economic benefits than brand or image-related benefits (de Chernatony & Cottam, 2006). From research conducted, it is known that businesses with high chances of success often listen to their customers (Prayag, 2007), and service quality is one of the determining factors in high-contact service industries such as banks (Osayawe Ehigie, 2006). The concept of quality of service, however, is one of the images that have been mostly associated with service-providing organizations and has gained immense importance in the context of online banking services, but not in high-contact service environments. There has been little research investigating the relation between the corporate image of service firms and service quality constructs (LeBlanc & Nguyen, 1996). The development of a positive and authentic image of Islamic organizations is crucial in constructing emotional affinity and consumer confidence, which contributes to favorable views of Islamic banks. Research shows that the perception of Islamic banks is highly affected by the level of customer satisfaction, and positive perception is associated with a higher level of loyalty and trust. In this view, consumer satisfaction is reached when products and services can meet consumer expectations. Satisfied if they think the service expects to perform its function or even goes beyond it, and elated if it does not – dissatisfied juxtaposition. Based on this theory, a consumer expects a certain standard of performance from a given good after making up their mind to acquire it. These expectations arise from a prior experience with a product, advertising of the particular items or companies, and the temper and beliefs of the consumer at the time in question (Sung Moon et al., 2011). Based on a similar study, Ahmad and Haron (2002) had proposed that there should be an increase in the advertisement of Islamic banking, as it is compulsory to get the customers into the interface of Islamic banking. Customer satisfaction has been pointed out as a factor that affects the image of an Islamic bank and thus the trust of the customer and even the decision to switch banks (Arshad et al., 2016). In a recent study by Siyamto et al. (2025), it was found that customers with a positive perception towards Islamic bank image tend to have trust in the institution, and consequently enhance intention and decision in using the Islamic bank service. Siyamto et al. (2025) had also suggested that the

Islamic bank double its effort in improving its image by delivering Shariah values consistently through all marketing channels, highlighting social responsibility and services based on religion, and developing a reputation through customer testimony and Shariah recognition. Based on the above argument, the following hypothesis is proposed:

H_4: There is a significant relationship between image and the customer's attitude towards Islamic banking.

Figure 1: Research Framework



3. Research Design

According to Campbell et al. (2007), a cross-sectional study is a study on a group of subjects at a specific point in time. This cross-sectional study was performed among adults in Malaysia through self-administered questionnaires. The questionnaire will contain closed-ended questions with a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" to measure all variables. The questions are either adopted from the previous studies or adapted into the current study. In this study, a simple random sample will be obtained regardless of the gender, age, race, current occupation, level of income, level of education, and period of dealing with banking activities. The sample size calculated using G*Power is 85 respondents. Descriptive and inferential statistical analysis will be used to examine the effect of awareness, Shariah compliance, individualism or collectivism, and image, on customers' attitude towards Islamic banking. Descriptive statistics are utilized to characterize and summarize the collected data. Additional details about each variable's distribution can be found using descriptive statistics such as mean, standard deviation, and variance. Meanwhile, inferential statistics will be used to make conclusions, forecasts, or generalizations about a larger population based on the data collected. Regression analysis will be used to test the hypotheses proposed. The data will be analyzed using the Statistical Package for the Social Sciences (SPSS) software for both descriptive and inferential statistical analysis.

4. Theoretical and Managerial Implications

Findings from this research contribute to the literature on Islamic banking management by proposing the relationship between awareness, Shariah compliance, individualism, image, and consumers' attitude towards Islamic banking through the integration with the Theory of Reasoned Action. The relationship between awareness, Shariah compliance, individualism, image, and consumers' attitude towards Islamic banking is established. Findings from this research highlight the importance for Islamic banks to stimulate perception of the customers in terms of awareness, Shariah compliance, individualism, and image, to enhance customers' attitude towards Islamic banking. Such actions must be considered in the banks' strategies to remain relevant in the market and survive the competition, not only against other Islamic banks but also against conventional

banks.

Conclusion

Further studies are required to examine the effects of awareness, Shariah compliance, individualism, and image on customer attitudes towards Islamic banking. Hence, a questionnaire survey will be designed and distributed to empirically examine these effects. Responses gathered will be analysed using SPSS in testing the research hypotheses. This research is limited to the Malaysian context. Future researchers should consider testing the research framework in other countries to increase the generalisability of the findings. We hope that the research findings will help the Islamic banks in developing their strategies for attracting and retaining customers. The results will also assist future researchers in designing their studies on customer attitudes towards Islamic banking.

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Balancing Demands and Resources: Exploring the Impact of Workload, Work-Life Balance and Technological Adaptation on Job Satisfaction Among Malaysian Academics

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Abstract: Based on the Job Demands--Resources (JD-R) model, this study examines the inter-relationships of workload, work-life balance, technological adaptation, and job satisfaction among academic staff members in Malaysian universities. Within this context, workload is considered a job demand that may impose pressure on individual well-being and reduce satisfaction, whereas work-life balance is regarded as a useful job resource and mediating variable, allowing individuals to balance conflicting work and non-work demands. Technological adaptation as the ability and willingness of academic staff to work with digital tools is conceptualized as a personal resource and a moderator that can strengthen the relationship between work-life balance and job satisfaction. The research design is a quantitative one, where a self-completion online questionnaire would be sent via stratified random sampling to achieve a wide representation in terms of the type of universities and field of study. Regression and moderated mediation will be applied to analyze data. This research helps to advance the theoretical understanding of the JD-R model by investigating the negative influence of high workload on job satisfaction, the mediating role of work-life balance and the enhancing effects of technological adaptation on the relationship between work-life balance and job satisfaction. It is also an invaluable resource to institutions of higher learning interested in how they can manage academic workload, enhance digital competency and streamline staff well-being in institutions that are increasingly becoming technology-oriented.

Keywords: *Workload, Work-life Balance, Technological Adaptation, Job Satisfaction, Job Demands–Resources (JD-R) Model*

1. Introduction and Background

Educational institutions are increasingly concerned about the quality of education delivered to their students, which has led to greater effort and dedication in improving student learning through the development of various policies and programs that promote academic achievement. Enhanced academic achievement may indicate increased competency, which students require for future career planning and development.

The competitive nature of the education sector demands that educators be creative in nurturing future leaders of the nation. Academic workload is directly linked with the complex roles of teachers, researchers, administrators, leaders, and professionals. Teaching, research, and community service are increasing with pressure to enhance the quality of educators. Workload The standard workload of Malaysian public universities includes teaching, supervision, research, consultation, publications, professional development, community service, student consultation, and administration. In alignment with the Ministry of Education Malaysia (MOE), the objective is to increase the graduate employability rate from 75% to over 80% by 2025, necessitating the reorganization of higher education institutions to meet this goal.

Ultimately, the performance indicators established for academics contribute to work-related stress, exacerbating burnout due to incessant tasks. Academics often take work home and spend long hours completing assignments before deadlines (Norazlinda, 2024; Utusan Malaysia, 2025). Academicians must devise strategies to manage work-related stress; otherwise, it may result in depression or burnout.

The control of emotions in managing job activities considerably influences academic performance; hence, achieving work–life balance is essential. This article highlights the importance of addressing task-related challenges in supporting academics to achieve such a balance. At the same time, academics must prioritize their personal lives to maintain mental well-being. They cannot afford to neglect their private lives merely to meet

imposed performance standards.

2. Literature Review

Workload

Workload encompasses the quantity and intricacy of work that a single worker takes on over a particular duration of time. Generally, it consists of the amount of work, its level of difficulty, time constraints, as well as cognitive and emotional pressures (Çelik & Köse, 2022). Excessive workload could cause physical and psychological exhaustion, temporal conflicts and role strain, which consequently could affect the work output, contentment and the general well-being of the employees (Jermsittiparsert, Petchchedchoo, Kumsuprom, & Panmanee, 2021)

According to Malaysia's Employment Act of 1955, the standard working hours for employees are 45 hours per week, with no more than 8 hours per day. Any hours worked beyond this are considered overtime and must be compensated at least 1.5 times the regular rate (Hassan, Saripan, Putera, Abdullah, & Mohamad, 2023). While the law establishes standard working hours, in practice, many employees may work beyond this standard, particularly in certain industries and positions.

For academic staff in Malaysia, workloads are generally heavy, and tasks are highly complex, leaving many scholars feeling overwhelmed in their daily work. Research indicates that academic staff at Sultan Idris Education University (UPSI) in Malaysia spend an average of 20.9 hours per week on teaching and student guidance, accounting for 50% of the standard 40-hour workweek (Razalli, Kamaruddin, Tek, Teck, & Daud, 2021). Among these, academic staff in the Faculty of Management and Economics have the highest teaching workload, averaging 27.1 hours per week, representing a staggering 67.8% of their total working hours (Razalli, Kamaruddin, Tek, Teck, & Daud, 2021).

However, teaching is not their sole responsibility. In addition to lecturing and guiding students, academic staff must also undertake tasks such as applying for and executing research projects, publishing high-quality academic papers, supervising undergraduate and postgraduate research projects, participating in curriculum development, undergoing teaching evaluations both within and outside the university, holding various administrative positions within the university, and actively engaging in community service and industry-academia collaboration (Reymert & Thune, 2023). This multitasking work model significantly increases time pressure and role conflicts, thereby affecting their job satisfaction and mental and physical health.

Work-Life Balance

To become exemplary employees by fulfilling organizational objectives, prioritizing tasks, and demonstrating high achievement, individuals must devise strategies. Assuming the dual roles of employee and family member positions an individual in challenging situations. The challenges are overwhelming the population. Previous research indicates that becoming an ideal employee is often neither essential nor desirable, as most employees struggle to suppress other aspects of life to maintain a singular concentration on work. They struggle significantly with managing other aspects of their lives, experiencing severe and dysfunctional consequences (Reid & Ramarajan, 2016). Consequently, inadequate life management adversely affects job satisfaction, resulting in diminished performance and increased turnover intentions (Mohamad et al., 2024; Noor, 2011).

Therefore role of academics in the process of knowledge transfer requires them to motivate, provoking students to challenge their ideas by encouraging critical thinking. The diversity of the area imposes intellectual expression to produce vibrant and dynamic outcomes. The advancement of learning environments through technology adaptation engages critical reflection and justification of the academic view. The students can extend their learning beyond factual concepts through the evaluation of their judgments. Transitioning from traditional learning methods to discussion-based approaches necessitates that academics adequately prepare, which requires additional time to furnish students with pertinent information. Academics often find themselves bringing job responsibilities home, which can contribute to role conflicts and result in an imbalance in managing work-life responsibilities.

Consequently, balancing work responsibilities and personal lives contributes to heightened stress and

discontent (Lwin et al., 2024). Maintaining job performance and achieving job satisfaction requires an individual to be able to properly manage their time in order to accomplish both their professional obligations and their personal responsibilities. This represents the idea of work-life balance, which is achieved when an individual is able to successfully manage the responsibilities that make up their life (Diego-Medrano & Ramos Salazar, 2021; Lwin et al., 2024; Yusoff et al., 2024).

Job Satisfaction

Job satisfaction is an emotional experience in fulfilling a job responsibility; it has a positive impact on employee behavior at the workplace. Various antecedents lead to job satisfaction such as working conditions, leadership, employee empowerment, compensation, job security, job freedom, flexibility, recognition and appreciation (Smetanová, 2024). As an academician with a variety of workloads, job satisfaction leads to greater dedication, productivity, allegiance, and involvement, while decreasing employee attrition, complaints, lateness, and absenteeism(Sinniah et al., 2022; Tafese Keltu, 2024).

The teaching load for Malaysian academics is structured on a semester basis, with a minimum requirement of 13 to 18 credit hours. An increase in teaching hours to 21 credit hours or beyond per semester may result in diminished efficiency and performance, potentially leading to job dissatisfaction. Meanwhile, the work environment is beyond the scope of the workplace; a healthy work environment is the possibilities of academics on self-development and career growth, which is also inclusive of employees' appreciation and recognition of their accomplishments (Smetanová, 2024). A healthy working environment, where individuals feel valued and respected both as employees and as private individuals (Lee et al., 2018). Satisfied employees exhibit greater commitment to task completion, perceiving their responsibilities as challenges that contribute to their sense of fulfilment in life. Discuss the leadership determinations leading to job satisfaction, the university management's primary motivational variables greatly affect employee empowerment, allowing academics in decision-making, curriculum creation, and community involvement (Sakarji et al., 2022).

The well-being of the academic staff and professional sustainability are concerns in which healthy work-life balance plays a role. The concept of flexible working hours which is widely applied in higher learning institutions enables the academics to manage their time freely whereby they can have enough time to carry out the preparation of teaching duties, research duties as well as the administrative duties. Such independence raises productivity levels besides limiting stress linked to strict work schedules (Sinniah et al., 2022). At the same time, the academic profession is the one that by itself stimulates life-long learning and self-development via participating in conferences, skill development courses, and research collaboration. All these activities contribute to present job performance and future career development, which brings some feeling of personal and professional satisfaction.

Furthermore, having the institutional support, in particular, academic leadership is rather essential to strengthen the work-life balance. In case academic leaders create a favorable environment, i.e., via participatory decision-making, balanced workload, and appreciation of the work effort, the faculty members will have a higher level of job satisfaction and a lower level of occupational stress. It is this enabling climate that allows the academics to take independent decisions and shape their work in a way that is consistent with both personal and professional aspirations.

Notably, the perceived work-life balance satisfaction has a close connection to organizational commitment and retention. When academics believe that their institution values and supports their necessity to have balance, as Noor (2011) points out, the more likely they are to want to stay in their posts. On the other hand, faculty turnover has been demonstrated to be one of the many effects of poor work-life integration. Thus, to minimize vertical cohesion and maximize horizontal stability, the atmosphere should be created that upholds the importance of personal boundaries but allows professional development to occur..

Technology Adaptation

Revolutionary technology in education compels academics to improve their technological competencies and adapt to the evolving learning environment. Traditional pedagogical methods, such as classroom lectures and textbooks, are nearly obsolete; the current generation of learners wants amusement, leisure, flexibility, involvement (Abdul Bujang et al., 2020), and applicable information for future use. Technological

advancements in education have heightened learners' desire to acquire knowledge. The Education 4.0 program has revamped the Malaysian higher education system (Ministry of Education Malaysia, 2015).

The progression of Technology 4.0 in education includes computer-based assessments, e-learning, learning management systems, gamification, and artificial intelligence (AI) (Hajar Halili, 2019). Computer-based tests offer immediate feedback by tailoring the examination to the students, while e-learning tools enable educators to present educational material in a flexible and accessible manner. Moreover, a learning management system serves as a comprehensive tool for monitoring and administering training content. Additionally, gamification enhances the learning experience by including game aspects, while artificial intelligence further increases engagement in the educational process. Consequently, the academician must be proficient in utilizing technology to engage students' interests effectively.

Integrating technology in higher education needs to be closely matched with the proper instructional practices to be successful. Not the existence of digital tools, but the existence of the strategic and pedagogically sensible application of these tools improves learning outcomes. That requires the instructional designers, educational technologists as well as the subject matter experts to work closely to come up with effective and engaging instructional materials (Khamis et al., 2024). This kind of collaboration is important to make sure that technological tools are not used in isolation but are meaningfully integrated into the curriculum to facilitate deep learning.

The willingness of the academic staff to embrace and use technology in their work is also important. This involves not just technical ability, but readiness to modify teaching plans and evaluation practices to match digital contexts. Scholars are also required to have digital literacy and pedagogical flexibility to be able to handle the complications of an online and blended learning environment. Yet, the barriers still exist, e.g., lack of training or reluctance to adopt changes, and the matter of ensuring academic integrity in online environments, which may hamper the successful implementation of online learning platforms.

Even though those are the obstacles, online learning environments have some exceptional benefits, such as time and place flexibility, more significant student autonomy due to self-regulated and self-directed learning, and novel forms of interaction and collaboration. Technology, when holistically incorporated in teaching, research, and community service, can help simplify academic processes and make them more productive. In its turn, this has a positive effect on the work-life balance, as academics will be able to handle their tasks more effectively and participate in the ongoing professional development in their own time. Thus, establishing digital preparedness and pedagogical creativity amongst the faculty is central to the optimal utilization of the educational technology and promotes academic health.

