INFORMATION MANAGEMENT AND BUSINESS REVIEW

Artificial Intelligence, Digital Entrepreneurship and Educational Technology

Vol. 17 No. 2 (S) ISSN 2220-3796

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, China, England, India and Indonesia. Artificial Intelligence and Audit Quality, Employability in Accounting Education, Board Diversity & Firm Performance, Balancing Growth & Sustainability, Forensic Accounting, Fraud Detection & Risk Management, Financial Reporting Behavior in Determining Audit Quality, Content Analysis of Media Reporting, Purchase Intention of Modest Fashion Products, HR Practices and Employee Retention, Houseowner & Householder Insurance Adoption, OSH Integration in Supply Chains, Green Supply Chain Management Adoption, Quality Management Practices, Islamic Crowdfunding, Travel Insurance, Artificial Intelligence and Educational Technology, Evolution of Viral Marketing Strategies, Knowledge Sharing Behavior, Social Entrepreneurship, Islamic-Oriented Customer Service Management, Service Quality and Health & Safety Practices, Sustainable Engagement in Higher Education, Household Financial Strain, Digital Entrepreneurial, Educators' Behavioral Intentions, Teaching Presence, Cognitive Presence and Social Presence, Supply Chain Resilience, Ethical Footprint in Global Supply Chains, Agricultural Entrepreneurship, Job Performance in Financial Institutions, Operational Failure and Mobile Banking Usage , Customer-Based Brand Equity, Planned Behavior Approach, Success of the Halal Food Control System and Gamification Approach in Mobile Payment 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

Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Mapping the Intersection of Artificial Intelligence and Audit Quality: A Bibliometric Analysis of Research Trends

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Abstract: The integration of artificial intelligence into audit practice has attracted considerable academic interest, particularly about its impact on improving audit quality. This study aims to examine the emerging trends in academic research at the intersection of artificial intelligence and audit quality through a bibliometric lens. A comprehensive dataset was extracted from the Scopus database based on documents published between 2008 and 2025, with a total of 122 documents included in the final analysis. The results show a notable increase in publications, reflecting the growing academic interest in the application of AI in auditing. The keyword analysis revealed that audit quality and artificial intelligence are the most frequently used and cited terms, highlighting them as fundamental topics. To summarize, this study provides a comprehensive bibliometric overview of the current state and future development of research on artificial intelligence and audit quality. It provides valuable insights for academics, practitioners and policy makers who want to understand the development of the field, identify influential contributions and uncover potential gaps for future research. As artificial intelligence continues to reshape the auditing profession, continued interdisciplinary collaboration is essential to ensure that technological advances do not jeopardize audit quality and professional integrity.

Keywords: *Artificial intelligence, Audit quality, Bibliometric analysis, biblioMagika, OpenRefine*

1. Introduction

Amid swift technological advancement, artificial intelligence (AI) has emerged as a major driver of transformation across various fields, including auditing. AI is characterized as the implementation of information technology and systems engineering involving intelligent machines and computers capable of demonstrating human-like interpretation, learning, autonomous action, and the capacity to analyze extensive data and independently make informed decisions (Griffin, 2019). AI technologies have emerged as a critical consideration for auditing businesses in their operational planning, seeking to capitalize on the growing volume of accessible big data. AI is an information technology that can gather, arrange, process and disseminate vast amounts of data in more reliable and accurate information (Laudon et al., 2020). This will enable the accountants to interpret data and draw conclusions from the findings. The use of AI has resulted in a paradigm shift from traditional data processing to highly automated data collection procedures that are more creative and advanced. This has improved the quality of audits and financial reporting by making them more accurate, reliable, and timely (Aguguom & Ebun, 2021; Albawwat & Frijat, 2021; Deniz & Jeffery, 2022).

An audit is a verification activity that takes place on-site and entails checking if a process or quality system conforms to requirements. It will facilitate an auditor to express an opinion on whether management has fairly and truthfully presented the information in the financial statements and business affairs for the financial period. An audit may focus on a specific function, process, or manufacturing step, or it may encompass the entire organization. Audits are crucial for verifying adherence to laws, rules, and accounting standards. Companies must follow accounting rules and reporting guidelines as one of their legal obligations. In order to guarantee the accuracy of financial statements and their ability to provide economic value to investment choices, audit quality is concerned with comprehensive, trustworthy, and comparable data (Adeoye et al., 2023).

Technological advances have changed the landscape of auditing. Auditors are endeavoring to use audit tools to ensure high audit quality in audit procedures. The application of AI in the audit process offers the ability to increase audit quality, as auditors may utilize AI-powered tools to do advanced data analytics and uncover

trends, patterns and inconsistencies in financial data. A high-quality audit provides independent assurance that the organization is meeting compliance requirements and can reduce the risk of fines, legal repercussions or reputational damage (Taha, 2024). It also fulfills stakeholder demands for greater efficiency, accuracy and transparency in the audit process. Furthermore, a quality review offers an impartial evaluation of the business's financial reporting, which promotes effective corporate governance and management accountability. Audits ensure the integrity and reliability of financial statements and protect the company's assets, investments and jobs, which fosters stability and trust in corporate governance (Qader et al., 2024). Moreover, the interests of other stakeholders such as employees, customers, suppliers and financiers can be safeguarded through audits. Audits increase the transparency and accountability of organizations by highlighting weaknesses and areas for improvement. This can be done by reviewing the organization's internal controls and risk management (Ogbu, 2023).

Moreover, the application of AI could significantly raise audit quality, which includes the reliability, relevance and transparency of audit findings. Auditors can analyze whole samples of transactions much more quickly using AI approaches (Issa et al., 2016). This benefit allows auditors to use their professional abilities efficiently by concentrating on interpreting AI-generated findings rather than performing manual work. Additionally, AI facilitates the automation of some procedures, for example, reviewing sources of documents such as bank checks and payment vouchers. It also helps in processing paperwork and extracting metadata from emails and memos. The conventional financial characteristics employed in audits can be enhanced by such supplementary evidence (Issa et al., 2016). High-risk transactions are easily detected through the use of AI-based auditing technology. This is something that the manual auditing process cannot properly detect due to sampling, but AI technology allows the entire population to be audited (Noordin et al., 2022). Incorporating intelligent technology into accounting and auditing procedures increases accuracy and efficiency, which lowers costs and workloads and, in turn, improves audit quality. Several companies have spent billions of dollars on the auditing sector to create new methods and technologies that would assist auditors in completing challenging and complex tasks within a tight deadline (Stoel & Havelka, 2021).

AI is an important tool that can help auditors to increase audit quality and efficiency during performing audits. This approach has also been demonstrated to be a dependable way to lower the likelihood of human error. AI should be considered as an innovative approach to enhance the auditing procedure. Therefore, this study provides a comprehensive bibliometric overview of the current state and future development of research on AI and audit quality. The bibliometric results highlight important connotations and research trends in the literature and provide an insight into the intellectual structure of the field by methodically analyzing research patterns, citation networks and prominent publications.

The structure of this paper is as follows. The literature review is explained in Section 2, the research methodology is explained in Section 3, the results are presented in Section 4, and the study's conclusion, which includes a summary of the findings and suggestions for further research, is presented in Section 5.

2. Literature Review

Artificial Intelligence in Accounting and Auditing

The rapid advancement of AI has triggered significant transformation within financial domains, particularly in accounting and auditing. AI tools such as machine learning, natural language processing, and predictive analytics provide effective solutions to longstanding challenges involving data accuracy, operational efficiency and compliance oversight. These intelligent capabilities are increasingly embedded into financial systems, raising transformative questions about automation, assurance and accountability.

AI refers to the capability of machines or systems to perform tasks that typically require human intelligence, including learning, reasoning, problem solving, perception and language understanding (Lin & Chang, 2023). It is commonly associated with algorithmic processes and signifies the simulation of human cognitive abilities by computer systems (Sheikh et al., 2023), encompassing the concept of man-made machines or sentient beings that can think, learn and make autonomous decisions (Hasan, 2022).

Accounting is the systematic process of recording, classifying, summarizing and interpreting financial transactions to reflect an organization's performance, profitability and financial position. Its primary objective is to produce accurate and reliable financial information that facilitates informed decision making, ensures regulatory compliance and enables assessment of organizational performance and financial position (Gonzalez & James, 2024). Meanwhile, auditing is the independent examination and evaluation of financial statements and records to determine their accuracy, reliability and adherence to applicable standards (Public Company Oversight Board, 2016). It ensures transparency and assures stakeholders of the integrity of financial reporting. Recent advances illustrate how AI has transformed traditional accounting practices. AI technologies have reshaped accounting operations by automating repetitive tasks, improving classification accuracy and enabling real-time insights (Panwar, 2023). Tools based on machine learning and data analytics are employed to automate transaction classification, flag inconsistencies and generate predictive financial models (Hasan, 2022). These innovations enable faster processing, improved accuracy and dynamic responsiveness to dynamic data flows. AI also significantly improves the accuracy and efficiency of financial reporting by automating repetitive processes, including data entry, transaction categorization and reconciliation (Odonkor et al., 2024). Furthermore, intelligent systems enhance the completeness and timeliness of reporting by detecting duplicate entries, validating invoice data and aligning financial records with regulatory requirements, thereby strengthening the integrity of accounting outputs and audit readiness (Odonkor et al., 2024).

In auditing, AI supports risk assessments and evidence gathering through anomaly detection, natural language processing and continuous monitoring systems (Leocadio et al., 2024). These capabilities reduce manual errors and facilitate deeper insights, enhancing audit reliability and comprehensiveness. AI systems also assist auditors in professional judgment areas, such as materiality assessment and fraud prediction by analyzing historical data patterns and generating dynamic risk scores. Tools employing machine learning and linguistic analysis enable more accurate identification of control weaknesses and irregularities, thereby strengthening decision-making in audit and execution. Furthermore, AI enhances the sufficiency and appropriateness of audit evidence by automating transaction sampling, confirming ledger balances, and verifying source documentation with greater speed and precision. These functions help auditors assemble robust digital audit trails and support transparent evidence-based conclusions. AI tools are increasingly aligned with international auditing standards, contributing to transparent and efficient compliance verification. These advancements improve audit depth, timeliness and compliance monitoring particularly in high-volume environments (Fidyah et al., 2024).

The integration of AI into accounting and auditing is often conceptualized using technology acceptance models such as the Technology Acceptance Model and Diffusion of Innovation Theory. These frameworks suggest that perceived usefulness and ease of use are critical predictors of AI adoption in financial services (Rogers, 2003). Moreover, the Accounting Information Systems model situates AI as a transformative component within organizational financial infrastructure that enhances internal controls, data governance and decision-making capabilities (Romney & Steinbart, 2021). As intelligent systems become more embedded in assurance processes, international standard-setting bodies, including the Public Company Accounting Oversight Board and the International Auditing and Assurance Standards Board (IAASB), are updating their frameworks to accommodate AI-enabled audit techniques. These adjustments aim to ensure that AI-driven procedures remain transparent, ethical, and compliant with established principles such as audit independence, evidence sufficiency, and risk-based planning (IAASB, 2023; PCAOB, 2016).

Audit Quality

Auditors play a key role in ensuring technological excellence in quality assurance, where rapid changes in computer-based systems have transformed the auditing landscape (Willborn, 1989). Auditors must adopt innovative, integrative approaches and support policies that advance auditing technologies. Audit quality refers to the reliability of the audit report and the audited financial statements (Francis, 2023). It encompasses auditor competence, independence, and judgment, and is best assessed through audit outcomes rather than processes. High-quality audits constrain aggressive accounting and enhance the credibility of financial reporting for stakeholders and investors. Francis (2004) stated that audit quality refers to the degree to which audits meet legal and professional standards, minimizing audit failures. It exists on a continuum from low to high and is influenced by auditor independence, firm size, industry expertise, legal environments and audit outcomes. High audit quality enhances financial reporting credibility and investor confidence. Al-Qatamin and

Salleh (2020) concluded that audit quality lacks a single, universally accepted definition. It is often described in terms of an auditor's ability to identify and report material misstatements, and their adherence to auditing standards such as Generally Accepted Auditing Standards (GAAS) and Generally Accepted Accounting Standards (GAAP).

Audit quality influences stakeholder trust and decisions, including shareholders, creditors, regulators, and investors. It relies heavily on professional judgment shaped by training, experience and culture. Technology, such as big data, plays a growing role by improving audit procedures, increasing sample sizes, and enhancing the overall effectiveness and reliability of audits (Qatamin & Salleh, 2020). In commercial banks, it is found that audit quality is mainly influenced by the auditor's specialized competence, followed by the characteristics of commercial banks, time pressure, audit methods, and quality control systems (Pham et al., 2025). Other factors include auditor independence, compliance with standards, and firm conditions. Interestingly, this study also discovered that there is no significant difference in audit quality between Big Four and Non-Big Four firms.