Evaluating the Impact of Workload on Job Satisfaction

Moderate workloads can have positive effects. For highly motivated employees, challenging tasks can stimulate work enthusiasm, enhance their sense of accomplishment, and thereby increase job satisfaction (Swedana, 2023). At the same time, moderate workloads may also be perceived by employees as a sign that they are ‘needed’ or ‘valued,’ thereby enhancing their sense of belonging and professional identity, and improving overall satisfaction (Guo & Ayoun, 2024).

Intensive work activities, however, are often linked to physical exhaustion as well as mental pressure, which combine to destroy job satisfaction among employees. Employees are prone to work-life imbalance when the workload is extreme, that is, when responsibilities are high, and time limits are strict. Such an imbalance is likely to be expressed in the increased family tension, lack of personal time, and general deterioration in psychological health (Kundu, Tuteja, & Chahar, 2022). To add to this problem, high workloads are normally coupled with lower levels of control and autonomy under which the employees have little control over how, when and what they work on. Due to this, they tend to lack intrinsic motivation and the feeling of accomplishment most of the time (Msuya & Kumar, 2022).

These issues are acute, especially in the academic profession where work nature is multidimensional in itself. Academic employees are supposed to carry out several functions at the same time: giving lectures, doing research, advising students, conducting administrative duties and serving the institution. This version of

perpetual switching between these roles is cognitively taxing and in many cases, overloading. In the long term, this continuous multitasking may result in permanent stress, emotional burnout, and a sense of uncontrollability that will eventually damage the sense of accomplishment, professional autonomy, and well-being of academics. As a result, the mentioned pressures severely undermine the overall job satisfaction and burnout and disengagement risks (Marsh, Vallejos, & Spence, 2022).

A number of empirical studies have shown a significant negative correlation between workload and job satisfaction, particularly in the context of higher education. Increased lecturing, administrative duties, and research demands often lead to greater stress and lower satisfaction among academic employees (Winefield et al., 2003; Houston et al., 2006). These findings indicate that there is a motivational imbalance where, when job demands become excessive, the ability to manage workload, work-life integration, and satisfaction decreases significantly. Regardless of this prevailing theory, it is critical to point out that there is a gap in research concerning the relationship between workload and job satisfaction, as there are conflicting findings. Several studies documenting weak or absent relationships cited differences in the context of the institution, coping strategies employed by individuals, and available resources as contributing factors (Kinman & Wray, 2013; Barkhuizen & Rothmann, 2008). Such contradictory findings reveal a need for further empirical research in relation to mediators and moderators like work-life balance or the integration of technology in reporting, in order to clarify the complex interplay of workload and satisfaction in academic contexts.

Some studies have not found a direct impact between the two (Ekowati, Supriyanto, Fatmawati, Mukaffi, & Setiani, 2021), while others have reported either positive or negative correlations (Wahyudi et al., 2021). Tentama et al. (2019) found that work stress and workload significantly influence job satisfaction, jointly explaining 39.9% of the variance in satisfaction. Additionally, a study by Jalal and Zaheer (2017) found that workload positively influences both job satisfaction and performance—an unexpected conclusion.

Furthermore, some studies have suggested that the work environment may mediate the relationship between workload and job satisfaction (Ekowati et al., 2021). Therefore, to manage employee workload more effectively and enhance satisfaction, scholars recommend creating a positive work environment (Ekowati et al., 2021) and using information systems to reduce barriers to data access and improve work efficiency (Wahyudi et al., 2021). In summary, the relationship between workload and job satisfaction is complex, influenced by both individual characteristics and the organizational environment. Therefore, this study proposed that:
H1: There is a significant relationship between workload and job satisfaction.

Evaluating the Impact of Work-life balance on Job satisfaction
Work-life balance refers to a state of harmonious coordination between an individual's work and personal roles. A high level of work-life balance means that employees can allocate their time and energy reasonably (Bulger, 2024), ensuring that work does not interfere with personal life, while personal matters also do not adversely affect work. A good work-life balance helps reduce employee stress, thereby enhancing their job satisfaction. When employees can achieve a balance between work, family, and personal life, they often demonstrate more positive work attitudes and report higher levels of satisfaction (Aruldoss, Berube Kowalski, Travis, & Parayitam, 2022). Additionally, most employees generally believe that organizations that prioritize work-life balance for employees tend to demonstrate greater humanistic concern, thereby strengthening employees' identification with their roles and the organization (Alzadjali & Ahmad, 2024).

Extensive research involving empirical research has continuously shown a positive correlation between work-life balance and job satisfaction in most professional environments. It has been repeatedly demonstrated that workers who subjectively experience a more adequate balance between their professional and personal lives declare greater job satisfaction (Fayyazi & Aslani, 2015; Pratama & Srimulyani, 2022). Nevertheless, not everybody is able to establish and sustain a work-life balance. Part of the employees, especially those working in high-intensity working environment that entails meeting short deadlines and large workloads, fail to achieve a balance between work and family demands. Such an imbalance may be a cause of high levels of stress, poor performance at work, and decreased overall satisfaction (Lupu & Liu, 2025).

Moreover, the correlation between the work-life balance and job satisfaction could be moderated by the impact of personal demographic variables that can shape the perceptions of individuals and their ways to balance the

relationship between their professional and personal lives. As an example, age, tenure in the organization, and education level have been revealed to influence how employees perceive and react to work-life balance practices (Soomro, Breitenecker, & Shah, 2018). These demographic variations imply that although work-life balance has a largely positive effect on job satisfaction, it might not have the same effect on all groups of employees. Work-life balance might be more satisfying to some people than others, or it may depend on the life stage or career priorities. Finally, even though contextual and person-related factors can regulate its intensity, the work-life balance always proves to be an essential predictor of job satisfaction in employees. In that regard this research hypothesizes that:
H2: There is a significant relationship between work-life balance and job satisfaction.

Evaluating the Impact of Workload on Work-life Balance
High-intensity workloads often encroach on employees' time and energy, hindering their ability to effectively manage personal affairs and thereby disrupting the balance between work and life (Ruby et al., 2023). Such workloads typically manifest as heavy task loads, tight deadlines, frequent overtime, and high stress associated with job roles. This state requires employees to maintain high efficiency for extended periods, often at the expense of personal time, leading to significant pressure in areas such as family responsibilities, health management, and social activities (Rajan, 2021). This, in turn, impacts their mental health, emotional stability, and overall job satisfaction.

Additionally, excessive workloads can lead to sustained psychological stress, causing employees to fall into a 'work-dominated' state where personal life is marginalized and passively subordinated to work-related matters (McAllister et al., 2025). Long-term imbalance not only reduces employees' satisfaction with life but also weakens their positive emotions toward work, further disrupting the coordination between work and life. This is especially true when employees need to switch frequently between multiple social roles (e.g., employee, parent, spouse), as high workloads exacerbate time conflicts and role conflicts, thereby intensifying the tension between work and life (Ugwu et al., 2024).

Empirical evidence tends to support this perspective. In their study examining financial workers in Makati City, Nogoy and Ijar (2020) noted that greater workloads considerably affect an individual's work-life balance, frequently resulting in the necessity to work extra hours. Sari et al. (2017) also found a significant negative correlation between workloads and work–life balance in a study of government auditors in Indonesia. Kartika and Riana (2024) further confirmed this in a survey of a water utility company in Denpasar, where employees' workloads were found to have a negative impact on their work–life balance.

These findings emphasize that the notion of managing workloads is critical in improving work–life balance and mitigating stress among employees. By adopting suitable strategies which may include flexible work practices, realistic performance expectations and favorable organizational cultures, organizations are able to develop a supporting environment which favors the well-being of the employees and the performance outcomes of organizations. These policies can assist in managing the physical workload but also allow contributing to mental health and, in effect, creating a sustainable and productive workforce (Sari et al., 2017; Nogoy & Ijar, 2020).

On the other hand, extreme workloads together with inadequately controlled workloads are potential origins of occupational stress and a main cause of work–life imbalance. Otherwise, due to the lack of organized policies and regulatory measures, the long-term effect of high workloads may be emotional exhaustion, lower job satisfaction, and turnover intentions. Such negative consequences not only affect personal health and morale but also affect the effectiveness and survival of organizations. Thus, in recognition of the adverse outcomes that excess workload has on the welfare of employees and the sustenance of organizations, the study generates the following hypothesis:
H3: There is a significant relationship between workload and work-life balance.

Workload, Work-life balance and Job satisfaction
In organizational behavior research, workload is typically regarded as a primary stressor (i.e., work demands) (Kubicek et al., 2023). When employees face heavy workloads and intense work rhythms, they often experience physical and mental exhaustion, energy depletion, and time-resource conflicts over a certain period of time

(Pensar & Rousi, 2023). This condition disrupts the harmony between the work life and personal life of the employees resulting in a lack of work-life balance. Lack of work-life balance also catalyzes work burnout, helplessness, family tension, and other negative effects and reactions to the organization, hence, lowering the level of job satisfaction in employees (Irfan et al., 2023).

In this mechanism, work–life balance plays the role of an intermediary variable. In other words, workloads may not directly influence job satisfaction in all cases but rather indirectly impact satisfaction through employees' capacity to maintain an effective work–life balance (Permadi et al., 2023). This may be because employees' subjective perceptions of workload vary from person to person and if they receive adequate resource support or maintain a good work–life balance, their satisfaction levels may remain stable.

It has only been within the past few years, though, that scholars have started to formally investigate the mediating value of work–life balance in the connection between workload and job contentment. There is also an emerging empirical support indicating that the workload exerts a statistically significant, negative influence on work-life balance because, in many cases, extensive work demand may result in the fact that employees have an inadequate amount of time and energy to fulfil their personal duties (Haar et al., 2014). Such an imbalance, in its turn, is related to lower job satisfaction, which makes work balance a leading tool by which workload impacts employee well-being. Regardless of these insights, it is necessary to examine this mediating pathway in various professional settings and examine what factors may buffer the negative impact of high workload (Aloulou et al.,2023; Fuadiputra and Novianti, 2021), whereas work-life balance positively affects job satisfaction of the employees (Muzti and Mardiana, 2024). However, existing research findings are inconsistent regarding whether workload directly influences job satisfaction: some studies have found a positive correlation between the two (Inegbedion et al., 2020), while others have not identified a significant direct effect (Fuadiputra & Novianti, 2021).

In addition to this, the work-life balance has been found to mediate in a number of other relations. Indicatively, Aloulou et al. (2023) demonstrated that work-life balance mediates the effects of core self-evaluation, perceived organizational support, and job satisfaction to some degree. Further, the research also established that, work-life balance fully mediates the effects of life satisfaction through job satisfaction. On the whole, the results give a better idea of the complex interrelation between the workload, work-life balance and job satisfaction and highlight the significance of workload management and the promotion of the work-life balance from an organizational point of view. Based on the above discussion, this study proposes:
H4: Work-life balance mediates the relationship between workload and job satisfaction.

Technology Adaptation as a Moderator
In the context of accelerating digitalization, technological adaptability is regarded as an important personal resource for employees in responding to the demands of multiple roles (work and life). Technological adaptability refers to employees' ability and willingness to accept, master, and actively apply new technologies (such as remote working platforms, project collaboration tools, and enterprise instant messaging systems) (Kumi, Osei, Asumah, & Yeboah, 2024). Specifically, technological adaptability enhances the flexibility of the boundaries between work and life: on the one hand, technological tools enable employees to complete tasks outside of formal working hours, enhancing their sense of control over time and reducing time-based conflicts (Zamani & Spanaki, 2023); on the other hand, employees with higher technological adaptability can optimize workflows and communication efficiency through digital tools (Sun & Jung, 2024), thereby reducing overtime and work backlogs and freeing up more time and energy for personal life.

Consequently, the likelihood that work-life balance positively influences job satisfaction is high when the employees have a high degree of technological adaptability. These people are in a better position to manage their work and family life, or put it another way, to use technology to save time and be effective and productive in various spheres of life. Such adaptive ability is frequently transformed into the increased feeling of organizational support and personal effectiveness and hence confidence in job Satisfaction (Duan, Deng, & Wibowo, 2023). Conversely, low technological adaptability could result in frustration, inefficiency, and lack of confidence in interaction with digital tools in employees with low technological adaptability. They can experience a higher perceived strain and lower job satisfaction even in the case of the objective conditions of work and life balance because of technological obstacles (Nam, 2014; Marques & Berry, 2021).

The current literature agrees on the importance of work–life balance in shaping various organizational outcomes. Remarkably, it is linked positively with job satisfaction and negatively with work-related stress and turnover intentions (Aruldoss et al., 2021; Fayyazi & Aslani, 2015). Such relationships are not, however, homogeneous and they can be determined by contextual or individual-level variables, such as the character of the work environment, training availability and technological adequacy. More specifically, technological adaptation behavior is a major moderator in the connection involving technology use and work-related outcomes (Bala & Venkatesh, 2015). Such employee behavior is determined by their employee appraisal of new technologies as enablers or threats, depending on their perceived employee involvement and confidence towards the adoption of such tools. Considering the foregoing, the hypothesis of the study is as follows:
H5: Technology adaptation moderates the relationship between work-life balance and job satisfaction.

Job Demands–Resources (JD-R)
One of the fundamental theoretical models extensively applied in industrial research regarding work stress and employee well-being is the Job Demands--Resources Model (JD-R Model) suggested by Bakker and Demerouti (2007). This model argues that there are two types of factors that affect work environments. First, job demands refer to factors that consume an individual's physical and mental resources during work, such as workload, time pressure, and task complexity (Demerouti & Bakker, 2023). The second category, job resources, is those assets that enable an employee to achieve work objectives, mitigate the adverse impact of work demands, assist in personal development, or self-balance, social support, and autonomy at work (Albrecht, Green & Marty, 2021).

The JD-R model emphasizes that high job demands combined with insufficient job resources increase the likelihood of negative outcomes such as reduced job satisfaction, occupational burnout, and diminished performance (Demerouti & Bakker, 2023). Conversely, adequate resources can buffer stress induced by job demands and promote positive work outcomes (Bakker & De Vries, 2021).

Based on the JD-R model's theoretical perspective, this study conceptualizes workload as the representative indicator of job demands. Workload typically manifests as a high task volume, tight deadlines, and task complexity, which are common high-consumption factors (Vinícius, Rodrigues, Torquato & Silva, 2022). Prolonged exposure to high-intensity workload can deplete employees' psychological and time resources, exacerbate role conflict and fatigue, and ultimately reduce job satisfaction (Zhang, Dai, Chen, Gu & Zhao, 2025).

Second, current research conceptualizes work–life balance as a job resource, as well as a mediating factor.. As a critical resource, a strong work–life balance helps alleviate work stress and improve employees' overall well-being. Work–life balance mediates the relationship between workload and job satisfaction: high workload impairs employees' work–life balance, whereas improvements in balance can effectively buffer its adverse effects, thereby enhancing job satisfaction (Ugwu, Nwali, Onyishi & Okafor, 2024).

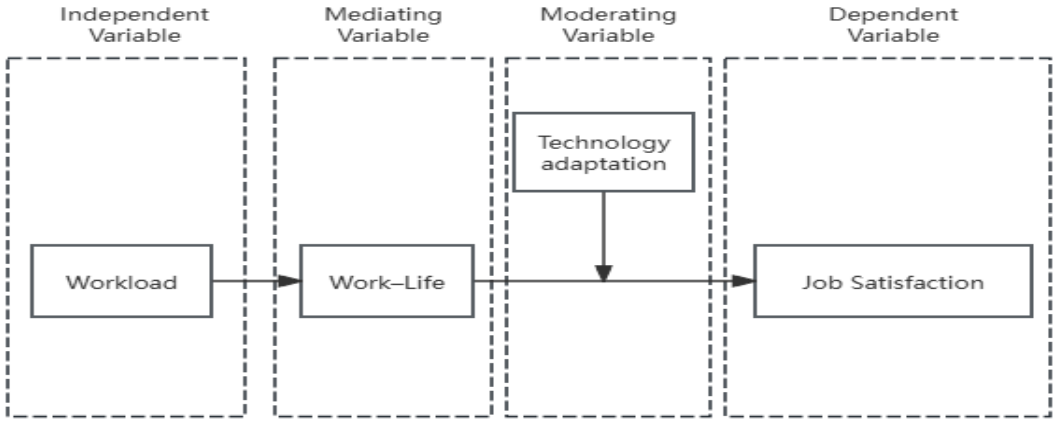
Additionally, this study incorporates technological adaptation as both a personal resource and a moderating variable within the model. In the JD-R framework, personal resources are believed to enhance the positive impact of job resources on work-related outcomes (Koroglu & Ozmen, 2022). Accordingly, technological adaptability is regarded as a moderator that influences the effect of work–life balance on job satisfaction. When employees demonstrate high technological adaptability, the positive effect of work–life balance on job satisfaction becomes more pronounced; conversely, this effect may diminish when adaptability is low.