Zahid et al (2022) found that the environmental, social and governance (ESG) performance negatively affects return on assets (ROA), supporting the trade-off hypothesis, but positively influences revenue, showing customer preference for responsible firms. This research then connected audit quality, measured by Big Four auditors and audit fees, strengthens ESG's positive impact on revenue and its negative effect on ROA. This indicates how audit quality contributes to increasing the credibility and financial impact of ESG practices. Other than that, audit quality plays an important role in strengthening the link between CSR and financial performance. Dakhli (2022) found that 200 French firms audited by Big Four firms showed stronger positive effects of CSR on ROA, return on equity, and Tobin's Q. This means high-quality audits make CSR disclosures more trustworthy, which helps build stakeholder confidence.

Audit quality emerges as a central theme across the various studies, highlighting its critical role in shaping corporate financial behavior and governance outcomes. Audit quality was examined regarding tax avoidance among Indonesian mining firms (Monika & Noviari, 2021). Interestingly, the findings revealed that audit quality, whether provided by Big Four or non-Big Four auditors, did not significantly influence tax avoidance behavior. This suggests that in certain sectors or contexts, audit quality alone may not be a strong deterrent against aggressive tax strategies. In contrast, Masmoudi (2021) found that audit quality plays a more prominent role in enhancing financial reporting quality in Dutch firms. Specifically, the existence of Big Four auditors was shown to strengthen the positive aspects of audit committee characteristics such as independence, financial expertise, and meeting frequency in reducing real earnings management. This underscores the value of high-quality audits in reinforcing internal governance mechanisms. Similarly, Zahid et al. (2023) examined how audit quality influences the relationship between dividend policy and ESG performance among Western European firms. Their results indicated that while ESG performance is positively associated with dividend payouts, the presence of Big Four auditors tends to moderate this relationship negatively, leading to more conservative dividend growth. This suggests that high audit quality may encourage firms to adopt more prudent financial policies, particularly when balancing sustainability commitments with shareholder returns. Collectively, these studies illustrate that audit quality, especially when delivered by reputable firms, can significantly influence how companies manage financial transparency, governance, and stakeholder expectations.

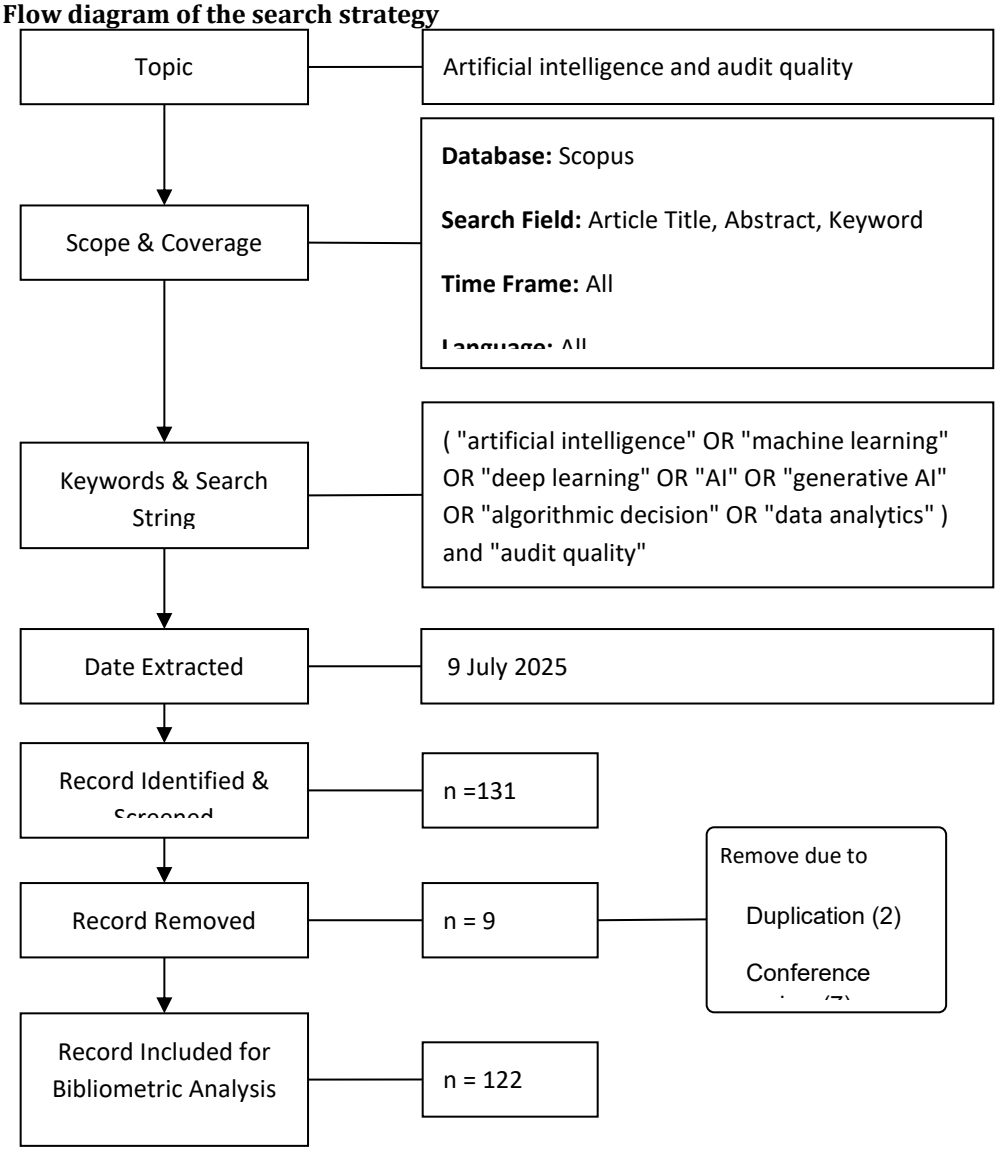
Noordin et al. (2022) highlight that AI significantly enhances audit quality by improving accuracy, efficiency, and fraud detection. Auditors in the UAE view AI as a valuable tool that supports risk assessment and automates routine tasks, allowing more focus on complex judgments. Both local and international firms share similar positive perceptions of AI's role in improving audit outcomes. Therefore, it is vital to address challenges by means of appropriate training, quality data, and strong governance to improve audit quality and reliability. It is to ensure that AI is beneficial to auditing as well as the general public. Auditors must understand AI-related risks and implement preventive measures, with cybersecurity serving as both a defense against external threats and a modern tool for risk management (Shazly et al., 2025).

3. Methodology

This study uses a bibliometric analysis to examine the research trends at the intersection of AI and audit quality. Bibliometric analysis is a quantitative method for assessing patterns in scholarly publications, authorship, keyword usage and highly cited documents. The bibliometric data were extracted from the Scopus database, which is known for its broad multidisciplinary coverage and reliable indexing of peer-reviewed literature. The search was conducted using the title, abstract and keywords (TITLE-ABS-KEY) fields of the article to ensure relevance and specificity as depicted in Figure 1.

All document types, including journal articles, conference papers and reviews, were considered. The original dataset comprised 131 records. Manual screening was performed to ensure relevance and quality. Duplicate entries and unrelated papers were excluded. Specifically, 9 records were removed, 2 of which were due to duplicates, leaving 122 documents for the final bibliometric analysis. The metadata of the selected publications, including title, abstract, keywords, authors, affiliation, number of citations and source titles, were exported from Scopus in CSV format. The data was cleansed and standardized to ensure the accuracy of the analysis with biblioMagika® (Ahmi, 2024).

Figure 1: **Flow diagram of the search strategy**



Source: Zakaria et al. (2021), Moher et al. (2009)

4. Findings and Results

A total of 122 publications on the topic of AI and audit quality were identified, which corresponds to an active period of 18 citable years, as shown in Table 1. The results show 339 contributing authors with an average of 2.78 authors per paper. This indicates that research in this field is generally a collaborative endeavor, often involving interdisciplinary teams. The 5.35 citations per author also suggest that the field is gaining recognition, which could further encourage future research. Of the 122 publications, 83 were cited, which reflects a relatively strong academic interest in this topic. The total number of citations was 1,815, resulting in an average of 14.88 citations per article, indicating that studies in this area have attracted considerable attention. The citation rate of 106.76 per year emphasizes the upward trend in this research area. This trend reflects the academic community's increasing realization that AI has the potential to impact audit quality, audit efficiency and audit practice.

Table 1: Data description

MAIN INFORMATION	DATA
Publication Years	2008 - 2025
Total Publications	122
Citable Year	18
Number of Contributing Authors	339
Number of Cited Papers	83
Total Citations	1,815
Citation per Paper	14.88
Citation per Cited Paper	21.87
Citation per Year	106.76
Citation per Author	5.35
Author per Paper	2.78
Citation sum within h-Core	1,718
h-index	22
g-index	41
m-index	1.222

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

As shown in Table 2, most of the 122 publications were categorized as journal articles (n = 71, 58.20%), followed by conference papers (n = 33, 27.05%). This distribution suggests that while journals remain the primary source of research findings dissemination in this area, conferences also play a significant role, reflecting the dynamic and evolving nature of AI-related topics, which are presented at international academic conferences.

Table 2: Document type

DOCUMENT TYPE	TOTAL PUBLICATION	PERCENTAGE
Article	71	58.20
Conference paper	33	27.05
Book chapter	12	9.84
Review	4	3.28
Book	1	0.82
Short survey	1	0.82

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

As shown in Table 3, all 122 publications (100%) were written in English, confirming the dominance of English in academic research worldwide, particularly in the fields of accounting, auditing and AI. The universal use of language promotes accessibility and facilitates cross-border collaboration among researchers, ensuring that findings and developments in the field reach a broader audience.

Table 3: Language

LANGUAGE	TOTAL PUBLICATION	PERCENTAGE
English	122	100

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

The distribution of documents by type of authorship in the form of single authorship and multiple authorship from 2008 to 2025 shows an important pattern in the development of scholarly collaboration in the field of AI and audit quality. Figure 1 shows a steady increase in publications with multiple authors, indicating increasing interdisciplinary and institutional collaboration. A notable acceleration in overall research output over the last three years, which could be attributed to the increasing use of AI technologies in auditing, digitalization trends and global regulatory attention to audit quality.