Finally, job satisfaction, as a typical positive work outcome in the JD-R model, is shaped by the interaction of job demands and resources. When employees are equipped with sufficient resources to manage their job demands effectively, their satisfaction and organizational commitment tend to be higher (Koroglu & Ozmen, 2022).

Overall, the present study uses the JD-R model as a theoretical basis to develop a research framework that allows combining job demands, job resources, and personal resources and discloses the mechanisms that underlie the connections between workload, work-life balance, technological adaptation, and job satisfaction. This theoretical model not only deepens the understanding of key factors affecting job satisfaction among university faculty and staff but also provides practical insights for organizations to optimize resource

allocation, alleviate excessive workload, and enhance employee well-being. The conceptual framework is shown in Figure 1.

Figure 1: Conceptual Framework



3. Research Methodology

To test the stated hypotheses, the proposed study will use a quantitative research design. The population of interest includes academic personnel in the private and public Universities around Malaysia. The primary data collection instrument will be a self-administered questionnaire, which allows respondents to complete the questions independently. This approach helps to eliminate potential interviewer bias and ensures consistency in the responses.

To make the sample representative and the findings more generalized, this research will consider using a probability sampling method. In particular, a stratified random sample will be used whereby the necessary representation of subgroups in the academic population will be achieved. The reason is that all members of the population will be known to have equal probability of being selected and this fact makes the external validity of the study strong. The stratification criteria will consist of important demographic attributes, which include type of university (public or private), academic rank or years of service, and faculty/department affiliation, to make meaningful comparisons among various strata or segments of academic staff in Malaysian higher educational institutions.

The data collection tool would be a structured questionnaire, and demographic items and the items to measure the core variables of interest would be based on existing and validated scales in the literature. Before the questionnaire is deployed fully, a pilot test will be carried out using a small group of academic staff to test the clarity, reliability and internal consistency of questions in the questionnaire. The pilot feedback will be taken into account to clarify any vague or Vague items.

The completed questionnaire will be sent out electronically, via university mailing lists, professional academic networks, and appropriate social media platforms (e.g., WhatsApp or Telegram groups popular among Malaysian academics). The questionnaire will also contain an informed consent form that will explain the objective of the study, the voluntary basis of the study, the assurance that the data will be treated in a confidential manner, and the freedom of the respondents to withdraw at any point without repercussion.

4. Managerial Implications and Recommendations

It is presumed that the outcome of the ongoing study would bear important practical inferences for the administrators and policymakers of the university sector in Malaysia who are obliged to uplift the magnitude of job satisfaction among the academic staff. On the one hand, the revealed adverse effect of work overload on job satisfaction indicates that higher education institutions should closely review and streamline the

assignments of academic duties. There should be a just and open distribution of teaching, research and administrative responsibilities to avoid professional burnout due to role overload and frequent multitasking. Greater equality and sustainability in working practices could be enabled by the adoption of clear workload policies, regular task reviews, and feedback mechanisms that are inclusive.

Second, because of the mediating value of work-life balance amid workload and job satisfaction, universities ought to employ initiatives that actively incorporate the well-being of the staff. This may involve health promotion programs, work-flex programs, mental health services and programs that assist employees in balancing work demands with personal and family demands. Institutional support of work-life integration should be high to provide additional satisfaction and prolonged involvement.

Third, technological adaptability provides a moderating effect, which explains the need to develop digital competency as a strategic resource amongst the academic staff. The institutions ought to invest in continuous professional development programs in digital literacy, in addition to providing sufficient infrastructure support. Job design within the context of technology-integrated teaching, research, and service activities may be facilitated through the application of intuitive digital systems, virtual instructional technology training, and electronic task management platforms. The initiatives are expected to improve technological frustration and overall job satisfaction.

Finally, the human resource strategies ought to recognize the demographic differences of academic staff. Academic rank, career stage, type of employment (e.g., tenured versus contract), and disciplinary differences are some of the factors that may modify the way staff members experience and react to work-related demands and resources. The positive impact of institutional support can be enhanced with different interventions that consider the unique needs of several subgroups and promote inclusive outcomes of job satisfaction. Together, the measures have the capability to empower organizational commitment, decrease turnover intentions, and increase institutional performance in the long term.

5. Conclusion

The academic employees in Malaysian universities are the target of the proposed research. It uses the Job Demands--Resources (JD-R) model as the major theoretical approach. The model is adopted to investigate the complicated correlation among workload, work-life balance, technological adaptation and job satisfaction. In this context, workload is considered a job demand. It involves prolonged physical or mental activity and it is commonly associated with stress and burnout. Conversely, work-life balance is managed as a job resource. It assists in cushioning the adverse effects of job demands and helps one have positive outcomes. The technological adaptability is regarded as a personal resource. It shows how well a person can utilize digital systems and tools in his or her practice. Such flexibility can moderate the connection between work-life balance and job satisfaction. The outcome variable is placed as job satisfaction. It is a feeling and attitudinal manifestation by workers towards their job and workplace.

The main aim of the study is to investigate that, do extreme workloads have negative indirect effects on work satisfaction through work–life balance violation, and can technological adaptability cushion that relationship by increasing the positive impact of work–life balance on satisfaction? In the proposed model, therefore, both mediating and moderating mechanisms are captured within the same theoretical framework that provides a more subtle picture of how academic staff negotiate job demands and resources in a higher education environment that is changing very fast.

This theoretical framework is predicted to have a significant contribution to the current body of knowledge on the determinants of job satisfaction among university employees and offer practice recommendations that could be applied by institutions of higher learning in Malaysia. With enhanced workload management practices, universities will be able to establish a more favorable working environment. They can also encourage flexible work practices and invest in creating digital skills in employees. Such initiatives will boost professional fulfillment, promote workforce wellness and increase organizational loyalty.

Moreover, the current study will guide policy and workforce planning of academics. It underlines that universities should pay attention to both structural (e.g., workload distribution, institutional support) and personal (e.g., digital skills, adaptability) aspects when developing their human resource development strategies.

It is highly recommended that future studies take place to empirically prove the proposed model. The longitudinal research design would enable investigation of the causal relationship of changes occurring over time and would give information about changes in job demands and resources in dynamic academic environments. Besides this, future research ought to increase the geographical and institutional reach to cover universities in other regions or countries to make cross-cultural comparisons. Including other moderating factors, including organizational culture, leadership style, or psychological capital, might further increase the theoretical soundness and the explanatory value of the model.

Taken together, the theoretical baseline of the current paper is substantial and the practical implications of addressing the issue of digital transformation, work intensification, and faculty retention in the contemporary higher education environment are extensive.

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The Relationship between Organizational Commitment and Job Satisfaction among Administrative University Staff

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Abstract: Over the past decade, organizational commitment and job satisfaction have been crucial elements in the organization's overall success. Many previous studies have merely focused on measuring employees' job satisfaction among academic staff. But there are two categories ofworkforce who work hard in developing the university, which are the academic and administrative staff. However, the study on job satisfaction among administrative staff is still lacking in providing evidence. Thus, the objective of this study is to examine the relationship between organizational commitment and job satisfaction. The sample size is 103 participants was selected by using convenience sampling. To collect data, Allen and Meyer's organizational commitment questionnaire and Brayfield and Rothe's job satisfaction questionnaire were used. The research methods utilized in this study were descriptive, correlation and multiple regression and have been analyzed by using SPSS version 25. In this study, three hypotheses have been tested. According to the result of the multiple regression, this study accepted only two hypotheses, which are affective and normative commitments. They have a strong and moderate relationship with job satisfaction among administrative staff at a private university inSarawak. Continuous commitment, on the other hand, was not accepted because the p-value is more than the 0.05 significance criterion. This study contributes to the body of knowledge by identifying additional support in the relationship between variables and assists policymakers in reviewing current policies to design better guidelines to promote organizational commitment and job satisfaction.

Keywords: *Organizational Commitment, Affective Commitment, Normative Commitment, Continuous Commitment, Job Satisfaction, Administrative Staff, Private University.*

1. Introduction and Background

Over the last two decades, the issue of employee job satisfaction has become an essential research topic that has gained the attention of numerous scholars. This statement was strongly supported by the previous research done by Hayat Bhatti et al. (2019), which stated that job satisfaction, defined as the favorable state or feeling resulting from an employee's experience in the workplace, has received a lot of attention in organizational research. Job satisfaction, as defined by Rivaldo (2021), refers to an individual's subjective evaluation, encompassing both positive as well as negative aspects of their employment. In Malaysia, employee turnover rose from 1.1% in 2014 to 13.2% in 2015. After reviewing the education sector, private institutions had a turnover rate of 45.45%, compared to 18.18% for public universities in Malaysia (Rathakrishnan et al., 2016). High turnover can lower the university's efficiency and raise costs (Butali & Njoroge, 2017). Thus, unengaged workers may leave their company which resulting in high turnover.

Job satisfaction among administrative staff in higher education has been under-researched, resulting in a limited understanding of their needs and experiences. Given its importance to the stability and productivity of academic institutions, the job satisfaction of administrative personnel warrants greater attention (Fako et al., 2009). Many studies on job satisfaction have explored factors such as job values, rewards, and working conditions (Judge et al., 2021). However, research on organizational commitment remains limited. Organizational commitment is essential for fostering job satisfaction. Therefore, it is important for organizations to identify the type of commitment that promotes satisfaction among administrative employees and to consider potential improvements. Since job satisfaction is a fundamental component of organizational effectiveness, enhancing organizational commitment can lead to better outcomes. Hence, this study aims to investigate the relationship between organizational commitment, such as affective commitment, normative commitment, and continuous commitment, with job satisfaction among administrative staff in the education sector.

2. Literature Review

Job Satisfaction

Job satisfaction is a major challenge for organisations managing the workforce (Kumareswaran et al., 2022). This is due to the significant role it plays in organizational performance. Previous studies have found that individuals who are extremely satisfied with their current employment are more motivated and eager to exert greater effort in carrying out their responsibilities (Riyanto et al.,2021). Job satisfaction also affects employee attitude, loyalty, support, and dedication (Hee et al., 2020; Gedif et al, 2018). Job satisfaction is a complex variable involving several factors pertaining to the mental state of employees and their expectations (Ahmad, 2018). Organisations that can cultivate a strong sense of job satisfaction among employees will reap the rewards of their positive work. A high level of job satisfaction will inspire employees to produce better outcomes. Moreover, businesses rely heavily on employee job satisfaction to maintain strategic and competitive advantages (Mahmood et al., 2019).

Job satisfaction is influenced by both job-related and individual-related factors (Alshmemri et al., 2017). Among the job-related aspects, pay plays a crucial role, as compensation significantly affects satisfaction levels. Research indicates that 54% of the variation in job satisfaction is linked to employee benefits (Hina et al., 2014), emphasizing the importance of fair wages in shaping attitudes and behaviours (Balouch & Hassan, 2014). Additionally, supportive and approachable supervisors encourage positive attitudes and communication, enhancing overall job satisfaction (Srihandayani & Barry, 2025).

Besides that, according to the research done by Cherian et al. (2018), organizational commitment influences job satisfaction. Organizational commitment is viewed as a form of psychological attachment between employees and their employer. Moreover, studies highlight that job satisfaction serves as a mediator between job characteristics and organizational commitment, which suggests that greater job satisfaction enhances employees' emotional ties to their organization and vice versa (Xianqiang, 2023). Researchers such as Utami and Aima further confirm that higher levels of organizational commitment lead to higher job satisfaction, indicating that the relationship is bidirectional (Utami & Aima, 2021).

Organizational Commitment

Most scholars agree that for employees to be highly committed to the organization, they must be satisfied with their work. From the perspective of organizational behavior, the definition of organizational commitment is the employees' attachment to their place of employment or the organization itself (Yukongdi & Shrestha, 2020). Organizational commitment refers to the degree to which employees experience a sense of attachment and loyalty towards their organization (Knotts & Houghton, 2021). According to a study by Afsar et al. (2020), employees who possess high levels of organizational commitment demonstrate higher motivation in their pursuit of the organization's objectives. In a different note, findings of the study by Moshabi et al. (2024) revealed positive correlations between job satisfaction and organisational commitment, as well as between job satisfaction and employee retention.

Herscovitch and Meyer (2002) describe the three-component model (TCM) of work commitment, which includes affective, normative, and continuance commitment. Affective commitment stems from an emotional connection between employees and their employer through positive work experiences. Normative commitment is driven by a sense of loyalty based on mutual obligations. Continuance commitment depends on financial and personal factors influencing an employee's decision to stay or leave. Affective commitment is the most prevalent component oforganizational commitment in the relevant literature (Ramalho et al, 2018). According to Kim & Beehr (2018), affective commitment is the element that is based on the emotional attachment between the employee and the organization. Normative commitment is characterized by a sense of responsibility to keep working for the organization (Sencherey et al., 2022). Deniz (2024) has revealed a highly significant positive relationship between normative commitment and intention to stay at work. While continuance commitment refers to the tendency to stay in an organization due to the inabilityof employees to overcome the expenses associated with leaving the organization. Continuance commitment serves as a pivotal yet complex aspect of organizational behavior, encapsulating the costs of leaving and the practical implications of an individual's relationship with their employer (Nam et al., 2020; Ekmekci et al., 2021; Tai et al., 2020). Research indicates that employees with strong continuance commitment often view their jobs as a necessity

rather than a choice. They remain in their roles primarily due to fear of negative consequences if they leave, rather than genuine attachment to the organization (Lewicka, 2020; Tohumcu & Tanrıverdi, 2023).

3. Research Methodology

Research design is a master plan that consists of the methods and procedures that will be used in the data collection and data analysis to extract the information needed. The research design specifies the methods for collecting and analyzing the necessary data and how this information will be utilized to answer the research question. According to Sekaran and Bougie (2016), a research design is an essential framework for systematically organizing, measuring, and analysing data to answer research questions. It defines the overall structure, methods, and procedures of a study, ensuring a well-planned approach to data collection, evaluation, and interpretation.

This study employs both descriptive and correlational research designs. The descriptive approach is used to uncover new information and provide a deeper understanding of the subject, enabling further quantitative studies. In this case, the researcher examines the level of job satisfaction, utilizing a descriptive design to explore its relationship with organizational commitment among the sample population. On the other hand, the correlational design examines the linear relationship between two or more variables without determining causality. Here, the researcher investigates the connection between organizational commitment and job satisfaction among administrative staff at a private university in Sarawak. This study follows a cross-sectional method, where individuals within the identified organization are observed at a single point in time. Data collection is primarily conducted through questionnaires, capturing participants' perspectives and responses. This study focuses on identifying the relationship between organisational commitment and job satisfaction individually among administrative staff. Thus, the unit of analysis is at the individual level.

For this study, the sampling technique that was applied was non-probability sampling, which involved using convenience sampling. The non-probability sampling, which is convenience sampling, was used in this study because the researcher was having difficulty getting the name list of the administrative staff due to the confidentiality and policy of the university. The population for this study was 142, and the sample was 103 of the administrative staff at the private university in Sarawak. The survey study has been carried out using a questionnaire. A questionnaire is considered an effective data collection method as it can be best administered personally to the sample that was chosen for the study (Sekaran & Bougie, 2016).

Table 1: Reliability Analysis.

Factors	Cronbach's Alpha	Result
Job Satisfaction	0.942	Excellent
Affective Commitment	0.934	Excellent
Normative Commitment	0.932	Excellent
Continuous Commitment	0.771	Good

The reliability analysis has been done for the instrument used in this study. The result shown in Table 1 indicates that the value of Cronbach's alpha for job satisfaction is 0.942, affective commitment is 0.934, normative commitment is 0.932 and continuous commitment is 0.771. Overall, Cronbach's Alpha for each variable is in the range of 0.7 to 1.0 and can be considered excellent.