Figure 2: Authorship by year

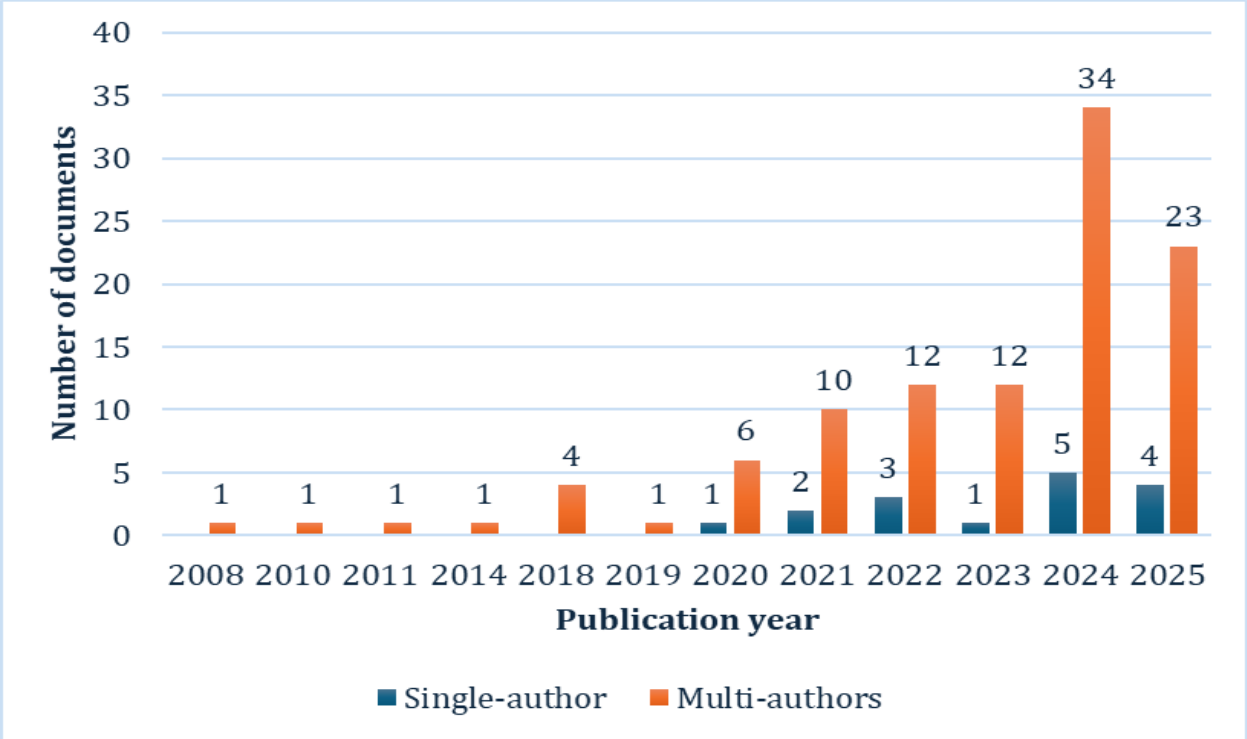
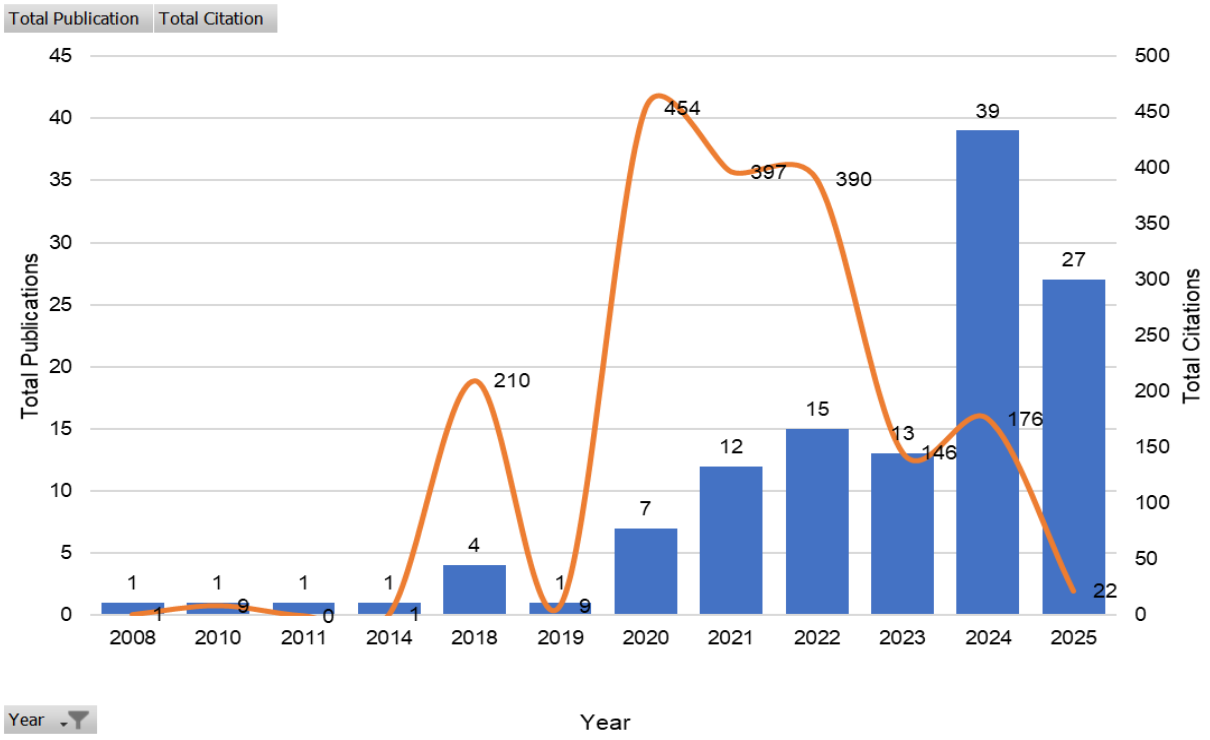


Figure 2 illustrates the annual distribution of total publications and total citations related to the field of AI and audit quality from 2008 to 2025. Between 2008 and 2014, research output in this area was minimal, with only one publication per year. From 2018, the landscape began to change, and from 2020, there was a significant increase in publications. In terms of citation trends, the peak of citations was between 2018 and 2020, suggesting that several influential studies published before or around these years received a lot of attention. However, from 2022 onwards, the total number of citations per year begins to decline, although the number of publications has increased significantly.

Figure 3: Total publications and total citations by year



Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

Table 4 shows the 10 most influential sources, based on the total number of citations, and indicates where the most influential research at the intersection of AI and audit quality has been published. The most cited source is Technological Forecasting and Social Change, with 270 citations from a single publication. Although it contributed only one article, the exceptionally high number of citations shows the great influence of the work, which is likely to provide forward-looking insights into the adoption of AI in accounting or auditing. In addition, the International Journal of Accounting and Information Management is listed as the most productive journal on the list, with 3 cited articles and a total of 168 citations.

Table 4: 10 Most Influential Source Titles by Total Citations

SOURCE TITLE	TP	NCP	TC	C/CP	h	g
Technological Forecasting and Social Change	1	1	270	270.00	1	1
International Journal of Accounting and Information Management	3	3	168	56.00	2	3
Review of Accounting Studies	1	1	137	137.00	1	1
International Journal of Digital Accounting Research	1	1	101	101.00	1	1
Journal of Econometrics	1	1	98	98.00	1	1
Contemporary Accounting Research	1	1	81	81.00	1	1
Journal of Accounting Research	1	1	74	74.00	1	1
Meditari Accountancy Research	2	2	70	35.00	2	2
Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	3	3	61	20.33	3	3
Accounting and Finance	1	1	57	57.00	1	1

Note: TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

Table 5 lists the 10 most cited papers in the field of AI and audit quality in terms of total number of citations and citations per year. The most influential work is that of Manita et al. (2020) with 270 citations, which deals with the digital transformation of auditing and corporate governance. This is followed by Albitar et al. (2021) with 147 citations, which deals with audit quality in the COVID-19 era, and Fedyk et al. (2022) with 137 citations, which critically examines the effectiveness of AI in the audit process. Other notable studies deal with smart contracts in auditing, machine learning applications and auditor interaction with AI. Most of the articles are recent (2020–2023) and have high citation rates per year, reflecting the growing academic interest and current relevance of AI in modern audit practice. These publications are seminal and influential contributions that have shaped the discourse in this emerging field of research.

Table 5: 10 Highly cited documents

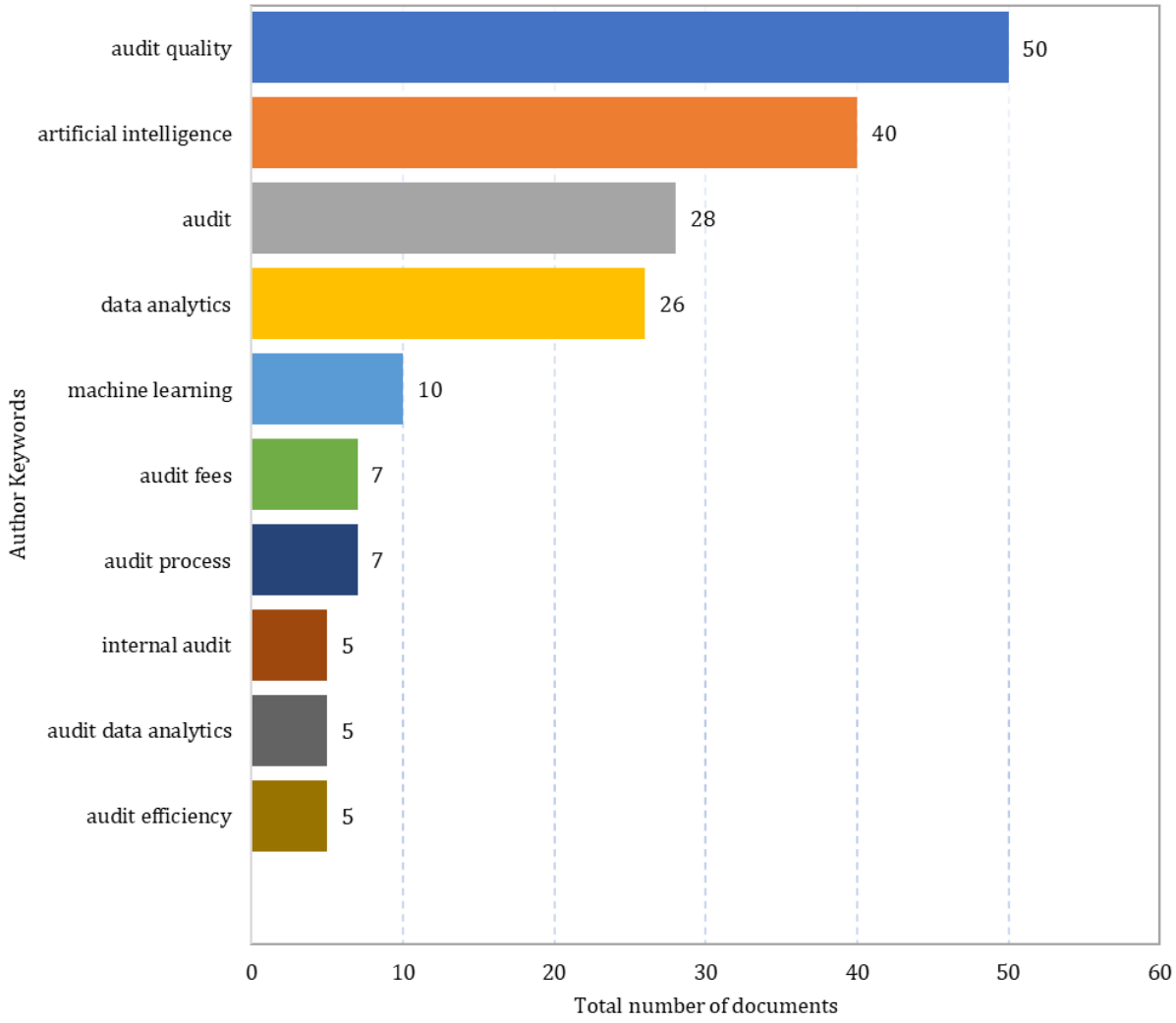
AUTHOR(S)	TITLE	SOURCE TITLE	TC	C/Y
Manita R.; Elommal N.; Baudier P.; Hikkerova L. (2020)	The digital transformation of external audit and its impact on corporate governance	Technological Forecasting and Social Change	270	45.00
Albitar K.; Gerged A.M.; Kikhia H.; Hussainey K. (2021)	Auditing in times of social distancing: the effect of COVID-19 on auditing quality	International Journal of Accounting and Information Management	147	29.40
Fedyk A.; Hodson J.; Khimich N.; Fedyk T. (2022)	Is artificial intelligence improving the audit process?	Review of Accounting Studies	137	34.25
Rozario A.M.; Vasarhelyi M.A. (2018)	Auditing with smart contracts	International Journal of Digital Accounting Research	101	12.63
Yang J.-C.; Chuang H.-C.; Kuan C.-M. (2020)	Double machine learning with gradient boosting and its application to the Big N audit quality effect	Journal of Econometrics	98	16.33
Austin A.A.; Carpenter T.D.; Christ M.H.; Nielson C.S. (2021)	The Data Analytics Journey: Interactions Among Auditors, Managers, Regulation, and Technology*	Contemporary Accounting Research	81	16.20
Commerford B.P.; Dennis S.A.; Joe J.R.; Ulla J.W. (2022)	Man Versus Machine: Complex Estimates and Auditor Reliance on Artificial Intelligence	Journal of Accounting Research	74	18.50
Jiang Y.; Jones S. (2018)	Corporate distress prediction in China: a machine learning approach	Accounting and Finance	57	7.13
Noordin N.A.; Hussainey K.; Hayek A.F. (2022)	The Use of Artificial Intelligence and Audit Quality: An Analysis from the Perspectives of External Auditors in the UAE	Journal of Risk and Financial Management	56	14.00
Seethamraju R.; Hecimovic A. (2023)	Adoption of artificial intelligence in auditing: An exploratory study	Australian Journal of Management	48	16.00

Note: TC=total citations; C/Y=average citations per year
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

The cleaning and harmonizing analysis was conducted beforehand using OpenRefine. This was done to eliminate errors due to spellings, plurals and synonyms. These keywords were further analyzed using biblioMagika®. Figure 3 shows the 10 most frequently used author keywords in the context of publications on AI and audit quality. The author keywords provide an insight into the conceptual focus of research in this area. The most frequent keyword is "audit quality", which appears in 50 documents, underlining that it is at the centre of this bibliometric analysis. Its frequency confirms the continuing academic interest in assessing and improving the reliability, credibility and effectiveness of audit results. This is followed by "artificial

intelligence" with 40 documents, confirming that AI is not just the technological context but a key research topic. The prominence of both terms emphasizes the strong interdisciplinary intersection in which auditing practice meets intelligent technologies. In addition, keywords such as "audit fees", "audit process," and "audit efficiency" reflect the growing interest in how AI affects audit processes and performance.

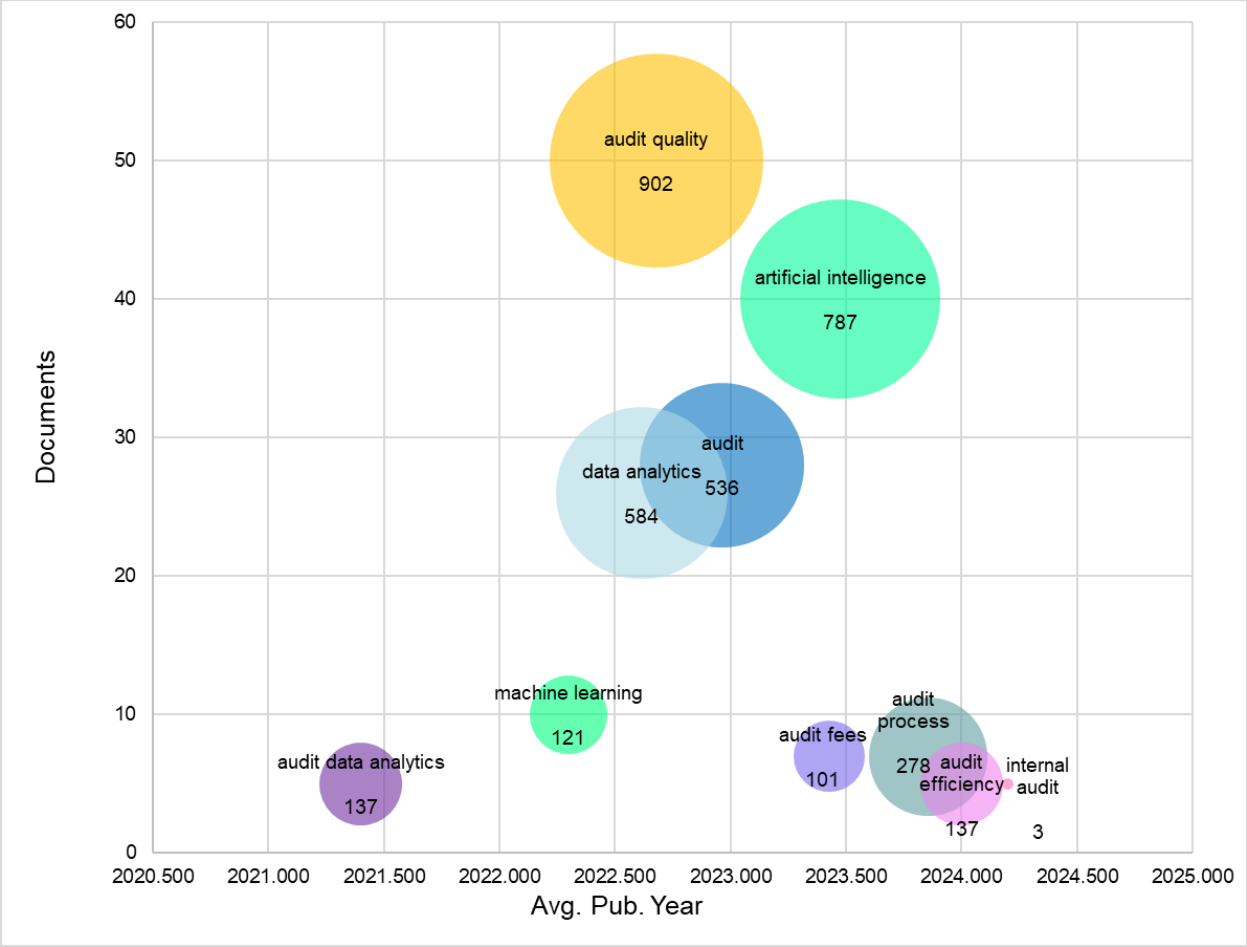
Figure 3: Top 10 author keywords by document frequency



Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024).

Figure 4 illustrates the temporal and citation impact of the top 10 most frequent keywords in the field of AI and audit quality. Core keywords such as “audit quality” and “artificial intelligence” are cited and used most frequently, reflecting their central role in the literature. Newer and emerging terms such as 'machine learning', 'audit efficiency' and 'internal audit' are cited less frequently but are gaining prominence, indicating evolving research interests.

Figure 5: Temporal and Citation Impact of Top 10 Most Frequent Author Keywords (Min. Freq. = 5, Bubble Size = Citations)



Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

5. Conclusion and Recommendations

This study contributes to a comprehensive bibliometric analysis of academic research at the intersection of AI and audit quality. It maps the development of this field in the period from 2008 to 2025 and analyses 122 documents from the Scopus database. The increasing number of publications and citations demonstrates a rising academic interest in understanding the integration of AI technologies into audit practice and their impact on audit quality. The study emphasizes the dominance of keywords in the co-occurrence analysis. "Artificial intelligence" and "audit quality" are consistently among the main topics, which indicates their importance in the current academic discussion.

The findings demonstrate the vibrant and growing state of this field of research, supported by fast-evolving technology progress and increasing demands for audit reliability, efficiency, and transparency. This bibliometric review not only reveals major trends, prolific authors, and influential journals but also offers a better comprehension of how the research community is addressing the infusion of AI in auditing. This study provides researchers, practitioners and policy makers with insightful information on how AI can increase the auditing standards by providing support and detecting fraud at an early stage. AI makes audits more effective and efficient by analyzing data, identifying complex fraud trends and monitoring them in real time.

In spite of the positive growth in literature, several areas are still under addressed. Future studies need to further address the practical aspects of AI implementation in auditing settings, especially its influence on

auditor judgment, ethical issues, and compliance with regulations. Empirical studies and case studies using actual audit firms may shed meaningful light on the efficiency and boundaries of AI tools. Cross-nation comparative studies can also reveal how geographic variations in regulation and technology infrastructure impact AI implementation in auditing.

In addition, interdisciplinary research that brings together ideas from accounting, computer science, law, and ethics will be very important for dealing with the difficult problems that come up when AI is used. Researchers should also look into how AI will affect the long-term viability of the audit profession, the need for training, and the trust of stakeholders. By filling in these gaps, future research can help shape a fair, well-informed, and ethical usage of AI that improves the quality of audits without hurting professional integrity.

Limitations and Future Directions

This study provides insightful information on the topic of AI and audit quality and emphasizes the strong interdisciplinary intersection in audit practice. However, this study has some limitations, including the dependence on the Scopus-indexed database and the limitation of the keyword search strategy. The first limitation is sole reliance on the Scopus-indexed database for extracting data. Scopus is a well-known source, but it may not contain all publications in this field, which is changing rapidly. For future studies, it would be advisable to use other academic databases such as Web of Science, ScienceDirect or IEEE Xplore to retrieve a wider range of literature. This would make the results more reliable and applicable to a wider range of situations. The second limitation relates to the search strategy used in this study. The keyword search is limited to precise terms such as "artificial intelligence", "machine learning", "deep learning", “AI”, "generative AI”, "algorithmic decision", "data analytics" and "audit quality". Although these terms are very pertinent, they may not reflect the full range of terminology used in interdisciplinary AI audit studies. Future researchers are encouraged to expand the keyword list by using synonyms, related concepts, and variations by utilizing tools such as thesauri or domain-specific dictionaries. This broader range may allow for greater coverage of the literature and identify more research trends and underlying contexts in the field.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Skill Up or Fall Behind: A Global Bibliometric Review of Employability in Accounting Education

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Abstract: This study conducts a comprehensive bibliometric analysis of global research on employability in accounting education from 2000 to 2025. Based on 422 documents retrieved from the Scopus database, it maps the scholarly landscape using citation analysis, authorship trends, source journals, keyword co-occurrences, and geographic and disciplinary distribution. The findings reveal a significant rise in research output since 2015, driven by growing concerns over graduate employability amid rapid technological change. The United States, Australia, and the United Kingdom are the most prolific contributors, with key journals including *Accounting Education* and *Journal of Accounting Education*. Frequently cited studies focus on curriculum alignment, soft skills development, and digital competency integration. The analysis underscores a global shift toward future-ready curricula while identifying underexplored areas in developing regions. These insights provide valuable guidance for educators, curriculum developers, and policymakers seeking to improve employability outcomes in accounting education.

Keywords: *Employability, accounting education, bibliometric analysis, graduate attributes, curriculum reform, soft skills, digital competencies.*

1. Introduction

In an increasingly dynamic and technology-driven global economy, the employability of accounting graduates has become a critical concern for higher education institutions, employers, and policymakers alike. As the accounting profession undergoes rapid transformation due to automation, artificial intelligence, and evolving regulatory environments, the expectations placed on graduates have expanded beyond technical proficiency to include a wide range of soft skills and digital competencies. Consequently, accounting education must adapt to ensure that graduates are equipped not only with domain-specific knowledge but also with transferable skills that enhance their readiness for the workforce. Over the past two decades, academic research has increasingly focused on the alignment between accounting curricula and employability outcomes. Numerous studies have explored employer expectations, student perceptions, curriculum reforms, and skill gaps (Kavanagh & Drennan, 2008; Jackling & De Lange, 2009; Lawson et al., 2014). However, despite this growing body of work, a systematic synthesis of the literature is needed to understand the field's development, key contributors, dominant themes, and emerging trends.

Bibliometric analysis provides a powerful methodology for mapping the intellectual structure and evolution of a research domain. By quantitatively assessing publication patterns, citation impact, authorship, and thematic concentrations, bibliometric studies offer evidence-based insights into the strengths, gaps, and trajectories of academic discourse. In this context, the present study seeks to conduct a bibliometric review of employability research in accounting education from 2000 to 2025, using data extracted from the Scopus database.
The objectives of this study are fourfold:

- To identify publication trends and growth patterns in the field.
- To highlight the most influential authors, documents, and journals.
- To analyze the thematic focus through author keywords and co-occurrence mapping; and
- To reveal geographic and disciplinary contributions to the field.

By synthesizing and visualizing two and a half decades of research output, this study contributes to the understanding of how accounting education is evolving to meet the demands of a rapidly changing employment landscape.

2. Literature Review

The concept of employability has gained significant interest in higher education literature over the past two decades, particularly in professional programs such as accounting. Defined by Yorke (2006) as "a set of achievements, skills, understandings and personal attributes that make graduates more likely to gain employment and be successful in their chosen occupations," employability encompasses more than academic qualifications alone. It involves the development of a broad set of competencies including technical, cognitive, interpersonal, and increasing digital skills that allow graduates to navigate dynamic and competitive labor markets. This holistic view of employability has become particularly critical in accounting, where the professional landscape is evolving rapidly due to technological disruptions, globalization, and changing stakeholder expectations.

Numerous studies have documented a persistent and global disconnect between the skills accounting graduates possess and those required by employers. Kavanagh & Drennan (2008), in a widely cited study, revealed that employers value soft skills such as teamwork, communication, and adaptability as highly as technical expertise. However, many graduates overestimate the importance of their technical training while underestimating the interpersonal and professional attributes needed in the workplace. Jackling & De Lange (2009) reinforced this skills mismatch by demonstrating that graduate self-perceptions often diverge from employer expectations, particularly about problem-solving and critical thinking abilities. This gap has been identified not only in Western contexts but also in emerging economies such as Malaysia, Indonesia, and China, where mass expansion of higher education has intensified the challenge of ensuring graduate employability.

The growing importance of soft skills has led to a paradigm shift in accounting education with increasing emphasis on the development of graduate attributes that go beyond disciplinary knowledge. These include communication skills, emotional intelligence, cultural awareness, ethical reasoning, and leadership potential. Studies by Rebele & St. Pierre (2019) and Dolce et al. (2020) have pointed out that while educators and employers recognize the importance of these attributes, students often remain unaware of their value until they enter the workforce. The gap in perceptions further complicates efforts to design effective curricula. Educators have responded by advocating for pedagogical reforms that promote active learning such as simulations, case-based learning, internships, and collaborative projects (Levant et al., 2016; Wells et al., 2009). These approaches aim to replicate real-world conditions and develop the soft skills employers seek, thus enhancing graduates' readiness for employment.