4. Results

Descriptive Analysis

Descriptive analysis provides a statistical overview of variables, including mean, standard deviation, minimum, and maximum values, based on responses from the questionnaires. Conducting this analysis is essential for understanding variations in respondents' perspectives and opinions.

Table 2: Descriptive Analysis

	Mean	Std. Deviation
Job satisfaction (DV)	3.83	.67
Affective commitment	3.33	.95
Normative commitment	3.31	1.07
Continuous commitment	3.53	.76

Table 2 shows the overall mean score and standard deviation for all variables involved in this study. The descriptive analysis result revealed that a high overall mean score was recorded for job satisfaction (M=3.83, SD=.67), followed by continuance commitment (M=3.53,SD=.76), affective commitment (M=3.33, SD=.95) and lastly normative commitment (M=3.31, SD=1.16).

Correlation Coefficient Analysis

Correlation analysis is used to determine the strength and direction of the linear relationship between two or more variables. It helps to determine whether there is a relationship between variables and the degree to which they vary together. As all the objectives of this study are to investigate the relationship between variables, a Correlation coefficient analysis has been conducted. The findings of this analysis can be shown in Table 3 below.

Table 3: Result of Correlation Analysis for All Variables

		Affective Commitment (AC)	Normative Commitment (NC)	Continuous Commitment (CC)	Job Satisfaction (JS)
AC	Pearson Correlation	1	.804**	.543**	.719**
	Sig. (2-tailed)		.000	·000	.000
	N		103	103	103
NC	Pearson Correlation	.804**	1	.571**	.671**
	Sig. (2-tailed)	.000		.000	.000
	N	103		103	103
CC	Pearson Correlation	.543**	.571**	1	.414**
	Sig. (2-tailed)	·000	·000		·000
	N	103	103		103
JS	Pearson Correlation	.719**	.671**	.414**	1
	Sig. (2-tailed)	·000	·000	·000	
	N	103	103	103	

(*p<0.05; **p<0.001)

Table 3 above illustrates that the outputs confirm that there is a highly positive and significant relationship between affective commitment and job satisfaction. The score is (r=.719, p<0.01, p=.000). Besides that, according to the table above, there is a moderate positive significant relationship between normative commitment and job satisfaction. The score is (r=6.71, p<0.01, p=.000). Lastly, as we can see from the table above, there is a low positive significantrelationship between continuous commitment and job satisfaction. The score is (r=.414, p<0.01, p=.000).

This shows that among the three variables, affective commitment (Independent Variable) influences the job satisfaction (Dependent Variable) the greatest. The organization needs to focus on the affective commitment as if employees were emotionally attached to theirorganization, which means that they will stay in their current organization. They typically identifywith the organizational goals, feel that they fit into the organization and are satisfied with theirwork.

Multiple Regression Analysis

Multiple regression analysis is usually used to determine the strength of the relationship between independent variables and a dependent variable. Multiple regression analysis is a statistical method also used to predict the value of a variable based on the values of numerousother variables (Statistics, 2018). In this study, the dependent

variable was job satisfaction, which was used to predict the value. The independent variable, known as organizational commitment, was used as the predictor value for the dependent variable.

Table 4: Model Summary for Correlation Coefficient.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson
1	.736[a]	.542	.528	.45781	2.057

a. Predictors: (Constant), Affective Commitment, Normative Commitment, Continuous Commitment
b. Dependent Variable: Job Satisfaction

Table 4 indicates the percentage variance in the dependent variable, which is job satisfaction, that is explained by the variation in the independent variables, which are affectivecommitment, normative commitment, and continuous commitment. The R Square of 0.542 implies that all the independent variables, which are affective commitment, normative commitment and continuous commitment, explain 54.2 percent of the variance in the dependent variable, which is job satisfaction. The rest of 45.8 percent of the variance in job satisfaction is not explained by affective commitment, normative commitment, and continuous commitment in this study. This indicates there are other independent variables that are notincluded in this study and could further strengthen the regression equation.

In addition, the R-value of 0.736 explains the relationship between independent variables (affective commitment, normative commitment, and continuous commitment) and the dependent variable (job satisfaction). With the adjusted R^2 value of 0.528, it measures the proportion ofvariation that is explained by only the three independent variables, which help in explaining the dependent variable (by taking into consideration the degree of freedom, df). Meanwhile, the standard error of the estimate is 0.45781, representing the average distance between the observed and predicted values of job satisfaction. Durbin-Watson shows a score of 2.057, whichindicates that this study is free from error because the score is more than 1.50.

Table 5: Results of Coefficients Analysis

		Unstandardized Coefficients		Standardized Coefficients		
Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	2.137	.223		9.599	.000
	Affective Commitment	.359	.081	.512	4.414	.000
	Normative Commitment	.168	.074	.269	2.268	.025
	Continuous Commitment	-.015	.074	-.018	-.209	.835

Table 5 shows that the constant term has an unstandardized coefficient of 2.137, and there is no standardized coefficient beta, suggesting the expected value of job satisfaction when all predictors are zero. Besides that, affective commitment has a positive regression coefficient (β) = .512 or 51.2%,indicating that higher levels of affective commitment are associated with higher employee jobsatisfaction scores. The T-test value is 4.414 and significant at the 0.000 level, which is below 5% at the significance level. Therefore, the affective commitment variable is significant. Hence, it explains that affective commitment is positively related to job satisfaction and the regression model is valid. In addition, normative commitment has a positive regression coefficient (β = .269 or 26.9%, indicating that higher levels of normative commitment are associated with higher employee job satisfaction scores. The T-test value is 2.268 and significant at the 0.025 level, which is below 5% at the significance level. Therefore, the normative commitment variable is significant. Hence, it explains that normative commitment is related to job satisfaction and the regressionmodel is valid. Meanwhile, continuous commitment has a negative regression coefficient (β = -0.018 or-1.8% indicating that the lower levels of continuous commitment are associated with low employee job satisfaction scores. The T-test value is -0.209 and not significant at the 0.835 level,which is above 5% at the significant level. Therefore, the continuous commitment variable is not significant. Hence, explain that continuous commitment is not related to job satisfaction.As a conclusion, the most significant factors that influence employee job satisfaction at a private university in Sarawak were recognized with the highest score value 0.512, which is affective commitment.

Summary of hypothesis testing

A summary of hypotheses and regression results refers to a concise overview of the research hypotheses and the corresponding outcomes obtained from the regression analysis. It presentsasummary of each hypothesis, indicating whether the hypothesis was supported or not basedon the statistical results.

In the context of this study, the summary of hypotheses and results would involve listing eachhypothesis (H1 to H3) and providing a brief statement about whether the hypothesis was supported or not based on the statistical significance of the corresponding coefficients or variables in the regression analysis. This summary helps to communicate the overall findingsand conclusions regarding the relationships between the variables studied in this research. However, only two hypotheses were accepted as each p-value of the hypothesis is less than 0.05, which are affective commitment and normative commitment. Hence, it can be concludedfrom this research that affective commitment and normative commitment and job satisfaction have a significant relationship. Meanwhile, one hypothesis was not accepted, which was continuous commitment, as the p-value is more than 0.05. Hence, it can be concluded from this research that continuous commitment and job satisfaction have an insignificant relationship.

	Research Hypothesis	p value	Result	Beta Value(β)
H1	There is a relationship between Affective Commitment and Job Satisfaction	0.000	Accepted	.512
H2	There is a relationship betweenNormative Commitment and Job Satisfaction	0.025	Accepted	.269
H3	There is a relationship betweenContinuous Commitment and Job Satisfaction	0.835	Not Accepted	-.018

From the analysis results conducted on the respondents in this study above, it was found that two (2) hypotheses were accepted, and one (1) hypothesis was not accepted. The results guide determining the results of regression indicated that there was a relationship between affective commitment and job satisfaction ($\beta = 0.512$, $p<0.000$); thus, hypothesis 1 was accepted. Hypothesis 2 indicates that there was a relationship between normative commitment and job satisfaction. The analysis also found that this relationship wasaccepted ($\beta = 0.269$, $p<0.025$). Lastly, hypothesis 3 indicates that there is an insignificant relationship between continuance commitment and job satisfaction. The analysis found that this relationship was not accepted ($\beta = 0.835$, $p<-.018$).

Discussion

Research Objective 1:

To examine the relationship between affective commitment and job satisfaction among administrative staff at a private university in Sarawak.

Based on the correlation analysis, is high positive significant relationship exists between affective commitment and job satisfaction. The results of the correlation indicate that higher affective commitment scores were associated with higher job satisfaction scores ($r=0.719$, $p<0.01$, $p=0.000$). It is consistent with the finding by Aziz et al (2021), where the study results indicate that the affective commitment has having positive and significant relationship with job satisfaction. The research indicates that workers' emotional attachment to the company and their recognition of the expenses associated with quitting are the factors that contribute to their job satisfaction.

Besides that, as stated by Akinyemi et al. (2022), there is a statistically significant, strong positive relationship between affective commitment and job satisfaction. Therefore, the administrative staff's moderate levelof commitment might influence their level of job satisfaction within the organization.

Research Objective 2

To examine the relationship between normative commitment and job satisfaction among administrative staff

at a private university in Sarawak.

Based on the correlation analysis, the result showed that there is a moderately positive and significant relationship between normative commitment and job satisfaction. Results of the correlation indicate that higher normative commitment scores were associated with higher jobsatisfaction scores ($r=0.671$, $p<0.01$, $p=0.000$). This is also supported by Afolashade et al. (2024); Cao et al. (2024), who stated that there is a significant relationship between normative commitment and job satisfaction.

Research Objective 3

To examine the relationship between continuance commitment and job satisfaction among administrative staff at a private university in Sarawak.

Lastly, to find out the answer to research question 3, the correlation result showed that thereis a low positive significant relationship between continuance commitment and job satisfaction. Results of the correlation indicate that high continuance commitment scores wereassociated with high job satisfaction scores (0.414, $p<0.05$, $p=0.000$). This is also supported by the research done by Nazneen & Miralam (2017), which stated that continuance commitment was found to be positive relationship with job satisfaction means as along as employees feels thehigh cost associated with leaving the organization, employees may show high level of job satisfaction because it will be difficulty for them to get any such job because of poor employment scenario. A study conducted by Osei et al. confirmed that continuance commitment mediates the relationship between job satisfaction and job performance, suggesting that when employees perceive substantial costs associated with leaving their organization, they may engage more deeply in their roles to ensure performance, thereby improving their job satisfaction as a byproduct (Osei et al., 2024). This aligns with findings from Omar et al., which demonstrated that organizational commitment, including continuance commitment, positively influences job satisfaction among employees (Omar et al., 2020).

5. Managerial Implications and Recommendations

From the knowledge management shared by the policymaker, the organization would have the basis to uphold the internal work process, specifically from the point of human resource administration. The organization that practices the knowledge transfer would have a better direction to plan the activities that could boost employee commitment, thus improving job satisfaction. From there, the employees would likely have profited in terms of compensation or benefits, which would further motivate them to perform better. On the other hand, aside from the cascaded knowledge from top to bottom, this study would also be the direct reference for the organization. The organization may have the privilege to consider which dimension of organizational commitment is lacking in its organization. Once they know what is best, the management team could create its initiatives to improve the employees' job satisfaction.

Several recommendations were proposed by the researcher to enhance and maintain the affective commitment among administrative staff at a private university in Sarawak. Firstly, to enhance and maintain affective commitment is to increase cooperation between employees. The decision to stay put rather than to leave is therefore common in organisations where the social side-bets are prominent. Thus, the top management must increase the cooperation among administrative staff to increase the relationship between employees in every department. Managers can conduct outdoor activities or team building activities and must be participated in by all administrative staff at the university. Aligned with that, the relationship between the employer and employees can also be improved.

Secondly, it is to participate in a comprehensive and impactful training program. Training is widely regarded as the primary determinant of employee satisfaction. The opportunity to participate in a comprehensive training program that aligns with job responsibilities has a positive impact on employee performance, leading to increased employee satisfaction. Prior to allocating individuals to any training program, it is essential to complete a Training Need Analysis (TNA). TNA focuses on resolving skills deficiencies at three primary levels within an organization, which are at the organizational level, the group level, and the individual level. This aspect falls within the scope of employee learning and career development.

Conclusion

Based on the findings presented, it is well proven from the previous study and supported by the statistical analysis results that three (3) factors influence employee retention in manufacturing companies in Johor Bahru, Johor. Among all antecedents, the most influential factor on employee retention at manufacturing companies in Johor Bahru, Johor, was found to be career development. Therefore, it is proposed that top management should highlight and focus more on ways to enhance the career development of their employees. Several recommendations were also proposed by the researchers to enhance and sustain the career development level in the company.

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The Mechanisms of Corporate Governance and Firm Performance: Evidence from Malaysia's ACE Market

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Abstract: Corporate governance is pivotal for company performance, but Malaysian companies are not necessarily confident in their system. For companies on the ACE Market where the degree of adoption for MCCG is lower, the threat of delisting grows greater. This study, by using firm performances as measured by ROA and Tobin's Q, sought to answer whether there is an association between company return on assets (ROA) and Tobin's with the effect of these corporate governance mechanisms. This study using a sample of 103 listed companies in the ACE Market, our study obtained diversified metrics of governance effect on firm performance through OLS during the regression analysis process. Risk management committees and CEO duality had negative impacts on ROA; but their impacts were minor in relation to Tobbins Q. The size of the board and firm age both had a positive effect on ROA; however, the default rate decreased with the frequency of board meetings. Our results are consistent with the relational complexity of governance–performance phenomena underdeveloped. It seems that a one-size-fits-all categorical endorsement may not have any impact. The study provides practical implications to the literature for policy decision makers, managers of firms across countries (especially in emerging economies like India, who want to improve their quality of transparency and accountability) and investors.

Keywords: *Corporate governance, firm's performance, ordinary least squares, MCCG*

1. Introduction and Background

Most academics and business experts concur that successful corporate governance procedures are essential to the success of an organisation (Talalwa, Magableh & Badwan, 2024). Implementing robust corporate governance practices is advisable to improve both business performance and sustainability (Atugeba & Acquah-Sam, 2025). Studies demonstrate that countries with strong corporate governance structures achieve faster business growth, drawing increased capital inputs. Thus, efficient corporate governance substantially enhances organisational competitiveness and long-term sustainability (Wu, Alkaraan, & Le, 2023). Companies that prioritise corporate governance frequently exhibit enhanced cash flow and diminished capital costs, eventually augmenting the value of shareholders.

Companies that highlight corporate governance frequently exhibit enhanced cash flow and diminished capital expenses, hence augmenting shareholder value (Talalwa et al., 2024). Corporate governance mechanisms have been shown to connect with business success in numerous theoretical and empirical studies in emerging economies (Singla & Prakash, 2023). Prior research indicates that effective corporate governance frameworks in emerging economies are essential for domestic enterprises and foreign investors seeking significant investment and growth possibilities in these markets (Coleman & Wu, 2021).

Furthermore, a previous study contended that inadequate corporate governance frameworks are the underlying causes of financial statement fraud. Effective corporate governance can enhance the quality of internal control. Moreover, since it is shown that compliance with corporate governance in organizations may improve the quality of financial reports (Md Nasir & Hashim, 2021).

The Malaysian Institute of Corporate Governance (MICG) is one of Malaysia's main organizations working on corporate governance issues. In 1998, the MICG was founded as an independent corporate governance institute with several functions. It delivers information for clear and effective corporate governance applications in Malaysia. MICG also handles corporate governance issues that complement those addressed by CCM, Bursa Malaysia, SCM, and MIA. For instance, MICG is already actively calling for the Malaysian Code on Corporate

Governance (MCCG) which was launched by insisting that the Board of Directors for any publicly-traded company commit to follow it in their annual reports.

However, as a result of stringent listing requirements and poor company performance, many firms have been removed from the main market in Malaysia to be placed on a lower one, PN17. These objectives guide our study as we explore the connections between corporate governance and the business performance of Malaysia-listed corporations. Several businesses are delisted from the Main Market to PN17 for want of or inferior MCCG disclosures. After the implementation of MCCG by the Malaysian Government, the financial performance of listed corporations has significantly improved. MCCG is highly vital to the firm's performance. This issue may also stem from stringent listing requirements, which render it challenging for some companies to remain viable in the primary market. Hence, this research is prompted by the issue arising from the inadequate MCCG disclosure by Malaysian enterprises, which results in numerous companies being susceptible to delisting from the market.