At the same time, accounting education is undergoing a profound transformation driven by technological advances. The emergence of the Fourth Industrial Revolution has introduced complex challenges for accounting professionals who are now expected to operate alongside digital tools such as artificial intelligence, blockchain, data analytics, and robotic process automation. As noted by Sledgianowski et al., (2017), and later by Dzuranin et al., (2018), there is an urgent need to incorporate digital competencies into accounting education to ensure that graduates remain relevant and competitive. Qasim & Kharbat (2020) argue that future accountants must not only understand how these technologies work but also be capable of leveraging them strategically to drive organizational value. This shift has led to calls for accounting programs to embed digital literacy and data analytics across all levels of instruction from foundational courses to capstone projects.

Responding to these demands, several scholars have proposed comprehensive frameworks to guide curriculum development. Lawson et al. (2014) introduced a competency-based accounting curriculum model that integrates professional skills, ethical values, and lifelong learning objectives. Their framework emphasizes the importance of aligning educational outcomes with long-term career success rather than short-term technical proficiency. Other researchers such as Mohamed & Lashine (2003) and Pan & Seow (2016) have advocated for the internationalization of accounting curricula, arguing that global business environments require intercultural competence and international knowledge. Accreditation agencies such as the International Federation of Accountants, the Association to Advance Collegiate Schools of Business, and CPA Australia have similarly emphasized the integration of employability skills and digital acumen into accreditation standards, reinforcing the imperative for curriculum reform.

Despite the growing volume of literature on employability and accounting education, the field remains fragmented. Studies vary in their methodological approaches, geographic coverage, and conceptual frameworks, making it difficult to develop a unified understanding of how employability has been conceptualized, measured, and implemented over time. Furthermore, while individual countries have conducted national-level evaluations of graduate outcomes, there has been limited effort to synthesize these findings at a global level. In this context, bibliometric analysis offers a powerful method to map the structure, growth, and intellectual evolution of the field. As shown by Donthu et al. (2021) and Zupic & Cater (2015), bibliometric techniques can identify leading contributors, core journals, thematic clusters, and emerging research trends. Zakaria et al. (2021) applied such techniques to visualize the landscape of honey research, demonstrating how co-occurrence analysis and network mapping can uncover hidden patterns in academic literature.

In sum, the literature on employability in accounting education reflects a broad consensus on the need to integrate soft skills, digital competencies, and industry engagement into accounting curricula. However, there remains a lack of systematic, global-scale analysis of how this body of research has developed over time. This study addresses this gap by conducting a bibliometric review of 422 publications from 2000 to 2025, with the aim of mapping research productivity, identifying key themes and contributors, and providing direction for future inquiry and policy reform in accounting education.

3. Methodology

Search Strategy

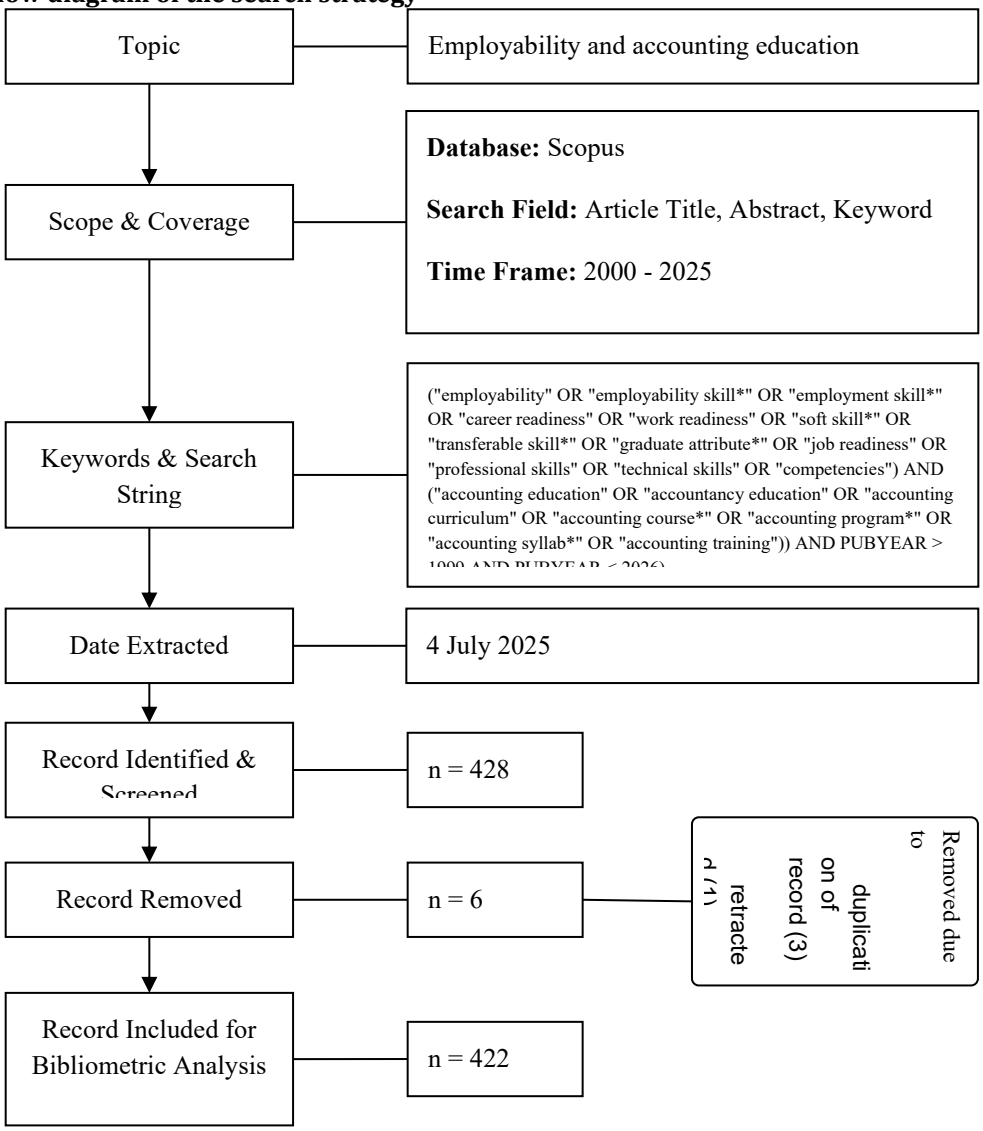
This study employed a bibliometric analysis approach to explore the landscape of scholarly publications on employability in accounting education. The bibliometric method enables systematic quantification of publication patterns, citation metrics, and thematic structures within a specific research domain. The Scopus database was selected for data extraction due to its comprehensive coverage of peer-reviewed journals, conference proceedings, and scholarly books across multiple disciplines. The search was performed on 4 July 2025 using the following Boolean query: ("employability" OR "employability skill*" OR "employment skill*" OR "career readiness" OR "work readiness" OR "soft skill*" OR "transferable skill*" OR "graduate attribute*" OR "job readiness" OR "professional skills" OR "technical skills" OR "competencies") AND ("accounting education" OR "accountancy education" OR "accounting curriculum" OR "accounting course*" OR "accounting program*" OR "accounting syllab*" OR "accounting training") AND PUBYEAR > 1999 AND PUBYEAR < 2026. The search was applied to the Title, Abstract, and Keywords fields. All document types and languages were included.

This section presents the bibliometric analysis of the scientific research findings on Employability in Accounting Education. This study focuses on documents published in the Scopus database between 2000 and 2025, for which the initial search yielded a total of 428 records. Records were screened manually and refined based on the following exclusion criteria:

- Duplicates: 3 records
- Retracted articles: 1 record
- Errata: 1 record
- Non-scholarly notes: 1 record

After screening, 422 records remained for analysis. Of these, 6 documents were selected for focused thematic review, while the remaining 416 documents contributed to overall bibliometric mapping. The final dataset was analyzed using biblioMagika® (Ahmi, 2024) to generate descriptive statistics, citation metrics, and publication trends. VOSviewer (Van Eck & Waltman, 2014) was used to visualize co-authorship networks, keyword co-occurrence maps, and thematic clusters. The data collection and screening process adhered to the PRISMA flowchart protocol for systematic reviews. Figure 1 summarizes the search and screening process.

Figure 1: Flow diagram of the search strategy



Source: Zakaria et al. (2021), Moher et al. (2009)

4. Results and Discussion

Documents Profiles

The bibliometric analysis identified a total of 422 publications on employability within accounting education from the year 2000 to 2025, marking a 26-year span of scholarly contributions. These records encompassed various document types including journal articles, conference papers, book chapters, and reviews. These results indicate a moderately high citation impact, with an average of 17.95 citations per paper, and a robust h-index of 45, suggesting a significant portion of papers have been cited at least 45 times. The g-index of 71 and m-index of 1.731 further affirm the consistency and maturity of the field over time. An average of 2.68 authors per paper reflects growing collaboration among researchers in accounting education and employability, and the dataset's breadth—spanning more than a thousand contributing authors—underscores its global academic relevance.

Table 1 summarizes the key citation metrics derived from the dataset.

Table 1: Citation Metrics

Main Information	Data
Publication Years	2000 - 2025
Total Publications	422
Citable Year	26
Number of Contributing Authors	1133
Number of Cited Papers	336
Total Citations	7,573
Citation per Paper	17.95
Citation per Cited Paper	22.54
Citation per Year	302.92
Citation per Author	6.68
Author per Paper	2.68
Citation sums within h-Core	6,901
h-index	45
g-index	71
m-index	1.731

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Document Types

The dataset comprises a diverse range of scholarly outputs, reflecting the multidisciplinary and evolving nature of research on employability in accounting education. As shown in Table 2, journal articles dominate the publication types, accounting for 81.99% of the total documents, followed by conference papers (7.11%) and book chapters (6.87%). The overwhelming presence of journal articles signifies a strong emphasis on peer-reviewed contributions in this domain. The relatively lower representation of books and reviews suggests that the field is still primarily driven by article-based dissemination, with conference proceedings and book chapters supporting ongoing dialogue and curriculum discussions.

Table 2: Document Type

Document Type	Total Publications	Percentage (%)
Article	346	81.99%
Conference Paper	30	7.11%
Book Chapter	29	6.87%
Review	14	3.32%
Book	2	0.47%
Conference Review	1	0.24%
Total	**422**	**100.00**

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Source Types

The classification of source types offers insights into the platforms through which research on employability and accounting education is disseminated. As detailed in Table 3, journals are the predominant source type, accounting for 83.41% of all publications. This finding reflects the scholarly community's preference for peer-reviewed journal outlets to communicate empirical findings, theoretical frameworks, and curriculum innovations. The prominence of journals underscores their role in shaping discourse and knowledge dissemination in the field. However, the presence of conference proceedings and book series (a combined 12.32%) indicates that conferences and edited volumes also serve as meaningful avenues for presenting emerging trends, preliminary studies, and collaborative research in employability and accounting education.

Table 3: Source Type

Source Type	Total Publications	Percentage (%)
Journal	352	83.41%
Conference Proceeding	27	6.40%
Book Series	25	5.92%

Book	18	4.27%
Total	**422**	**100.00**

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Languages

Language analysis reveals the linguistic accessibility and global reach of scholarly work in the field. As presented in Table 4, the vast majority of the 422 publications were written in English (96.92%), reinforcing English as the dominant language of academic discourse in employability and accounting education. While English dominates, the presence of Spanish, Portuguese, and other European languages suggests a modest degree of regional diversification. This linguistic trend highlights the need for more inclusive research outputs and translations to encourage wider global participation and knowledge exchange in this important area of education.

Table 4: Languages

Language	Total Publications*	Percentage (%)
English	409	96.92%
Spanish	6	1.42%
Portuguese	4	0.95%
Bulgarian	1	0.24%
Polish	1	0.24%
Ukrainian	1	0.24%
Total	**422**	**100.00**

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Subject Areas

The subject area distribution offers a multidisciplinary perspective on how employability in accounting education is researched across academic fields. As shown in Table 5, the majority of publications fall under the categories of Business, Management and Accounting (72.27%) and Social Sciences (66.11%), reflecting the core disciplinary focus of this research domain. These findings highlight the interdisciplinary nature of employability research in accounting education. In addition to traditional business-related disciplines, areas such as computer science, psychology, and decision sciences also contribute, indicating the growing relevance of technological integration, behavioral studies, and analytical decision-making in preparing future-ready accounting graduates.