The primary goal of this research is to investigate the relationship between corporate governance and firm performance in Malaysia, as well as to explain how corporate governance can favorably affect firm performance. As well as how corporate governance can influence and enhance firm performance. Correspondingly, aims to address the deficiencies of prior research by employing characteristics to enhance understanding and yield beneficial outcomes for organisations and investors. This research provides practical implications and significant insights for investors and organisations, facilitating informed decision-making, improving corporate governance processes, and enhancing performance in the sector of consumer products and services.

Moreover, this research aims to examine the relationship and impact of corporate governance on the performance of Malaysian firms, utilising return on assets (ROA) and Tobin's Q as proxies. Indeed, ROE and ROA serve as proxies for accounting-based performance metrics, particularly pertinent in emerging nations such as Malaysia (Singla & Prakash, 2023). Firm performance has predominantly been assessed using a singular metric, such as Tobin’s Q, return on equity, and return on assets (Mishra & Kapil, 2018).

Corporate governance is crucial for structuring the corporation and making it competitive with international firms. Corporate governance in banks is important because of the various interests that these firms should show consideration for. Therefore, this study has both theoretical and practical implications for the investors and firms by facilitating decision-making processes imposing governance institutions and improving company performance in the Malaysian environment. Therefore, it seeks to bridge this research vacuum by creating a greater comprehension and adding value to organizations and investors through its characteristics. The paper also provides practical consequences and contributions to investors and organizations by promoting more informed decision-making, strengthening corporate governance processes, and boosting the performance of companies in the consumer products/services sector. Lack of empirical evidence and practices on the benefits of corporate governance brings alarm, as it influences both company performance, within Malaysian companies.

2. Literature Review

Agency theory has exerted a profound effect on the field of corporate governance, like the business performance measurement, reasons for earnings management and capital structure decisions at the company level; and it raised concerns in corporate social responsibility (CSR) studies. For instance, Bhatt and Bhatt (2017) studied its impact on firm performance entities whereas Johari (2009) investigated the consequences of earning management. This theory was used to explain the disclosure practice by Haji and Ghazali (2013) whereas Deesomsak (2004) attempted to examine its impact on financial policy.

Risk Management Committee

Risk Management Committee (RMC) mainly assumes the responsibility of a company stewarding risks, which holds all dangers potentially on site, and tries to reduce them during the process of research and development. However, although the specific composition and work system of RMC varies widely by organization, merely having one often braces the improved corporate governance outlook. Karim, et al (2024) dribbles were mainly

RMC in proportion, the frequency of meetings, independence and nature. It is reported that these have an immense effect on company performance. Similarly, the previous studies by Jia(2019) and Alabdullah (2022), these RMC elements in bankruptcy risk research, emphasizing the relevance of this Board towards improved environmental stability for organizations.
H1: A positive relationship exists between RMC and firm performance.

Role Duality
Role duality arises when the CEO also serves as the board chairperson. This arrangement can generate conflicts of interest but may also provide unified leadership. Prior studies report mixed outcomes: some find that CEO duality weakens monitoring and reduces performance (Rahman & Haniffa, 2005), while others suggest it can streamline decision-making. Haniffa and Hudaib (2006) and Tran, Nguyen, and Wang (2021) highlight that the influence of duality, numerous directorships, and managerial rights varies with the performance metric used. Bharath and Shamway (2008), for example, measured duality as a binary variable (1 = CEO is also chair, 0 = otherwise) to capture its potential effect on governance.

Role duality is another essential factor of firm performance (Abdullah, Khatib, Elamer & Hazaea, 2021; Yu, 2023). Duality in a company or business context usually refers to the idea of duality of roles or interests. The underlying principle of this concept is that people who work for a company, especially those in positions of authority or responsibility, sometimes have multiple jobs or obligations that occasionally conflict with one another. This role or conflict of interest may increase the moral, legal, or practical difficulties. Properly managing these dual responsibilities or interests is critical for the company's integrity and ethical conduct. Companies frequently adopt governance frameworks, ethical guidelines, and conflict-of-interest regulations to address these dualistic issues and guarantee that choices and actions are taken in the company's and its stakeholders' best interests. Transparency, disclosure, and the setting of clear ethical norms are often critical instruments in managing duality inside a company. Haniffa and Hudaib (2006) and Tran, Nguyen, and Wang (2021) highlight that the impact of duality, multiple directorships, and managerial ownership varies with the performance metric used. Bharath and Shamway (2008), for example, measured duality as a binary variable (1 = CEO is also chair, 0 = otherwise) to capture its potential effect on governance.
H2: A positive relationship exists between role duality and firm performance.

Number of meetings
Board meeting frequency is an indicator of board activity and monitoring intensity. Lipton and Lorsch (1992) and Jensen (1993) say that frequent meetings help directors stay informed and reduce information gaps. Wijethilake (2015) also notes that regular meetings improve oversight quality and decision-making. Nonetheless, Vafeas (1999) reported that there is no significant association between the number of meetings and companies' performance. Further research found positive associations: El-Mehdi (2007) in Tunisia and Ntim and Osei (2013) in South Africa both observed that companies with frequently arrange board meetings manage to perform better. The mixed results suggest that meeting quality, not just quantity, is a key factor. According to Jackling and Johl (2009), arranging board meetings frequently can strengthen the external factors and internal governance relationship, potentially improving a company's overall performance (Kallamu & Saat, 2015).
H3: A positive relationship exists between the number of meetings and firm performance.

Board Size
Board size refers to the total number of directors serving on the board. Bigger boards can deliver various expertise and improve oversight, potentially leading to a better performance (Al Farooque, Buachoom, & Sun, 2020; Pucheta-Martínez & Gallego-Álvarez, 2020). However, the coordination difficulties in large boards may slow decision-making and harm efficiency (Lipton & Lorsch, 1992). Due to the complexity of the business environment in developing countries, where competition is limited, regulations are less strict, and information asymmetry is more pronounced, corporate boards gain particular importance. In this setting, the board of directors plays a crucial role in monitoring the management behavior and guiding strategic decisions, with important consequences for managers' operations (Disli et al., 2022). Bhatt and Bhattacharya (2015) and Kamarudin et al. (2025) observed that larger boards and higher attendance rates were linked to better firm performance, whereas board independence and meeting frequency showed no clear effect. A U-shaped correlation between the dimension of the board and Tobin's Q value is discovered by Saini and Singhania

(2018), indicating that very small or large boards could, in the right environment-boost performance.

Prior research presents conflicting perspectives on how board size influences firm performance (Hassan & Halbouni, 2013). Some scholars argue that larger boards face coordination challenges and weaker cohesiveness, which can slow the decision-making and negatively affect performance (Lipton & Lorsch, 1992). In contrast, Hassoun and Aloui (2017) suggest that during periods of uncertainty, having a larger board can be advantageous because the broader pool of expertise supports more effective decision-making and potentially better outcomes. A diverse board may also give companies a competitive edge by encouraging deeper analysis and innovative solutions, while simultaneously enhancing the company's status and attractiveness towards investors.
H4: A positive relationship exists between board size and firm performance.

Firm Size
Firm age has also been found to affect performance. Older firms may have established networks, reputational capital, and optimized processes that enhance profitability (Ramadan & Hassan, 2022; Tanikawa & Kim, 2017). At the same time, aging organizations might face challenges such as bureaucratic inertia and slower adaptability to market changes, which could suppress market-based performance indicators.
H5: A positive relationship exists between firm age and firm performance.

3. Research Methodology

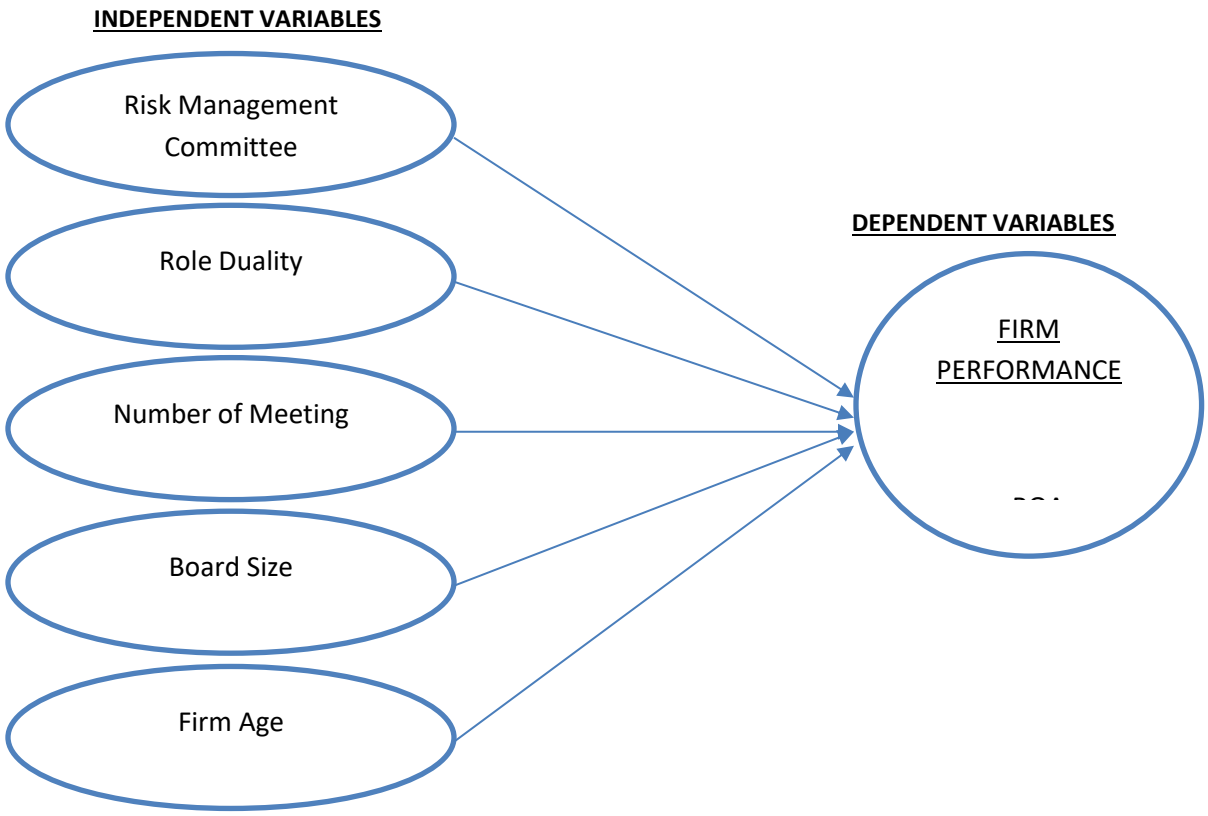
Sample
This paper focuses on Bursa Malaysia-listed companies, particularly those on the ACE Market. A total of 103 firms were selected as the sample to study the effect of RMC, duality, board meeting frequency, board size, and firm age on firm performance. These variables were measured according to established literature, with the company performance measured by using ROA and TQ. The summarization of the variables' measurement is shown in Table 1.

Table 1: Variable Measurement

Variables	Abbrev	Measurement
DEPENDENT VARIABLE		
Return on Assets	ROA	$\frac{Net\ Income}{Total\ Assets}$
Tobin's Q	TQ	$\frac{Market\ Value\ of\ Equity + Preferred\ shares + debt}{Book\ Value\ of\ the\ Total\ Assets}$
INDEPENDENT VARIABLE		
Risk Management Committee	RMC	Dummy variable: Denote as 1 if the firm has a separate risk management committee and 0 otherwise
Role Duality	RD	Dummy variable: Denote as 1 if the CEO is also the board chairperson, 0 otherwise
Number of Meetings	NOM	Total meetings attended by the board of directors within 1 year.
Board Size	BS	The total number of individuals takes place on the board of directors
Firm Age	FA	The age of the company from its formation until present.

The conceptual framework as shown in Figure 1 below for this research illustrates how corporate governance variables are hypothesized to influence firm performance. Risk management committee (RMC) and role duality (RD) are measured as binary variables, while the number of meetings (NOM), board size (BS) and firm age (FA) are continuous measures. Firm performance, as the dependent variable which represented by using both ROA as an accounting-based metric and Tobin's Q as a market-based metric.

Figure 1: Research Framework



Regression Model

Model 1:

$$ROA = \beta_0 + \beta_1(RMC_{it}) + \beta_2(RD_{it}) + \beta_3(NOM_{it}) + \beta_4(BS_{it}) + \beta_5(FA_{it}) + \varepsilon_{it} \quad \text{(Eq 1)}$$

Model 2:

$$TQ = \beta_0 + \beta_1(RMC_{it}) + \beta_2(RD_{it}) + \beta_3(NOM_{it}) + \beta_4(BS_{it}) + \beta_5(FA_{it}) + \varepsilon_{it} \quad \text{(Eq 2)}$$

4. Results

The model design, as shown in Eq. 1 and Eq. 2, was used as a research technique to identify the influence of the risk management committee, role duality, number of meetings, board size, and firm age on a company's performance. The data obtained for this study will be analyzed using EViews 12. This section will present the data and statistical analysis of this study.

Descriptive Statistics

The results of descriptive statistics in Table 2 are used in the study to give a summary of data for each variable. These statistics supply an outline of the characteristics of our sample. They indicate just how heterogeneous observations are.

Table 2: The Descriptive Analysis

	Mean	Medium	Maximum	Minimum	Skewness	Kurtosis	Std. Dev.	Obs.
ROA	-7.384	0.018	152.714	1385.699	-12.947	182.729	85.349	515
TQ	0.942	0.001	217.160	-0.275	15.623	248.859	13.044	515
RMC	0.722	1.000	1.000	0.000	-0.993	1.986	0.448	515
RD	0.718	1.000	1.000	0.000	-0.971	1.944	0.450	515
BS	0.668	6.000	13.000	3.000	0.927	4.307	1.556	515
NOM	4.856	5.000	14.000	1.000	0.859	7.428	1.679	515
FA	20.522	20.000	67.000	0.000	1.190	5.621	11.447	515

Correlation Analysis

A correlation matrix in Table 3 was constructed to explore how independent variables correlate with each other and also if there might be cases of multicollinearity. The correlation coefficients were tested for significance at 1%,5% and 10%.

Table 3: Correlation Analysis

Variables	ROA	TQ	RMC	RD	NOM	BS	FA
ROA	1						
TQ	-0.749***	1					
RMC	-0.054	0.042	1				
RD	-0.055	0.043	0.653***	1			
NOM	-0.052	0.031	0.141***	0.201	1		
BS	0.059	-0.033	-0.015	0.050	0.017	1	
FA	0.027	-0.016	0.150***	0.103**	0.056	-0.056	1

Notes: *, **, and *** indicate significance at 10%, 5% and 1% respectively

Variance inflation factors (VIF)

The VIF test was used to examine whether the independent variables, including the risk management committee, role of duality, number of meetings, board size and company age had any significant creative power. If the test of multicollinearity detects multicollinearity, the independent variables will have a large correlation. Table 4 presents a measure of collinearity analysis can be seen.

Table 4: Variance Inflation Factors (VIF)

Variables	Coefficient Variance	Uncentered VIF
TQ	0.037	1.009
RMC	53.923	6.252
RD	55.205	6.367
BS	1.072	8.064
NOM	1.854	7.854
FA	0.044	3.940

According to Hair et al. (1995) and Liao and Valliant (2012), VIF values fewer than 10 and acceptance values more than 0.10 imply no issue in the multicollinearity. The findings revealed that all variables matched these requirements, indicating that collinearity was not an issue in this model.

Regression Analysis

Regression analysis is a statistical tool for determining the relationship between independent and dependent variables. Its main purpose is to determine how changes in the independent factors affect the dependent

variable. This study employs the Durbin-Watson statistic to test for autocorrelation, which is the correlation of residuals through the observations in a time series or regression model. The statistic runs from 0 to 4, with a value around 2 suggesting no autocorrelation. The values are significantly less than 2 which indicates a positive autocorrelation, while values substantially greater than 2 imply negative autocorrelation. Table 5 summarizes the regression analysis results for both proxy measures of company performance.

Table 5: The Regression Analysis

Dependent Variables	MODEL 1 ROA	MODEL 2 TQ
RMC	-7.400**	0.843
	(0.024)	(0.1725)
RD	-6.070**	0.762*
	(0.039)	(0.0605)
NOM	-3.067**	0.266
	(0.043)	(0.1367)
BS	1.968*	-0.163
	(0.053)	(0.1443)
FA	0.225**	-0.023*
	(0.015)	(0.0803)
R-squared	0.009	0.004
Adjusted R-squared	0.002	-0.004
Durbin-Watson stat	1.151	0.660
No. of Observations	515	515

Notes: Significance levels, *** p < 0.01, ** p < 0.05, * p < 0.1

There are two proxies of dependent variables stated in this study which are the first one is ROA the second one is TQ. Based on the regression analysis in Table 5 was used to examine whether the performance of ACE market companies is affected by characteristics such as the RMC, role duality, number of meetings, board size, and firm age. The R-squared value of the first model is merely 0.009, indicating that the model explains only 0.9 percent of the variation in ROA. While the R-squared value for the second model is merely 3, indicating that the model explains only 300 percent of the variation in Tobin's Q. The adjusted R-squared based on the first model, is preferred due to a higher value which means it creates a greater percentage of variability in the dependent variable, with a positive 8, suggesting that the model performs well. The Durbin-Watson statistic based on the first model shows positive autocorrelation, as the result shown below 2, which is 1.151, while the result based on the second model shows negative autocorrelation, as the value is more than 2.

According to Hoyt and Liebenberg (2025), a positive relationship was found between risk management practices and corporate performance. Similarly, Nahar (2016) found a significant link between risk management disclosures, the number of risk committees, and the presence of dedicated RMC in Australian firms. In this study, the RMC variable is examined within both OLS regression models, using ROA and TQ as dependent variables. Results from the ROA model show that the results of coefficient for RMC is statistically significant at the 5% level and negatively related to ROA, suggesting that firms with an RMC experience lower accounting-based performance. Conversely, in the TQ model, although the coefficient for RMC is positive, it lacks statistical significance, implying limited evidence that RMC presence enhances market-based performance, even if investors may view it as a positive governance signal.

Role duality is the CEO also serving as board chair, continues to be debated as a main feature of corporate governance (Hsu, 2021). In this study, the ROA model shows a coefficient of –6.070 (SE = 0.039), indicating a clear negative effect on accounting-based performance at the 5% significance level. Interestingly, the TQ model

tells a different story: the coefficient for RD is 0.762 (SE = 0.061), showing a modest but significant positive association with market performance at the 10% level. Taken together, these results recommend that combining the CEO and chair roles may hurt operational efficiency but could still be taken by investors as a sign of strong centralized leadership.

Farhan, Obaid, and Azlan (2017) previously found that meeting frequency influences firm performance. This study shows that NOM has a coefficient of -3.067 with a standard error of 0.043 in the ROA model, suggesting a significant negative result at the 5% level. However, in the TQ model, NOM shows a positive coefficient of 0.266 with a standard error of 0.137, which is statistically insignificant. These results indicate that frequent board meetings may adversely affect accounting outcomes but do not have a conclusive impact on market valuation.

Previous research, such as Song (2017) and Wang (2015) found a nonlinear relationship between board size and performance, indicating that insider representation tends to boost outcomes while a bigger share of outsiders may harm them. In this study, board size (BS) has a coefficient of 1.968 with a standard error of 0.053 in the ROA model, indicating a positive and significant effect at 10%. In comparison, the BS coefficient in the TQ model is -0.164 with a standard error of 0.144, indicating a negative but non-significant effect. These findings imply that bigger boards have a beneficial influence on accounting-based indicators like ROA, but their influence on market-based measures like Tobin's Q is minimal.

Tanikawa and Kim (2017) reached a favorable correlation between size and performance of the companies. In line with the current study which reports that firm age (FA) has a positive effect on ROA, showing an estimated coefficient of 0.225 and a standard error for it is 0.015 (significant at the level of $P < 1\%$). This means that mature businesses make better profits as a result of operating for longer and having experience. However, in the TQ model, FA has a coefficient of -0.023 and a standard error of 0.080, showing a negative association at a 10% level of significance. As a result, older businesses will respond more slowly than younger ones in favor of market soon may also be undervalued.

Furthermore, the empirical study finds that legacy businesses (FA) significantly increase ROA. There is a coefficient of 0.225 for this and a standard error of 0.015 which is significant at 1% level. This means that older firms tend toward higher returns because they have greater experience in running a business. However, FA has a coefficient of -0.023 with a standard error of 0.080 in the TQ model. This means that the relationship goes negative and is significant at the 10% level. This suggests that older firms might not adapt to changes in market conditions quickly, which could reduce their market value.

Discussion

The outcomes of this analysis have given us important information about how company administration mechanisms have an impact on the Certificate Market in Malaysia. The research found that governance characteristics engage in complex interactions with company performance in the ACE Market (As of 2023). For example, on the basis of two indicators ROA and TQ as the performance, this study revealed convoluted relationships between governance attributes and the performance of a firm.

Alternatively, data from the research states that when a Risk Management Committee (RMC) was present, it had a detrimental and economizing effect on TQ, but no effect whatsoever on ROA. It seems that although RMCs generally do not make any difference to short-term financial performance measures such as ROA they are relatively well valued (Table 4). Our results contradict a previous study that praised the virtues of risk management. Thus, it is apparent from further details that there are structural deficiencies in RMC governance or that small-market, medium and unlisted stock enterprises on the ACE-Market are not performing effectively.

Second, role duality, where the CEO also chairs the board, negatively influenced ROA. The result of this study shows a positive and weakly significant effect on TQ. A dual role may impair internal monitoring, explaining the lower accounting returns, but markets may perceive it as a signal of strong, centralized leadership, hence the positive impact on valuation.

Third, the number of board meetings disclosed a negative effect on ROA and no significant effect on TQ. This

counters that more meetings enhance governance effectiveness. It implies that excessive meetings may reflect inefficiency or crisis response rather than proactive governance.

In addition, board size was insignificantly negative with TQ and had a positive correlation to ROA. A larger board would provide more diverse expertise and supervision that could well bring up overall internal efficiency-though to a lesser extent can such change be reflected by investors.

Lastly, firm age positively correlated with ROA but negatively with TQ. Older firms may benefit from accumulated experience and stable operations, leading to stronger accounting performance. However, the market may view them as less agile or innovative, explaining the lower Tobin's Q.

5. Managerial Implications and Recommendations

The findings of this study have significant consequences for corporate managers, board members, and policymakers, particularly within the context of Malaysia's ACE Market. Firstly, the negative association between risk management committees and firm performance suggests that companies should not only establish such committees for compliance purposes but also ensure they function effectively and contribute meaningfully to strategic oversight. Furthermore, the results emphasize the need to avoid role duality, as combining the roles of CEO and board chair could compromise independent oversight and reduce operational efficiency. Instead, separating these roles can enhance accountability and lead to more balanced decision-making. The negative relationship between the number of board meetings and firm performance indicates that management should emphasize refining the quality and strategic value of board meetings rather than simply increasing their frequency. Moreover, the positive effect of board size on ROA suggests that firms may benefit from expanding board membership by including directors with diverse skills and experience, which can better support internal decision-making. Lastly, the contrasting effect of firm age on ROA and Tobin's Q highlights the need for older firms to remain adaptive and innovative to retain investor confidence. Collectively, these insights underscore the importance of designing governance structures that are not only compliant with regulatory standards but also tailored to enhance firm performance and stakeholder value.

Conclusion

This study adds to the expanding corpus of literature. On corporate governance by empirically examining its influence on firm performance in Malaysia's ACE Market. The findings highlight the complex and, at times, contradictory roles of governance mechanisms such as risk management committees, role duality, board meetings, board size, and firm age. Although certain governance features show expected positive relationships with performance, others reveal inefficiencies or unintended consequences, particularly in emerging markets and smaller firms. The dual analysis using both accounting (ROA) and market-based (Tobin's Q) performance metrics underscores the importance of adopting a multi-faceted approach when evaluating firm success.

In conclusion, effective corporate governance is essential, but its design and implementation must be context sensitive. Strengthening governance in Malaysia's ACE Market requires not just policy enforcement, but also internal cultural shifts within firms to embrace governance as a tool for sustainable performance not mere

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Social Entrepreneurship: Bridging the Educational Disconnect and Empowering Youth for Social Change

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Abstract: This study examines the role of social entrepreneurship in bridging the gap between traditional education and the real-world needs of youth worldwide. It examines the relationship between education, youth empowerment, and social change through the lens of social entrepreneurship, connecting it with social movement theory. The study will use quantitative data to explore this important matter of youth entrepreneurship. The paper maintains that equipping young people with entrepreneurial skills and social awareness is key to long-term development and positive societal change.

Keywords: *Social entrepreneurship, education, social change, youth empowerment, social movement*

1. Introduction and Background

"Education is the most powerful weapon which you can use to change the world."

Nelson Mandela, 1993

Nelson Mandela's words underscore education's transformative role in shaping a brighter future. Despite this, many countries striving for development continue to fall short in providing high-quality education. The primary and secondary education levels often face the brunt of this inadequacy, leaving behind a generation of young people who are unable to seize opportunities to become leaders of their nations. The UNESCO (2015) report indicates that a gap exists between present educational systems in developing countries and the demands of a globalized economy, such as programs like the Youth Entrepreneurship Training Program and 'Dare to Innovate' in Guinea. As a result, education content, methods, and attitudes must evolve to equip students with the skills to drive social innovation and tackle local and global challenges. This has become vital in today's rapidly changing world. Education must keep pace with the rapid developments in technology and economic systems. However, a discrepancy exists between modern education systems and society's requirements, causing a skill gap that affects both developed and developing nations. Social entrepreneurship holds the key to bridging this divide by empowering young people with the essential tools they need to succeed. Building on Tarlau's (2014) emphasis, this paper seeks to investigate the complex dynamic between education, social entrepreneurship, and social movements.

2. Literature Review

Understanding Social Entrepreneurship

The field of social entrepreneurship continues to evolve and is still open to debate (Mair & Marti, 2006; Nicholls, 2006). It entails spotting and seizing chances to address societal issues in ways that are significant and long-lasting (Wallace, 1999). The goal is to sustain long-term viability while bringing about constructive change (Dee, 1998). According to Burton (1987), sustainable development entails addressing present demands without endangering those of future generations. Effective planning, support networks, risk management techniques, and cooperation between several sectors are necessary to accomplish this (Campanella, 2006; Tobin, 1999; Hultman & Bozmoski, 2006). Although social entrepreneurs are frequently praised by the media, academic study has not yet provided a thorough explanation of their motivations or methods of operation (Dees & Anderson, 2006; Nicholls, 2006). To assist these endeavors, reach their full potential, better knowledge is required.

Defining Social Movements

According to Tarlau (2014), social movement theory developed in reaction to earlier perspectives that disregarded political context and viewed activists as mentally ill. Rather, scholars like Tilly (1979) described social movements as continuous attempts by organized organizations to subvert power by persistent, group-wide activities. Contemporary definitions emphasize the necessity of sustained dedication and planning when voicing demands for change. These movements, which are the foundation of social change initiatives, frequently emerge from common objectives and values (McCarthy & Zald, 1977).

Linking Social Entrepreneurship and Social Movements

Some researchers argue that many social innovations seen in social movements can also be analyzed as forms of social entrepreneurship (Cukier et al., 2011). However, these two areas are rarely studied together, even though they share processes such as identifying problems, mobilizing resources, and framing issues to gain support (McAdam et al., 1996). There is a strong need to explore how these two fields intersect and how education plays a role in both. The combination of entrepreneurship and movement-building can create a powerful force for social transformation, especially when focused on youth and marginalized communities.

Education, Social Entrepreneurship, and Social Change

Education plays a key role in social entrepreneurship. Many young people turn to entrepreneurship because traditional job opportunities are scarce. Yet, most have not received proper training in business skills. In many countries, entrepreneurship education is still treated as an optional or extra subject rather than a core part of the curriculum.

Programs like YETP show that with the right training, young people can create businesses that not only support their families but also contribute to the broader community. Better education leads to better business strategies, higher incomes, job creation, improved access to health and education services, and increased civic participation.

Social movement literature, meanwhile, often overlooks grassroots educational practices (Tarlau, 2014). However, both social entrepreneurship and social movements involve learning—whether formal or informal. This learning empowers individuals and communities to take collective action.

Freire (1998) emphasized that education should help people see themselves as capable of changing their reality. He believed that education should go beyond knowledge transmission to include collective action. This vision aligns with the goals of social entrepreneurship: solving problems through innovative, sustainable, and people-driven efforts (Wallace, 1999; Dee, 1998).

Tarlau (2014) also highlighted the importance of informal education—learning that happens through life experience, business operations, and dealing with real-world challenges. While some, like Chambers and Cowan (2003), argue that valuable knowledge comes only from work or life experiences, this paper disagrees. Schools and formal education can also play a vital role in fostering social change when they connect with community needs.

Educators and policymakers should consider how schools can support larger community goals and encourage students to become social entrepreneurs. Governments should focus less on political gestures and more on building critical thinking and capacity within communities.

Problem Statement

In many parts of the world, traditional education systems fall short in preparing young people to address complex social challenges. These systems often prioritize academic achievement and standardized outcomes over experiential learning, civic engagement, and real-world problem-solving. As a result, a critical disconnect has emerged between formal education and the development of socially responsible, proactive young citizens. At the same time, youth represent a powerful demographic with the potential to drive innovation and change in their communities. However, limited exposure to social entrepreneurship within educational settings hinders their ability to translate awareness into action. The absence of structured opportunities to develop

entrepreneurial mindsets, leadership skills, and community-driven problem-solving approaches leaves many young people underprepared to engage in meaningful social transformation.

Social entrepreneurship presents a compelling framework to bridge this educational gap by fostering creativity, critical thinking, and commitment to social impact. Yet, there is a lack of comprehensive research on how it can be systematically integrated into youth education to empower the next generation of changemakers. This research seeks to examine the role of social entrepreneurship in addressing the educational disconnect, identify effective models for integrating it into youth education, and explore its potential to cultivate socially engaged and empowered youth.

3. Research Methodology

Research Design

This study employs a quantitative research design to examine the relationship between youth engagement in social entrepreneurship initiatives and their educational outcomes, skill development, and empowerment levels. A quantitative approach allows for objective measurement, statistical analysis, and generalization of findings across a broader population.

Research Approach and Rationale

The research is rooted in a positive paradigm, aiming to test hypotheses and identify patterns through measurable data. This approach is appropriate for assessing the extent to which social entrepreneurship addresses educational disconnects and empowers youth, using numerical data and statistical methods.

Research Objectives and Hypotheses

The study focuses on the following key objectives:

- To measure the impact of participation in social entrepreneurship programs on youth empowerment.
- To assess the relationship between educational, disconnect and involvement in social entrepreneurial activities.
- To evaluate whether youth engaged in social entrepreneurship report higher levels of skill development and civic engagement.

Hypotheses may include:
H1: Participation in social entrepreneurship initiatives is positively correlated with youth empowerment.
H2: There is a statistically significant difference in educational engagement between youth involved and not involved in social entrepreneurship.
H3: Social entrepreneurship programs contribute to measurable improvements in employability and soft skills among youth.

Data Collection Methods

Data will be collected using a structured questionnaire survey consisting of:

- Demographic information (age, gender, education level, location)
- Standardized scales measuring:
  - Empowerment (e.g., Youth Empowerment Scale)
  - Educational engagement
  - Skill acquisition (e.g., self-reported soft/hard skills)
  - Civic participation or social impact involvement

The questionnaire will use Likert scale **items** to assess responses, allowing for quantifiable analysis.

Sampling Strategy

A stratified random sampling method will be used to ensure representation across key subgroups (e.g., age, gender, type of social enterprise, educational background). The target population includes:

- Youth aged 16–30, both involved and not involved in social entrepreneurship
- Participants from both urban and rural settings (if applicable)

A sample size of 200–300 respondents is targeted to ensure statistical significance and generalizability of results.