Table 5: Subject Area

Subject Area	Total Publications	Percentage (%)
Business, Management and Accounting	305	72.27%
Social Sciences	279	66.11%
Economics, Econometrics and Finance	85	20.14%
Computer Science	42	9.95%
Engineering	16	3.79%
Decision Sciences	15	3.55%
Arts and Humanities	13	3.08%
Environmental Science	8	1.90%
Psychology	7	1.66%
Energy	6	1.42%
Multidisciplinary	5	1.18%
Mathematics	3	0.71%
Agricultural and Biological Sciences	3	0.71%
Pharmacology, Toxicology and Pharmaceutics	1	0.24%
Nursing	1	0.24%
Health Professions	1	0.24%

Subject Area	Total Publications	Percentage (%)
Biochemistry, Genetics and Molecular Biology	1	0.24%

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Publication Trends

Publication Trends by Year

An analysis of annual publication trends provides insights into the evolution and momentum of research interest over time. As depicted in Table 6, research on employability in accounting education experienced a gradual rise in the early 2000s, with a significant surge beginning in 2015. The number of publications peaked in 2024 with 52 papers, reflecting heightened global focus on aligning accounting education with employment demands amid rapid technological and economic shifts. Notes: TP = Total Publications; NCA = Number of Contributing Authors; NCP = Number of Cited Publications; TC = Total Citations; C/P = Citations per Publication; C/CP = Citations per Cited Publication; h = h-index; g = g-index; m = m-index. The overall h-index of 45 and g-index of 71 indicate a strong cumulative impact of publications, particularly after 2010. Citations peaked in earlier years such as 2010 (583 citations) and 2009 (590 citations), demonstrating the enduring influence of foundational studies. The m-index of 1.731 suggests a healthy annual growth in research productivity and impact. This temporal growth corresponds with increased global concern over graduate employability and the digitalization of accounting practices. The upward trend suggests sustained academic attention to bridging the gap between classroom instruction and industry expectations.

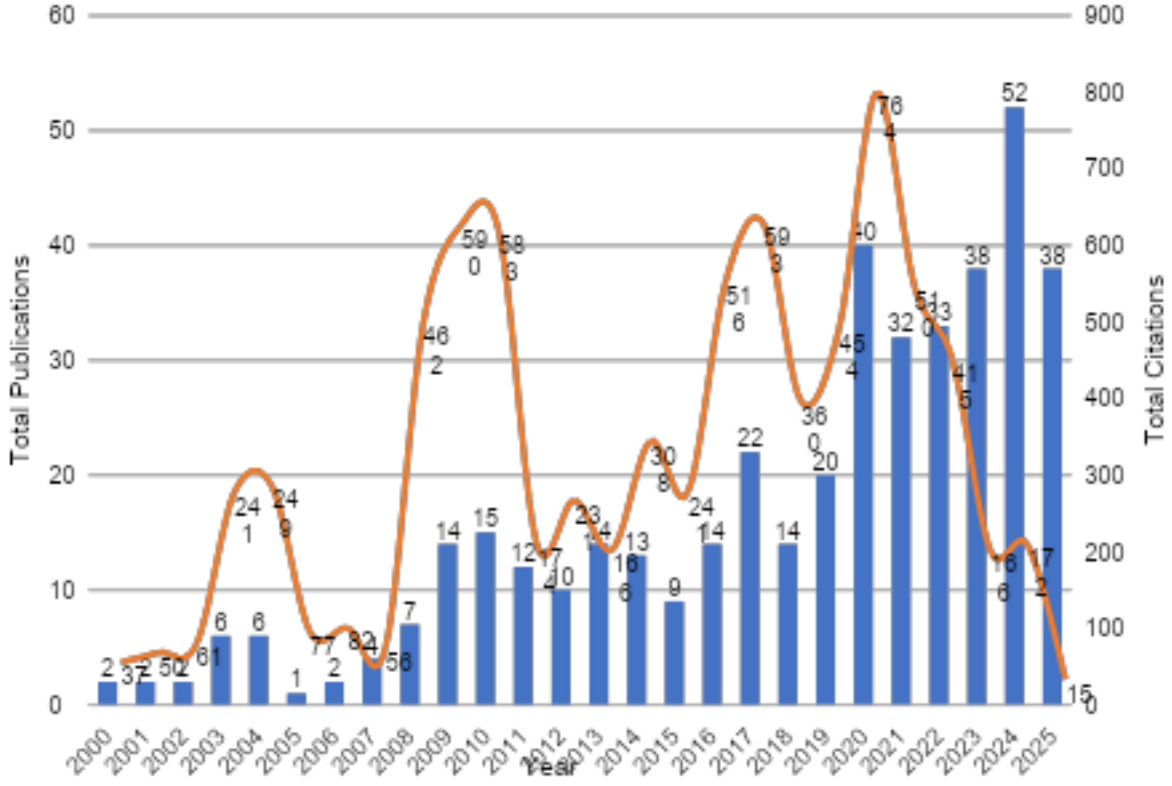
Table 6: Publication by Year

Year	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
2025	38	127	7	15	0.39	2.14	2	2	2.000
2024	52	145	31	172	3.31	5.55	6	11	3.000
2023	38	123	30	166	4.37	5.53	7	9	2.333
2022	33	76	31	415	12.58	13.39	13	19	3.250
2021	32	82	26	510	15.94	19.62	14	22	2.800
2020	40	97	34	764	19.10	22.47	13	27	2.167
2019	20	49	19	454	22.70	23.89	10	20	1.429
2018	14	36	13	360	25.71	27.69	8	14	1.000
2017	22	55	18	593	26.95	32.94	11	22	1.222
2016	14	35	14	516	36.86	36.86	12	14	1.200
2015	9	26	8	241	26.78	30.13	7	9	0.636
2014	13	39	10	308	23.69	30.80	8	13	0.667
2013	14	32	12	166	11.86	13.83	7	12	0.538
2012	10	22	10	231	23.10	23.10	7	10	0.500
2011	12	31	12	174	14.50	14.50	7	12	0.467
2010	15	31	15	583	38.87	38.87	9	15	0.563
2009	14	39	14	590	42.14	42.14	9	14	0.529
2008	7	22	7	462	66.00	66.00	5	7	0.278
2007	4	14	4	56	14.00	14.00	3	4	0.158
2006	2	5	2	82	41.00	41.00	2	2	0.100
2005	1	4	1	77	77.00	77.00	1	1	0.048
2004	6	13	6	249	41.50	41.50	6	6	0.273
2003	6	13	6	241	40.17	40.17	5	6	0.217
2002	2	8	2	61	30.50	30.50	2	2	0.083
2001	2	7	2	50	25.00	25.00	1	2	0.040
2000	2	2	2	37	18.50	18.50	2	2	0.077
Total	**422**	**1133**	**336**	**7573**	**17.95**	**22.54**	**45**	**71**	**1.731**

Notes: TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Figure 2 illustrates the annual trends in total publications and citations related to employability in accounting education from 2000 to 2025. The publication trend shows a steady increase over the 25 years, with a notable acceleration in output beginning around 2012. This upward trajectory suggests growing academic interest and recognition of employability as a critical dimension within accounting education. The rise aligns with global efforts to reform higher education curricula and respond to employer demands for work-ready graduates equipped with both technical and soft skills. The citation trend, meanwhile, follows a lagging but complementary pattern, with a noticeable surge in citations beginning around 2015. This suggests that earlier publications have gained influence over time and that recent research is now shaping the scholarly conversation more significantly. The peak in citations in recent years may also reflect the maturation of the field, where foundational studies are being frequently referenced in newer publications. The parallel growth of both publications and citations underscores the expanding relevance and scholarly impact of employability-focused research in the accounting education domain. Overall, the figure confirms that this area of study is not only gaining momentum but also making meaningful contributions to the academic and practical discourse on curriculum design, graduate competencies, and workforce readiness.

Figure 2: Total Publications and Citations by Year



Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Publications by Authors

Identifying the most prolific contributors offers valuable insights into the academic leadership shaping research on employability in accounting education. Table 7 lists the top authors based on total publications (TP), citations (TC), and impact indices (h, g, and m-indexes). Others have fewer than three publications. The top contributors are predominantly based in Anglophone countries, particularly the United States, Australia, and Canada. Authors such as Raef Lawson and Beverley Jackling are especially notable for producing highly cited works on competency-based accounting education and employer expectations.

The high citation-per-publication (C/P) values of over 80 for some authors underscore the impactful and influential nature of their contributions, despite relatively modest output. This suggests a focus on quality over quantity in this field, with a small number of well-cited publications shaping academic discourse.

Table 7: Most Productive Authors

Author's Name	Current Affiliation	Country	TP	NCP	TC	C/P	C/CP	*h*	*g*	*m*
Stout, David E.	Stout D.E.	United States	5	5	291	58.20	58.20	3	3	0.136
Sorensen, James E.	Sorensen J.E.	United States	4	4	277	69.25	69.25	3	3	0.250
Jackling, Beverley	Jackling B.	Australia	4	4	326	81.50	81.50	4	4	0.235
Lawson, Raef A.	Lawson R.A.	Jersey	4	4	361	90.25	90.25	3	3	0.250
De Lange, Paul	De Lange P.	Australia	3	3	272	90.67	90.67	3	3	0.176
Montaño, José Luis Arquero	Montaño J.L.A.	Spain	3	3	125	41.67	41.67	3	3	0.115
Schmulian, Astrid	Schmulian A.	South Africa	3	3	73	24.33	24.33	2	2	0.286
Boulianne, Emilio	Boulianne E.	Canada	3	3	65	21.67	21.67	1	1	0.100

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Publications by Countries

An analysis of country-level contributions reveals the geographic distribution of scholarly output and highlights regions actively engaged in research on employability in accounting education. As shown in Table 8, the United States leads with 84 publications, followed by Australia with 75 and South Africa with 38. These figures underscore the dominant role of the Anglo-Saxon higher education system, which has traditionally emphasized graduate competence and outcome-based education. While many other countries have contributed fewer than 10 publications, Asia is emerging as a significant research hub, with Malaysia and Indonesia each producing 27 publications. This trend reflects the growing commitment of developing nations to enhance graduate employability through accounting curriculum reform. The strong presence of South Africa in the top three further illustrates its active role in higher education transformation, while contributions from New Zealand and Canada reinforce the global nature of the discourse.

Table 8: The Top 10 Countries contributed to the publications

Country	Continent	TP
United States	North America	84
Australia	Oceania	75
South Africa	Africa	38
United Kingdom	Europe	28
Indonesia	Asia	27
Malaysia	Asia	27
New Zealand	Oceania	26
Canada	North America	23
Portugal	Europe	13
Thailand	Asia	10

Notes: TP = total number of publications
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Publications by Source Titles

The identification of the most active journals sheds light on the primary publishing venues for research on employability in accounting education and the potential visibility of future contributions. As shown in Table 9, the top source is *Accounting Education*, with 75 publications and 2,619 citations, making it the leading platform for scholarly dialogue in this field. The dominance of *Accounting Education* and *Journal of Accounting Education* confirms these journals as central publication venues for scholarship on curriculum design, graduate competencies, and education policy. Their high citation-per-publication rates also indicate their influence on practice and policy discussions. Moreover, sources such as *Meditari Accountancy Research* and *Higher Education, Skills and Work-based Learning* demonstrate growing contributions to cross-disciplinary conversations, especially concerning digital skills, soft skills, and work-based learning approaches.

Table 9: Most active source titles (Top 10)

Source Title	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
Accounting Education	75	204	72	2619	34.92	36.38	31	50	1.348
Journal of Accounting Education	32	81	30	977	30.53	32.57	14	31	0.583
Issues in Accounting Education	20	64	18	450	22.50	25.00	11	20	0.647
International Journal of Management Education	11	35	9	140	12.73	15.56	6	11	0.462
Advances in Accounting Education: Teaching and Curriculum Innovations	11	27	11	72	6.55	6.55	5	8	0.263
Meditari Accountancy Research	9	26	9	148	16.44	16.44	6	9	0.600
Higher Education, Skills and Work-based Learning	7	21	6	107	15.29	17.83	5	7	0.455
Journal of Higher Education Theory and Practice	7	18	5	15	2.14	3.00	3	3	0.429
Journal of Education for Business	6	10	6	290	48.33	48.33	5	6	0.217
Springer Proceedings in Business and Economics	6	14	1	1	0.17	1.00	1	1	0.167

Notes: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Highly Cited Documents

Examining the most highly cited publications provides a snapshot of the foundational and transformative works that have significantly shaped the field. As shown in Table 10, the top-cited articles often explore the skills gap between accounting graduates and employer expectations, curriculum reforms, and the integration of technology into accounting education. These highly cited documents serve as cornerstones of academic discussions on employability in accounting education. For instance:

- Kavanagh and Drennan (2008) emphasized discrepancies between students' self-perceptions and employers' expectations regarding required graduate skills.
- Lawson et al. (2014) proposed a widely referenced competency-based curriculum framework, stressing long-term career skills.
- Qasim and Kharbat (2020) illustrated the need to embed emerging technologies such as blockchain and AI into accounting training.

Overall, these studies reinforce the importance of aligning curricula with industry needs, integrating technological fluency, and fostering non-technical competencies to produce work-ready accounting graduates.

Table 10: Top 20 highly cited articles

No.	Authors	Title	Source Title	Cites	Cites per Year
1	Kavanagh M.H.; Drennan L. (2008)	What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations	Accounting and Finance	380	21.11
2	Jackling B.; De Lange P. (2009)	Do accounting graduates' skills meet the expectations of employers? a matter of convergence or divergence	Accounting Education	289	17.00
3	Bui B.; Porter B. (2010)	The expectation-performance gap in accounting education: An exploratory study	Accounting Education	203	12.69
4	Lawson R.A.; Blocher E.J.; Brewer P.C.; Cokins G.; Sorensen J.E.; Stout D.E.; Sundem G.L.; Wolcott S.K.; Wouters M.J.F. (2014)	Focusing accounting curricula on students' long-run careers: Recommendations for an integrated competency-based framework for accounting education	Issues in Accounting Education	176	14.67
5	Sledgianowski D.; Gomaa M.; Tan C. (2017)	Toward integration of Big Data, technology, and information systems competencies into the accounting curriculum	Journal of Accounting Education	144	16.00
6	Qasim A.; Kharbat F.F. (2020)	Blockchain technology, business data analytics, and artificial intelligence: Use in the accounting profession and ideas for inclusion into the accounting curriculum	Journal of Emerging Technologies in Accounting	138	23.00
7	Pincus K.V.; Stout D.E.; Sorensen J.E.; Stocks K.D.; Lawson R.A. (2017)	Forces for change in higher education and implications for the accounting academy	Journal of Accounting Education	125	13.89
8	Rebele J.E.; St. Pierre E.K. (2019)	A commentary on learning objectives for accounting education programs: The importance of soft skills and technical knowledge	Journal of Accounting Education	124	17.71
9	Dolce V.; Emanuel F.; Cisi M.; Ghislieri C. (2020)	The soft skills of accounting graduates: perceptions versus expectations	Accounting Education	122	20.33
10	Tan L.M.; Laswad F. (2018)	Professional skills required of accountants: what do job advertisements tell us?	Accounting Education	112	14.00
11	Dzuranin A.C.; Jones J.R.;	Infusing data analytics into the accounting curriculum: A framework and insights from faculty	Journal of Accounting Education	106	13.25

No.	Authors	Title	Source Title	Cites	Cites per Year
	Olvera R.M. (2018)				
12	Pan G.; Seow P.-S. (2016)	Preparing accounting graduates for the digital revolution: A critical review of information technology competencies and skills development	Journal of Education for Business	106	10.60
13	Mohamed E.K.A.; Lashine S.H. (2003)	Accounting knowledge and skills and the challenges of a global business environment	Managerial Finance	103	4.48
14	Tsiligiris V.; Bowyer D. (2021)	Exploring the impact of 4IR on skills and personal qualities for future accountants: a proposed conceptual framework for university accounting education	Accounting Education	102	20.40
15	Levant Y.; Coulmont M.; Sandu R. (2016)	Business simulation as an active learning activity for developing soft skills	Accounting Education	91	9.10
16	Blackmore J.; Gribble C.; Rahimi M. (2017)	International education, the formation of capital and graduate employment: Chinese accounting graduates' experiences of the Australian labor market	Critical Studies in Education	88	9.78
17	Palmer K.N.; Ziegenfuss D.E.; Pinsker R.E. (2004)	International knowledge, skills, and abilities of auditors/accountants: Evidence from recent competency studies	Managerial Auditing Journal	86	3.91
18	Wells P.; Gerbic P.; Kranenburg I.; Bygrave J. (2009)	Professional skills and capabilities of accounting graduates: The New Zealand expectation gap?	Accounting Education	85	5.00
19	Kerby D.; Romine J. (2009)	Develop Oral Presentation Skills Through Accounting Curriculum Design and Course-Embedded Assessment	Journal of Education for Business	83	4.88
20	Hassall T.; Joyce J.; Montaño J.L.A.; Anes J.A.D. (2005)	Priorities for the development of vocational skills in management accountants: A European perspective	Accounting Forum	77	3.67

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Co-occurrence Analysis of Author Keywords

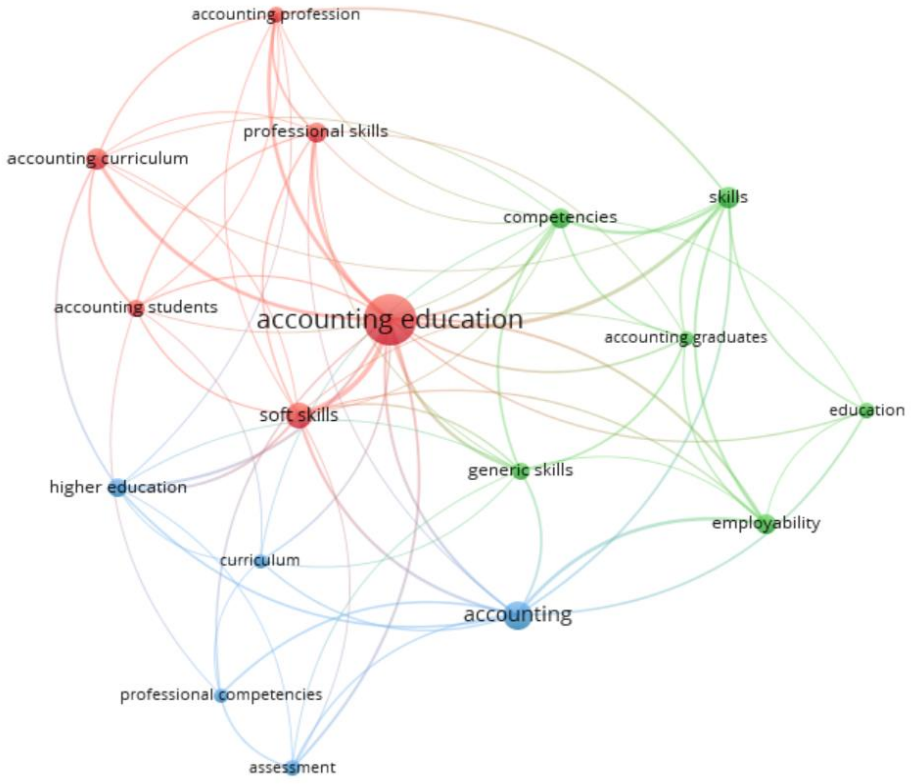
The network visualization in Figure 2, produced using VOSviewer with a minimum co-occurrence threshold of 10, illustrates the dominant research themes in employability and accounting education. By analyzing frequently co-occurring keywords, the map reveals a structured and interconnected research landscape, where key topics are grouped into color-coded clusters representing distinct thematic areas. The largest and most central cluster focuses on employability and skills development, featuring keywords such as *employability*, *soft skills*, *graduate attributes*, and *career readiness*. This reflects the core emphasis of the literature on non-technical competencies that are essential for preparing accounting graduates for today's workforce. The strong

link between *employability* and *soft skills* highlights the consistent recognition of attributes like communication, adaptability, and teamwork.

Another significant cluster focuses on accounting education and curriculum reform. Keywords like *curriculum*, *competency-based education*, and *learning outcomes* indicate a research focus on aligning academic programs with industry expectations. This cluster underscores the shift toward outcome-based learning and the integration of employability within curriculum design. A third emerging cluster relates to digital transformation, with terms such as *digital skills*, *data analytics*, and *artificial intelligence*. These indicate a growing focus on equipping graduates with technological capabilities in response to Industry 4.0. In addition, a cluster focusing on *professional development* and *work-based learning* reflects the importance of internships and experiential learning in enhancing workplace readiness.

The interconnectedness of these clusters suggests that employability is being examined through multiple, overlapping lenses—curriculum innovation, digital readiness, and skill development. The visualization confirms that employability is no longer an isolated topic but part of a broader effort to modernize accounting education and better prepare graduates for evolving professional demands.

Figure 3: Network visualization of the authors' keywords

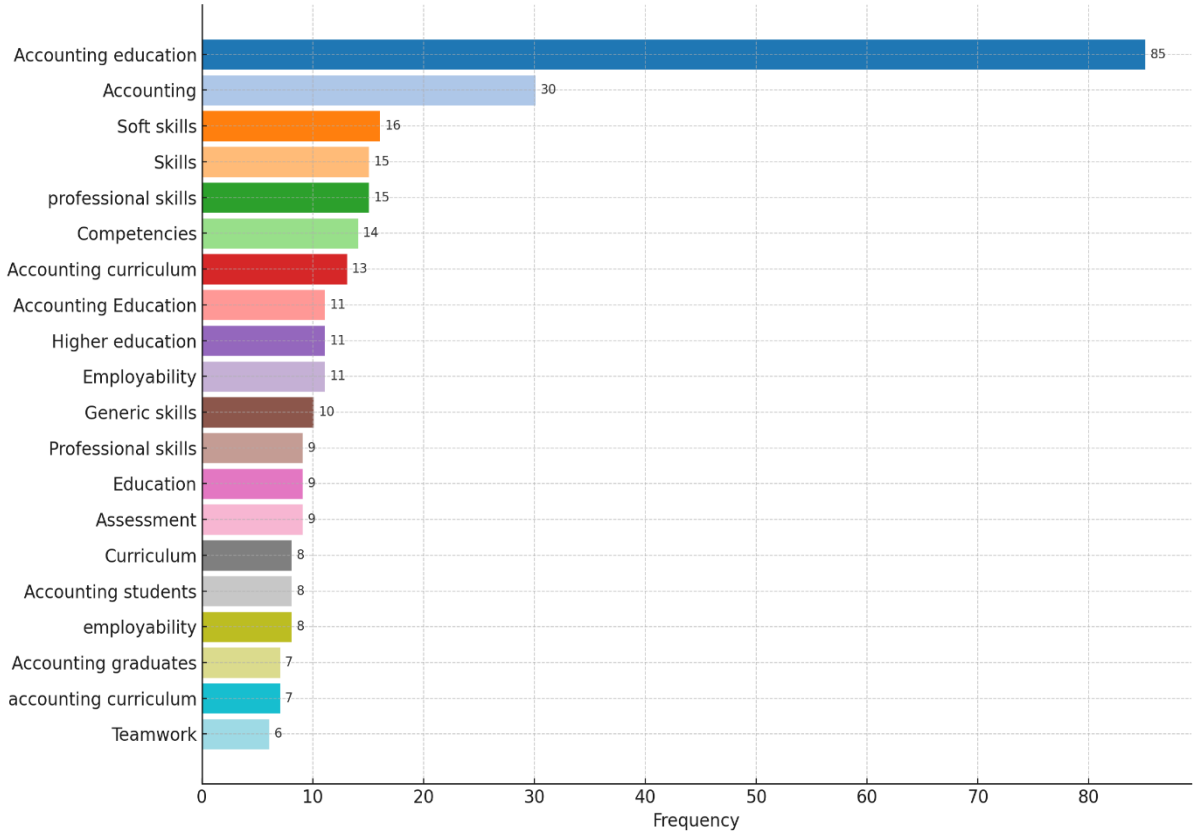


The bar chart in Figure 3, based on the analysis of the top 20 author keywords by document frequency, the term "Employability" was the most frequently used keyword, appearing in 88 documents, underscoring its central role in the research field. "Accounting education" followed closely with 75 occurrences, highlighting the academic context in which employability is often explored. The keyword "Skills" appeared 64 times, reflecting a broad focus on the capabilities required for graduate success. Terms such as "Curriculum" (58), "Graduate employability" (49), and "Soft skills" (42) further indicate a strong emphasis on aligning educational content with workforce needs and enhancing student readiness through targeted competencies. Keywords like "Higher education" (40), "Competency" (38), and "Professional skills" (36) suggest a broader institutional and pedagogical discourse around the preparation of accounting graduates. Meanwhile, the presence of terms such

as "Technology" (30), "Digital skills" (28), and "Industry 4.0" (25) points to a growing concern with digital transformation and the need for graduates to possess technological literacy. Emerging educational strategies are also reflected in keywords such as "Work-integrated learning" (21) and "Experiential learning" (18), which highlight practice-based approaches aimed at improving employability outcomes.