Data Analysis Techniques

Collected data will be analyzed using statistical software such as SPSS or R. Analytical techniques will include:

- Descriptive statistics (mean, standard deviation, frequency)
- Inferential statistics, such as:
  - T-tests or ANOVA to compare groups
  - Correlation analysis to assess relationships between variables
  - Regression analysis to determine predictors of empowerment or educational engagement

Significance will be determined at a p-value of < 0.05.

Validity and Reliability

To ensure reliability, standardized scales with established psychometric properties will be used. A pilot test will be conducted with 20–30 respondents to refine the survey instrument. Cronbach's alpha will be calculated to test internal consistency (target $\alpha \geq 0.7$).

Ethical Considerations

Ethical clearance will be obtained from the institutional review board. Informed consent will be secured from all participants. Participation will be anonymous and voluntary, and respondents will have the right to withdraw at any stage without any consequence.

Research Timeline

Week	Tasks
Week 1–2	◈ Finalize research title and objectives ◈ Conduct preliminary research and literature review ◈ Identify research gaps and draft research questions
Week 3–4	◈ Complete literature review ◈ Organize sources into key themes ◈ Develop theoretical/conceptual framework
Week 5	◈ Identify case studies or models ◈ Choose research methodology ◈ Define sampling and tools (surveys) ◈ Seek ethical approval
Week 6–7	◈ Collect data (distribute surveys) ◈ Record and organize findings
Week 8–9	◈ Analyze data (quantitative) ◈ Interpret findings and relate to research objectives
Week 10	◈ Write the Results section ◈ Write the Discussion section
Week 11	◈ Write the Introduction, Conclusion, and Recommendations ◈ Draft the Abstract
Week 12	◈ Revise and edit the full paper ◈ Format citations and references (APA) ◈ Seek peer feedback ◈ Final submission

4. Conclusion

This concept paper highlights the transformative potential of social entrepreneurship as a strategic approach to bridging the educational disconnect and empowering youth as agents of social change. By equipping young people with entrepreneurial skills, critical thinking, and a sense of civic responsibility, we can foster a generation that not only understands the challenges within their communities but is also empowered to create sustainable solutions. Addressing educational gaps through innovative, socially driven ventures not only enhances individual opportunity but also contributes to broader societal development. This research aims to serve as a foundation for actionable frameworks that align education with purpose, ultimately nurturing empowered youth capable of leading meaningful and inclusive changes.

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Assessing Students' Well-being by Campus Facilities

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Abstract: This study examines the relationship between student engagement and the availability and quality of campus facilities at a Malaysian university, particularly emphasizing the varying experiences of resident and non-resident students. The issue being addressed is the uneven degree of participation from students, especially those who do not live on campus, which could be impacted by their opinions and use of the facilities. The objective of this paper is to investigate the effects of facility availability and quality on student involvement and the effect of the involvement of non-resident students. A quantitative research design was used, and student survey data were analyzed using multiple regression and cross-tab analysis involving 271 respondents. The results show that while the quality of campus facilities positively and significantly impacts student engagement, there is a negative and significant relationship between facility availability and student engagement. Additionally, cross-tab results show that resident students are more engaged and satisfied than non-resident students. These findings imply that facilities' relevance, quality, and accessibility are more important than quantity. In order to create a more welcoming and balanced campus environment, the study suggests that university planners prioritize raising facility standards and creating inclusive strategies to involve all student groups, particularly non-residents.

Keywords: *Health Belief Model, Students' Engagement, Motivation, Campus Facilities*

1. Introduction and Background

The university experience extends beyond academics; it involves various aspects that contribute to student life and foster holistic development and well-being. Campus facilities, including libraries, classrooms, laboratories, recreation centers, and student housing, are essential for addressing students' physical, social, and psychological needs (Astin, 1999). Ensuring the availability and quality of these facilities is crucial for providing a supportive campus environment that enhances students' overall well-being (Temple, 2013). Key elements in improving the student experience include these facilities, which directly influence well-being, academic performance, and engagement. Since students spend much time on campus, access to high-quality facilities such as libraries, study areas, recreational spaces, and housing is vital for enhancing their overall experience (Astin, 1999). These resources ensure comfort for learning and significantly promote social interaction, physical health, and mental well-being among students and the wider community, as noted by Temple (2013). However, the need to continuously improve facilities raises concerns about whether they will adequately meet students' needs and expectations. Inadequate facilities can hinder students' mental and physical health, academic performance, and overall satisfaction (Fisher, 2015). Specifically, shortages of study spaces, limited entertainment options at the university, and poor maintenance of hostels can negatively impact student health, wellness, and academic progress.

Student well-being encompasses a holistic state of health that includes psychological, intellectual, emotional, physical, social, and spiritual dimensions (Adams et al, 2000). Balancing student strengths with available resources is essential to foster an environment where students can thrive. In this context, student well-being can be divided into two key components: eudaimonic indicators, which reflect meaningful growth and positive development, and hedonic indicators of subjective well-being, encompassing positive emotions, the absence of negative emotions, and overall life satisfaction.

In this study, "students' well-being" refers to the overall mental, physical, and emotional health of students at the university, shaped by their academic and social experiences. Well-being is a multidimensional concept that

includes physical health, mental resilience, life satisfaction, and a sense of belonging within the university community (Rahman et al, 2024). As universities increasingly acknowledge the significance of student well-being, evidence shows that students who experience positive well-being are more likely to excel academically, actively engage in campus life, and form meaningful social relationships (Teo et al, 2023).

Research consistently indicates that when universities support students' well-being, it positively influences their motivation, mental health, and overall sense of purpose (Amir et al. 2023). Conversely, environments lacking sufficient resources or presenting challenges to students' well-being, such as limited mental health services or overcrowded study areas, can increase stress, decrease engagement, and even academic burnout. According to Norton (2023), campus facilities are crucial in shaping student well-being, as they provide spaces for studying, relaxation, and social interactions essential for mental and emotional health. At the university, assessing student well-being involves examining various factors, such as physical health (e.g., availability of healthcare services and fitness facilities), mental health support (e.g., access to counseling), and social well-being (e.g., community spaces conducive to interaction). This study aims to explore the relationship between campus facilities and these aspects of well-being, identifying areas for improvement to create a university environment that better addresses the diverse needs of students.

2. Literature Review

Quality of Campus Facilities

In this study, the quality of campus facilities is treated as an independent variable, referring to the perceived standards of maintenance, functionality, accessibility, and overall comfort of amenities provided at the university. High-quality campus facilities significantly enhance the university experience by promoting student comfort, safety, and active engagement within the campus environment (Lim & Tan,2021). The scope of facility quality spans various areas, including the cleanliness and upkeep of study and recreational spaces and the accessibility and reliability of essential support services such as healthcare and counseling. When these facilities align with students' needs and expectations, they increase satisfaction and engagement in campus life (Ahmad et al., 2022). Research highlights that well-maintained and easily accessible facilities positively affect students' mental and physical well-being, fostering an environment conducive to productivity, relaxation, and social interaction (Chen & Wong, 2023). In contrast, substandard facilities such as overcrowded libraries, poorly maintained restrooms, or outdated recreational areas can heighten stress, reduce comfort, and negatively impact the overall university experience. Zhang et al. (2023) emphasize that the quality of campus facilities is a critical factor influencing student satisfaction and well-being, as it shapes daily interactions with the campus environment and fulfills physical and emotional needs. At the university, evaluating facility quality involves assessing tangible elements, such as maintenance standards and overall comfort, alongside functional aspects, including accessibility and availability. By examining the relationship between facility quality and student well-being, this study aims to identify areas needing improvement to enhance the campus infrastructure and provide a more supportive environment for students' academic and personal success. Hence, the hypothesis for this study is developed as follows:

Hypothesis 1: Quality of campus facilities has a significant relationship with students ' well-being.

Availability of Campus Facilities

The availability of campus facilities plays a significant role in students' overall experience and well-being, making it a critical, independent variable in this study. It focuses on how easily students can access essential campus resources, such as libraries, recreational areas, health services, dining options, and study spaces at the university. Accessibility in this context refers to the ease with which students can utilize these facilities without facing unnecessary barriers or limitations. Ensuring smooth access to these resources is vital for academic success and personal well-being (Swai et al, 2022). Research consistently suggests that students who have ready access to various campus facilities tend to report higher satisfaction levels and lower stress, as these resources help them manage the pressures associated with academic and social life (Tan & Lee, 2022).

In contrast, restricted or limited availability of campus facilities can present significant challenges, hindering students' ability to engage in campus life and diminishing their overall well-being. For instance, a study by Norton (2023) highlighted that limited access to quiet study spaces or mental health support services often leads to increased stress levels and a decline in academic motivation. This issue is particularly pronounced in

larger universities where the demand for certain facilities, such as study rooms or recreational spaces, can exceed supply, making it difficult for students to access these resources when needed. A campus with easily accessible and well-maintained facilities allows students to effectively balance their academic responsibilities with their social and recreational needs, contributing to their overall well-being. At the University, assessing the availability of campus facilities involves examining several factors, including the operating hours of key resources, the proximity and convenience of facility locations, and whether the capacity of these facilities aligns with the size and needs of the student population. This study aims to better understand how effectively the university meets its students' needs by evaluating these aspects. Additionally, it will help identify potential areas for improvement, providing valuable insights into how the university can enhance its campus environment to better support student success and well-being. Hence, the hypothesis for this study is developed as follows:

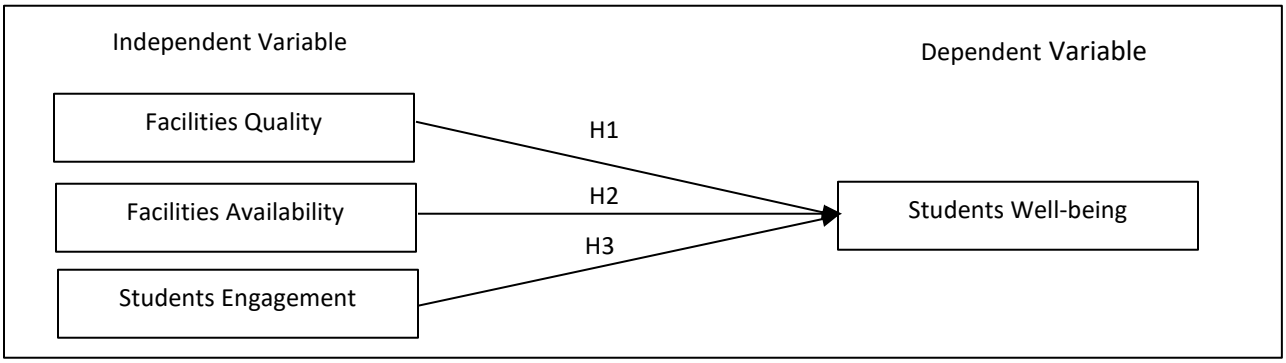
Hypothesis 2: Availability of campus facilities significantly correlates with students ' well-being.

Student Engagement

Student engagement with campus facilities pertains to the various ways in which students interact with the resources provided by the university, including how often they use these facilities, for what purposes, and in what manner. This variable measures how students actively utilize key amenities such as study spaces, recreational areas, and other campus resources. Engagement goes beyond mere usage; it reflects the effectiveness and impact of these facilities, providing valuable insights into their role in supporting students' academic, physical, and social well-being. Student engagement with campus facilities can be influenced by several factors, including students' awareness of available resources, individual preferences, and the overall quality and accessibility of these amenities (Astin, 1999). For instance, students who frequently use study rooms or libraries may experience academic benefits due to the quiet, well-equipped environments that help them focus on assignments and exam preparation. Likewise, engaging in recreational activities like gymnasiums or sports fields can improve physical health, reduce stress, and enhance peer interactions (Chaudry et al, 2024). However, engagement is not solely determined by the availability of facilities; it is also shaped by how relevant and accessible students perceive these resources. If students believe that certain facilities do not meet their needs or find them difficult to access, they may choose not to use them despite their availability. Chen and Wong (2023) point out that factors like the perceived inconvenience of a facility or its lack of alignment with students' academic or recreational needs can discourage engagement. Hence, the hypothesis for this study is developed as follows:

Hypothesis 3: Student engagement has a significant relationship with students ' well-being

Figure 1: Conceptual Framework of Assessing Students' Well-being by Campus Facilities



3. Research Methodology

This study adopted a quantitative approach through a survey questionnaire. The purpose of the study is descriptive research with correlational types of investigation, and three hypotheses were tested to confirm that the facilities' quality, facilities availability, and students' engagement significantly influence students' well-being. The population of this study was estimated to be more than 1000 students in one selected local university in Klang Valley. According to Krejie and Morgan (1970), the population (N) is 1000, and the estimated sample size of the study is 278. This study collected a 100 percent response rate using a convenience

sampling technique. However, after considering straight lining and missing values, 6 cases were removed, and the final sample used for data analysis was 271.

4. Results

The demographic information provided in Table 1 shows that the participants offer important new perspectives on the makeup of the study sample. There were 271 students, most female (88.2%), with only 11.8% men. This shows relatively high female participation in the research. Regarding age, most respondents—60.9%—were between 23 and 25 years old, followed by 35.8% between 20 and 22. Very few were under 20 (0.7%) or 26 and above (2.6%), implying that the sample mostly comprised students in the usual undergraduate range. About academic development, most respondents (75.3%) were in Semester 5, suggesting a concentration of data on students in later phases of their education. Semester 4 (9.2%) and Semester 3 (8.5%) were the next most often occurring among the much smaller percentages of the remaining semesters. This implies that the results might most fairly depict the experiences of more senior students. Though smaller numbers came from Accountancy (3.0%), Pharmacy (2.2%), and Hotel and Tourism Management (1.1%), faculty distribution shows that 93.7% of respondents were from the Faculty of Business and Management. Most participants were also college residents, as indicated by the majority (89.3%) living in college accommodation.

Table 1: Demographic Factor Analysis

Classification		Frequency	Percentage (%)
Gender	Male	32	11.8
	Female	239	88.2
Age	Under 20 years old	2	0.7
	20-22 years old	97	35.8
	23-25 years old	165	60.9
	26 years old and above	7	2.6
Semester	Semester 1	5	1.8
	Semester 2	3	1.1
	Semester 3	23	8.5
	Semester 4	25	9.2
	Semester 5	204	75.3
	Semester 6	3	1.1
	Semester 7	5	1.8
	Semester 8	3	1.1
Faculty	Faculty of Business and Management	254	93.7
	Faculty of Accountancy	8	3.0
	Faculty of Hotel and Tourism Management	3	1.1
	Faculty Pharmacy	6	2.2
College Accommodation	Resident	242	89.3
	Non-Residents	29	10.7

Using multiple items, Table 2 shows the reliability analysis of four variables evaluated via Cronbach's Alpha coefficients. Measuring internal consistency, Cronbach's Alpha shows the general degree of relationship between a set of items. Generally speaking, a Cronbach's Alpha value above 0.70 is acceptable; above 0.80 is good; above 0.90 is excellent. Measuring five items apiece for the quality and availability of campus facilities, the Cronbach's Alpha values for each are 0.810 and 0.700, respectively. The findings imply that the availability variable is at the threshold of acceptability, indicating only modest dependability. However, the items used to measure quality are reliable and show good internal consistency. When these dimensions are considered holistically, the two facility-related variables' combined Cronbach's Alpha is 0.929, suggesting excellent dependability. Likewise, for students' engagement and well-being, each with five items, the overall dependability score is 0.877, which shows strong internal consistency. The high dependability coefficients

show the generally consistent and dependable nature of the survey items applied to evaluate these constructs. The results help justify the validity of investigating student perceptions and experiences using these variables in the following studies, including structural equation modeling or regression analysis.

Table 2: Assessment of Reliability

Variables	No of Items	Cronbach Alpha
Quality of Campus Facilities	5	0.810
Availability of Campus Facilities	5	0.700
Students Engagement	5	0.929
Students Well Being	5	0.877

Descriptive Analysis

The data provided in Table 3 offers a detailed look at students' perceptions of the Quality of Campus Facilities, Availability of Campus Facilities, Student Engagement, and Student Well-being, with each factor being assessed through a series of statements. Each statement has been ranked based on its mean score, with a higher mean indicating a more favorable perception. The overall quality of campus facilities received positive feedback, with a mean range of 3.86 to 4.50. The statement "Campus facilities are adequately equipped to meet students' needs" received the highest rating (mean = 4.50), suggesting that students are generally satisfied with the adequacy of campus facilities in meeting their needs. Similarly, other highly-rated facilities include "On-campus amenities such as cafeterias or convenience stores offer good service quality" (mean = 4.42) and "The study spaces available on campus are well-maintained" (mean = 4.06). The lowest rating was for recreational facilities, which scored 3.86, yet it still shows a relatively positive perception, with a standard deviation of 0.719, indicating moderate agreement among students.

Next is the availability of campus facilities; however, it seems to be a more problematic area. The statement that campus facilities are available at the times that suit my schedule received the lowest mean score of 2.52, indicating significant dissatisfaction with facility scheduling. Students also reported overcrowding: "I find the campus facilities overcrowded when I try to use them, receiving a score of 2.85. These findings suggest that while students may be satisfied with the quality of facilities, the availability and accessibility may not always meet their expectations. The statement "I frequently experience issues (e.g., broken equipment, lack of availability) with campus facilities" had the highest mean in this section (3.96), still showing some dissatisfaction. Furthermore, in terms of engagement, students appear to be quite active in using campus facilities. The statement "I frequently use campus facilities for academic purposes received the highest score of 4.45, followed by "Campus facilities motivate me to participate in group activities or social interactions" (mean = 4.37). These results suggest that the facilities are a strong motivating factor for students' academic and social engagement. Additionally, the university effectively promotes awareness of available facilities and programs, receiving the highest mean score in this section (4.46), indicating that students are well-informed about available opportunities.

In addition, the impact of campus facilities on students' well-being is highly significant, with mean scores ranging from 4.09 to 4.75. The statement "improving campus facilities would enhance my well-being and university experience" received the highest mean (4.75), showing that students firmly believe that better facilities could improve their overall experience. Other statements that scored highly include "Well-maintained campus facilities are important for my mental well-being" (mean = 4.61) and "Recreational facilities contribute positively to my physical health and fitness" (mean = 4.55). The lowest score in this section was "Campus facilities significantly impact my ability to focus on academic work" (mean = 4.09), yet it still indicates a positive perception. Therefore, the results indicate that while students are generally satisfied with the quality and engagement of campus facilities, there are clear concerns regarding the availability and accessibility of those facilities. Students also value the campus facilities' role in enhancing their academic performance and well-being. Therefore, addressing the issues of overcrowding and accessibility could further improve students' experiences and perceptions of campus life.

Table 3: Descriptive Analysis

1. Quality of Campus Facilities	Mean	Standard Deviation	Ranking
Recreational facilities (e.g., gyms, sports fields, equipment) on campus are of high quality.	3.86	0.719	1
Public areas on campus (e.g., restrooms, hallways, common spaces) are clean and well-maintained	3.94	0.699	2
The study spaces available on campus (e.g., libraries, reading rooms) are well-maintained	4.06	0.644	3
On-campus amenities such as cafeterias or convenience stores offer good service quality.	4.42	0.852	4
Campus facilities are adequately equipped to meet students' needs.	4.50	0.784	5
2. Availability of Campus Facilities	**Mean**	**Standard Deviation**	**Ranking**
Campus facilities are available at the times that suit my schedule.	2.52	1.549	1
I find the campus facilities overcrowded when I try to use them.	2.85	1.151	2
Study spaces and recreational areas are accessible when I need them.	3.04	1.200	3
My university provides sufficient options for both academic and recreational activities.	3.18	1.259	4
I frequently experience issues (e.g., broken equipment and lack of availability) with campus facilities.	3.96	1.296	5
3. Student's Engagement	**Mean**	**Standard Deviation**	**Ranking**
I often use campus facilities for recreational activities (e.g., gyms and sports fields).	4.13	1.259	1
I actively participate in events or programs organized on campus (e.g., workshops and tournaments).	4.17	1.188	2
Campus facilities motivate me to participate in group activities or social interactions.	4.37	0.910	3
I frequently use campus facilities for academic purposes (e.g., libraries and study spaces).	4.45	0.905	4
The university effectively promotes awareness of available facilities and programs.	4.46	0.810	5
4. Student's Well-being	**Mean**	**Standard Deviation**	**Ranking**
Campus facilities significantly impact my ability to focus on academic work.	4.09	0.620	1
Recreational facilities contribute positively to my physical health and fitness.	4.55	0.758	2
Well-maintained campus facilities are important for my mental well-being.	4.61	0.674	3
Campus facilities improve my overall quality of life as a student.	4.63	0.641	4
Improving campus facilities would enhance my well-being and university experience.	4.75	0.511	5

Cross-tab Analysis

Table 4 shows the result of a cross-tab analysis of students' interaction with university facilities depending on their residence or non-residence. In the first comment, "Public areas on campus are clean and well-maintained," most resident students (167) agree, 37 of them strongly. On the other hand, non-residents score lower in agreement, with only 15 agreeing and six strongly agreeing. Particularly among resident students, the overall answers suggest that the campus is thought to be generally clean and well-kept. With 114 disagreeing, 53 agreeing, and 55 strongly agreeing, resident students show much satisfaction with the second statement, "The university provides sufficient options for both academic and recreational activities." Only 9 of the non-residents agree, and 4 of them strongly agree. The overall responses imply that, compared to non-residents, resident

students believe the university offers more choices for both academic and recreational events. Thirdly, "I often use campus facilities for recreational activities" shows the frequency of recreational facility use: 154 resident students agree, and 33 strongly agree. Conversely, non-resident students have far lower usage rates; just nine strongly agree, and only two agree. This suggests that, compared to non-residents, residents participate more in using university recreational facilities. Particularly about cleanliness, the availability of academic and recreational activities, and regular use of recreational facilities, the study reveals a clear trend of greater engagement with campus facilities among resident students overall. Lower degrees of satisfaction and usage among non-resident students point to possible areas for development in involving them with university resources. Another positively framed statement, probably related to facility satisfaction or effectiveness, helps to confirm the trend. Of the residents, 49 agree, and as many as 181 strongly agree. On the other hand, non-residents show far less engagement, with just 12 strongly agreeing and nine agreeing. These results generally confirm that resident students find great satisfaction with university facilities and are far more involved. Conversely, non-residents show reduced degrees of interaction and satisfaction, suggesting a need for focused policies to increase accessibility, inclusiveness, and awareness for off-campus students to guarantee balanced facility engagement.

Table 4: Cross-Tab Analysis of Students' Engagement with Campus Facilities

Public areas on campus are clean and well-maintained.					
Student's Category	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Resident	0	10	28	167	37
Non-Residents	1	2	5	15	6
Total	1	12	33	182	43
Provides sufficient options for both academic and recreational activities					
Resident	2	114	18	53	55
Non-Resident (NR)	2	9	5	9	4
TOTAL	4	123	23	62	59
Often use campus facilities for recreational activities.					
Resident	11	24	20	33	154
Non-Resident (NR)	3	4	11	2	9
TOTAL	14	28	31	35	163
Campus facilities improve my overall quality as a student.					
Resident	0	2	10	49	181
Non-Resident (NR)	0	0	8	9	12
TOTAL	0	2	18	58	193

Table 5 shows the results of descriptive statistics that show interesting trends in the attitudes and actions of the students. Perceived benefits have a mean score of 4.207 and a comparatively low standard deviation of 0.469. Given the low variability of responses, it can be inferred that students generally have a moderately high perception of the advantages of physical activity. The idea that students understand the value of physical activity is supported by the fact that most seem to agree strongly with its perceived benefits. With a mean score of 2.217 and a standard deviation of 0.779, perceived barriers, on the other hand, indicate a lower degree of agreement with physical activity barriers. This implies that students generally report fewer barriers to physical activity, but the higher standard deviation shows that responses vary widely. While some students may perceive fewer difficulties, others may encounter substantial obstacles. Lastly, students participate in physical activity at a moderate frequency, as indicated by the mean score of 3.913 for students' physical activity and a standard deviation of 0.684. The lower standard deviation indicates that respondents' activity levels follow a fairly consistent pattern, with most students probably participating in regular but moderate physical activity. Overall, the findings show that students maintain moderate physical activity levels while acknowledging the advantages of physical activity and perceiving fewer obstacles. These results point to possible areas for intervention, including encouraging more frequent physical activity by addressing individual barriers and highlighting the advantages for those who might be less active.

Pearson Correlation

Table 5 shows that the correlation study reveals how campus facilities affect student involvement. With both

variables producing statistically significant findings, the study explicitly investigates how campus facilities' quality and availability relate to student well-being. With a p-value of 0.000 and a positive and notable coefficient of 0.469, the quality of university facilities is rather good. This suggests that higher student well-being is significantly correlated with improvements in the apparent quality of university facilities, including cleanliness, maintenance, and general design. Stated differently, students who see facilities as high-quality, comfortable, and fit for their needs are more likely to use them and engage in university events. The availability of university facilities shows a negative and significant coefficient of -0. 201, together with a p-value of 0.001. Although this would first seem contradictory, it implies that simple access to various facilities does not always encourage involvement; in some cases, it may even discourage it. This could result from inadequate distribution, improper communication of accessible services, or facilities not matching students' needs. Finally, student engagement is quite influenced by students' well-being; a coefficient of 0.646 and a p-value of 0.000 confirm a positive and significant correlation. This emphasizes how important student involvement is, driven primarily by the impression and the quality of campus buildings. Hence, only quality influences student involvement, while facility quality and availability are statistically significant. Institutions should thus concentrate more on improving the experience and functionality of current facilities than on raising their count.

Table 5: Pearson Correlation

Variables	Coefficient	P Value	Result
Quality of Campus Facilities	0.469	0.000	Positive and significant
Availability of Campus Facilities	-0.201	0.001	Negative and significant
Students Engagement	0.646	0.000	Positive and significant

Regression Analysis

Table 6 presents a regression analysis examining how students' engagement relates to the quality and availability of campus amenities. The results provide an insightful analysis of the elements influencing students' active participation in campus life. First, with a standard error of 0.059 and a standardized beta of 0.031, the availability of campus facilities displays an unstandardized beta value of 0.015. With a p-value of 0.628, the t-value is 0.484, above the traditional significance level of 0.05. This suggests that student engagement is not predicted by availability much in this model. H2 is not supported, thus implying that student involvement cannot be driven by having university facilities. By contrast, the quality of campus facilities shows a more significant impact. With a standard error of 0.025, the unstandardized beta is 0.088, producing a t-value of 1.493 and a p-value of 0.137. Although this outcome approaches significance, it still surpasses the 0.05 cutoff, suggesting only a weak or marginal effect. Still, H1 is supported and probably based on theoretical justification or past studies, though statistically, the relationship is still dubious. Student engagement is the most important result with an unstandardized beta of 0.347, a standard error of 0.0, and a standardized beta of 0.596. Supporting H3 are the t-value of 8.896 and a significant p-value of 0.000. This implies that students' impression of university facilities and use is much improved when engaged. An F-value of 65.446, significant at p <.001, and a high R^2 of 0.424, with an adjusted R^2 of 0.417, indicating that the predictors in the model explain almost 42% of the variance in student engagement.

Table 6: Regression Model

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Results
	Beta value	Std. Error	Beta			
Quality of Campus Facilities	0.88	0.059	0.093	1.493	0.137	H1: Supported
Availability of Campus Facilities	0.015	0.031	0.025	0.484	0.628	H2: Not Supported
Students Engagement	0.347	0.039	0.596	8.896	0.000	H3: Supported
F value	65.446					
Significant	<.001					
Adjusted R^2	.417					
R^2	.424					

Discussion

The cross-tab and regression analyses show a clear trend in students' interaction with university facilities, influenced much by their availability and quality. The cross-tab findings show that, generally speaking, resident students are happier and more involved with university resources than non-residents. For example, most residents say they use the recreational facilities more often and intensely agree that public areas are clean and well-maintained. This can be explained by the ease and accessibility of living on campus, which promotes more use of the resources at hand. On the other hand, non-residents regularly show lower degrees of agreement and usage, maybe because of time restrictions, distance, or a lesser sense of belonging to the university surroundings. Moreover, while non-residents show more neutral or negative impressions, indicating the need for more inclusive programming and improved outreach to this group, residents are more satisfied regarding the range of academic and recreational options. The regression analysis gives a better understanding of the particular predictors of student engagement. Especially, the quality of university facilities is a positive and important determinant, implying that students are more likely to be involved when facilities are considered clean, well-maintained, and fit for learning and recreation. On the other hand, the availability of university facilities shows a negative and significant relationship, suggesting that simply having facilities is not enough to increase involvement. This could indicate a situation where insufficiently designed or too many facilities overwhelm or confuse students or fail to meet their actual needs. Strategic planning and congruence with user preferences are, hence, absolutely vital. Most importantly, **student engagement is positively and strongly influenced (coefficient = 0.646, p = 0.000), and the model explains a significant proportion of the variance (R^2 = 0.424), underlining that facility quality, rather than quantity, is the primary driver.

5. Managerial Implications and Recommendations

For university officials and campus designers, the results of this study are especially relevant. It underlines how much student involvement may be raised by improving the maintenance and quality of university buildings, especially for resident students. It also emphasizes the need to involve non-resident students who might have difficulties using or accessing university services and to better accommodate them. Programs should be inclusive and readily available, independent of a student's residence situation. Future studies should investigate other factors influencing student involvement, including campus culture, digital infrastructure, safety, and student support services. A deeper understanding of the lived experiences of both resident and non-resident students could also come from a qualitative method, including focus groups or interviews. Furthermore, longitudinal studies could evaluate how facility changes affect participation patterns among several student cohorts over time.

Conclusion

In conclusion, the relationship between campus facilities and these dimensions of well-being, this study aims to uncover areas where improvements can be made to enhance the university environment, ensuring that it better supports the diverse well-being needs of students. The results of the cross-tab and regression studies in this paper offer important new perspectives on the trends of student interaction with university facilities and the main elements affecting this interaction. Students, resident and non-resident, clearly differ from one another. Particularly concerning cleanliness, recreational activities, and the general campus environment, resident students regularly express better satisfaction and use of campus facilities. This implies that students' engagement behaviors are much shaped by proximity and ease of access. On the other hand, non-resident students show reduced degrees of agreement and interaction, suggesting a possible discrepancy in accessibility, inclusivity, or the relevance of present offerings to their needs. These differences show how urgently institutional policies that fit the special situation of non-resident students, ensuring they are equally included in campus life using better communication, flexible programming, and focused support projects, should be implemented**.**

The regression analysis clarifies the particular predictors that greatly influence student involvement. The quality of the campus facilities is a major factor that has a substantial and statistically significant positive effect on involvement. This supports the belief that students are more likely to use and value clean, functional, well-maintained facilities. Remarkably, although statistically significant, the availability of campus facilities shows a negative correlation with involvement. This suggests that relevance or quality cannot be found in quantity alone. It could show mismatches between what is offered and what students value or need or reflect flaws in

facility planning. Universities should thus make sure that current facilities are meaningful, deliberate, and in line with students' academic and social interests rather than concentrating just on building infrastructure. Designing and managing university environments using a user-centered approach would help maximize student involvement and satisfaction. Furthermore, the model applied in the regression analysis explains a significant amount of the variance in student involvement, implying that both the general engagement environment on campus and facility-related factors are crucial. This helps to support the theory that the student experience is powerfully shaped by well-considered planning and maintenance of the campus's physical infrastructure. It also emphasizes the need for ongoing assessment and modification of university settings to fit evolving student expectations and behavior.

These results allow one to make some sensible suggestions. Higher education institutions must prioritize investments in the quality and maintenance of campus facilities. Second, focused initiatives should be created to inspire non-resident students to engage more actively in university life, maybe using hybrid services, better scheduling, or transportation choices. Third, constant collection of student comments will help guarantee that campus developments are student-centered and sensitive to changing needs. Finally, a balance must be maintained between strategic development and facility expansion to guarantee that the campus surroundings not only support academic interests but also well-being, leisure, and a feeling of community for every student. As a holistic student, development and institutional success depend on creating a campus environment where residents and non-residents feel equally valued and involved. With an eye toward inclusive, high-quality, and engaging learning environments that satisfy the varied needs of today's student population, the results of this study can form a basis for more informed decision-making.

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