Overall, the frequency distribution of keywords illustrates a thematic convergence on curriculum reform, competency development, and adaptation to digital and professional demands—key priorities in the evolving discourse on employability in accounting education.

Figure 4: Frequency Distribution of Top 20 Author Keywords



5. Conclusion and Recommendations

This bibliometric review offers a comprehensive overview of global research on employability in accounting education, drawing on 422 publications indexed in the Scopus database from 2000 to 2025. The findings reveal a significant and growing body of literature that has evolved from early concerns about skill gaps and curriculum alignment to more recent emphases on digital transformation, technological integration, and graduate readiness in the context of the Fourth Industrial Revolution. Thematic analyses highlight four dominant research clusters: curriculum reform, soft skills development, digital competencies, and alignment between graduate attributes and employer expectations.

The concentration of research in English-speaking countries, particularly the United States, Australia, and the United Kingdom, demonstrates academic leadership in this domain. However, emerging contributions from developing nations such as Malaysia and Indonesia indicate increasing global engagement. Highly cited authors and journals, especially Accounting Education and the Journal of Accounting Education, play a central role in

shaping the discourse, reflecting the field's growing maturity through structured competency frameworks and empirical assessments.

These findings confirm that employability is no longer treated as a supplementary aspect of accounting education but rather as a core educational outcome. The increasing co-occurrence of keywords related to technology, skills, and curriculum innovation further supports the view that accounting education must adapt to meet the changing needs of the professional environment.

In light of these insights, several key recommendations can be made. First, curriculum designers should give priority to the integration of soft skills and digital competencies alongside technical accounting knowledge. Embedding experiential learning, data analytics, and ethical reasoning into learning activities will help prepare graduates for complex and technologically advanced workplaces. Second, institutions and policymakers should encourage international collaboration and comparative studies, especially as more developing countries begin to contribute meaningfully to the field. Lastly, researchers are encouraged to undertake longitudinal studies to evaluate the impact of employability-focused curriculum reforms and explore regional needs and innovations through cross-cultural inquiry.

Overall, this study provides a valuable foundation for advancing both scholarly research and practical reforms in accounting education. It calls for a future-oriented, skills-based approach that ensures accounting graduates are not only technically proficient but also adaptable, digitally fluent, and prepared for the evolving demands of the global workforce.

Acknowledgement: The authors would like to express their appreciation to the developers of biblioMagika® and VOSviewer for providing the bibliometric tools used in this study. Gratitude is also extended to the reviewers and colleagues whose insights helped improve the quality of this work. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Effect of Board Diversity on Firm Performance: An Exploration through Human Capital Theory

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Abstract: A crucial element of corporate governance that could affect organizational results and strategic decision-making is board diversity. The diversity of human capital has been recognized as important in ensuring corporate governance effectiveness. Finding opportunities, coming up with ideas, and overcoming blind spots are all made easier for a company and CEO when a diverse group of directors contributes a range of skills, knowledge, and information. The Human Capital Theory explains the value of individual attributes, where individuals from different backgrounds possess unique knowledge and abilities that contribute to productivity. Despite the growing interest in this topic, empirical findings remain inconsistent, calling for more conceptual exploration. The purpose of writing this paper is to explore the effect of board diversity on firm performance. This conceptual paper will explore the relationship by utilizing Human Capital Theory. Specifically, this paper examines how diverse boards could contribute to firm performance and the quality of governance. This paper also highlights the different outcomes in existing literature on these issues and proposes a direction for future research. Through the perspective of the Human Capital Theory, this paper identifies diversity as a strategic asset, where a variety of professional experiences, educational backgrounds, and demographic profiles support innovative capacity, board-level decision-making, and the caliber of oversight.

Keywords: *Board Diversity, Firm Performance, Human Capital Theory*

1. Introduction

The board of directors' composition emerged as a crucial issue in the discussion of corporate governance in the current globalized world, particularly in the competitive business climate. Board diversity has been associated with improved decision-making and business effectiveness. Numerous studies have indicated that a more diverse board enhances decision-making and business performance, as different companies have varied board structures, which have diverse effects on organizational decisions (Onyekwere & Babangida, 2021). Regardless of structure, a business that practices sound corporate governance can better assist the management in tracking and managing the company's assets.

The important role of the board of directors is to maintain sound corporate governance as they supervise the company's management and ensure that financial reporting is accurate. Therefore, for directors to play significant roles in each of the several components of a firm, a diverse group is required. The company and CEO can discover opportunities, generate ideas, and address blind spots when a varied set of directors contributes a range of abilities, knowledge, and experience to the table. A diverse board can also provide new perspectives and insights, encourage innovation and creativity, and promote idea sharing (Wang, 2022). Not only that, but the diversity of the board also reflects equality (Puntaier et al., 2022), which can influence the functionality of the board.

However, this diversity can still lead to issues in coordination and communication that cause disputes, leading to delays in decision-making, particularly in situations where there is uncertainty. Research on the relationship between board diversity and company performance has also produced conflicting results where some studies have found a positive correlation, while others have found none at all or even a negative one (Dong et al., 2023). Despite its growing prominence, empirical findings remain inconclusive, calling for more theoretical exploration.

This conceptual paper uses the Human Capital Theory as a framework to investigate the impact of board diversity on business performance and integrates recent studies from academic journals, online databases, and government and organizational reports.

2. Literature Review

Human Capital Theory

Considering the significant challenges of achieving economic growth through conventional elements of production, economist Becker empirically developed the Human Capital Theory in the 1960s (Sarto et al., 2019), which posits that individuals possess unique knowledge and abilities that contribute to productivity. (Becker, 1964). This concept explains the value of individual attributes. Given that the Human Capital Theory is widely accepted to enhance organizational performance, a key idea in value creation is that an organization depends on the skills, knowledge, and abilities of its employees (Wuttaphan, 2017). In relation to corporate governance, this theory suggests that board members contribute diverse human capital that has a direct impact on firm outcomes and strategic decision-making.

According to Saha & Maji (2022)Education is the most widely used indicator of human capital since it considers not only the knowledge that a person has gained but also their intelligence and proficiency in carrying out their tasks. In the governance setting, directors' educational backgrounds, industry expertise, and tenure are critical components of board effectiveness. (T. Wang, 2022). Therefore, the diversity of the board is not just a symbol; instead, it has real implications on the direction and performance of a business.

Board Diversity

To cultivate a range of demographic traits and characteristics within the boardroom, the board should be diverse. According to ACCA Global, this is primarily done to utilize the advantages that come with diversifying the board, which include enhanced investor relations, enhanced business reputation, better decision-making, and greater utilization of the talent pool. Board diversity is a concept that includes a variety of traits like demographics (e.g., gender, age, nationality), human capital (e.g., education, tenure, professional expertise), and social and cultural diversity (e.g., affiliation, external networks). One of the most important criteria in hiring board members is educational qualification as the board needs to perform highly-skilled tasks, necessitating the need to possess a particular degree of cognitive capacity (EmadEldeen et al., 2021).

There are conflicting effects of board diversity on company performance (Ooi et al., 2017), which come with their own set of advantages and disadvantages (Dong et al., 2023). According to the findings of Ali et al. (2023), a diverse board can improve group performance, increase decision-making, and lower business risk. It also successfully controls risk management operations. However, return on equity (ROE) and return on assets (ROA) are positively impacted by gender diversity on the board, according to Onyekwere & Babangida (2021). Meanwhile, a contrary finding reported that women on the board positively influence company performance whereas female executives negatively influence ROA, according to Simionescu et al. (2021). The result of the study by Lim et al. (2019) showed that greater gender diversity reduces firm performance, which may be due to tokenism and gender stereotypes.

Diversity can be categorized into demographics, human capital, social, and cultural dimensions (Li et al., 2025). These details of board composition affect governance outcomes in certain sectors, particularly in how risks are assessed, how the management is monitored, and how stakeholders are responded to by the board, which all play a role in increasing firm resilience and ethical conduct. Recent literature has also linked board diversity with improved stakeholder engagement and responsiveness to environmental, social, and governance (ESG) concerns (Kabir et al., 2023).

Firm Performance

In corporate governance research, firm performance, which includes both financial success and strategic effectiveness, is a key variable. According to the literature, firm performance encompasses both monetary and non-monetary metrics, such as strategic and operational success. Tobin's Q, ROE, ROA, and innovation output are often employed metrics to assess the performance of businesses (Dong et al., 2023; Kabir et al., 2023; Onyekwere & Babangida, 2021; Wang et al., 2024).

Performance and diversity of the board in Malaysian firms do not significantly correlate, according to Firew (2024), while Li et al. (2025) found that in multinational firms, diversity in education and nationality enhances risk management and innovation. Diversity by itself might not result in appreciable performance gains in the

absence of inclusive practices or active engagement, according to Firew (2024), who found no significant relationship. In the meantime, Li et al.'s (2025) study was in accordance with the Human Capital Theory, which highlights the strategic value of directors' unique backgrounds, abilities, and knowledge.

Based on the preceding discussion, there is a need for a more nuanced theoretical interpretation, as some studies indicate inconclusive or context-dependent findings, while others show positive relationships (K. Wang et al., 2024). Contradictory results point to the necessity of investigating how different types of human capital translate into decision-making value, going beyond diversity at the surface level.

3. Discussion

Even though the effect of board diversity on business performance has been thoroughly studied, its effects are frequently nuanced and situation-specific. According to the Human Capital Theory, board members' tenure, age, education, and experience add unique value. Several topics are covered in detail in this discussion, including the relationship between performance and board diversity, the dimensions of human capital, the integration of pertinent theories, the gaps in the literature, and pragmatic methods for reforming policies and corporate governance.

Board Diversity and Firm Performance

Positive Effects

An increasing amount of empirical evidence indicates that board diversity can enhance company performance by promoting wider viewpoints, lowering groupthink, and enhancing managerial oversight. For example, boards with gender diversity tend to be more attentive to stakeholder concerns and ESG priorities, which improves ethical governance and transparency (Kabir et al., 2023). Companies with diversified memberships' ROE and ROA have also shown improvement, particularly when inclusive board cultures are in place. In addition, nationality and educational diversity appear beneficial, driving innovation and adaptability in multinational corporations (Li et al., 2025). The following shows previous studies that found a favorable relationship between firm success and board diversity.

Author	Title	Research Objective	Findings
(Dong et al., 2023)	Board Diversity and Firm Performance: Impact of ESG Activities in China	to investigate the connection between firm success in relation to ESG activities and board diversity.	There is a strong and positive correlation between the company's success and the board's diversity, indicating that diverse boards are advantageous to companies. ESG initiatives are important, as is a favorable impact on the performance of businesses.
(Onyekwere & Babangida, 2021)	Board Diversity and Firm Performance: Panel Data Evidence from 12 Selected Commercial Banks in Nigeria	To investigate new data that will advance understanding of whether board diversity affects the financial performance of Nigerian listed banks.	Evaluating the study's findings, the ROA and ROE of banking institutions are significantly improved by a gender-diverse board.
(Puntaier et al., 2022)	Board Diversity as a Strategic Choice and Why It Should Matter to SMEs	To comprehend, from the standpoint of the top echelons, how the success of small and medium-sized firms (SMEs) is influenced by the diversity of nationalities and genders on their management boards.	Diversity in nationality and gender both improve company performance and are examples of upper-level traits that alter the mental and emotional dynamics of boards. While diverse boards help CEOs see things from a wider angle, larger boards may not necessarily result in improved performance.

(Saha & Maji, 2022)	Board Human Capital Diversity and Firm Performance: Evidence from Top Listed Indian Firms	to investigate the effects of board diversity in terms of gender and educational background on Indian companies' financial performance after adjusting for corporate governance and firm-specific factors.	Business financial performance is much enhanced when the gender and educational backgrounds of a board are diversified. There is a highly significant positive interaction effect between the gender and educational backgrounds of a company's board members and its financial performance.
(Ali et al., 2023)	Does Board Diversity Mitigate Firm Risk-Taking? Empirical Evidence from China	To explore the connection between board diversity and business risk as determined by cognitive-oriented factors (education, tenure, and expertise) and demographic factors (age, gender, and nationality).	Results indicate that a board with diversity improves the performance of the company and efficiently oversees risk management initiatives. Using the generalized method of moments, the results were found to be robust. A more diverse board can lower firm risk, enhance group performance, and facilitate better decision-making.

Mixed Evidence

Contrary to the above, the evidence from several studies shows that a positive relationship between board diversity and firm performance is not universally conclusive. In some cases, board diversity has shown neutral or negative correlations with firm performance, particularly when diversity is not matched with inclusion. For example, Firew (2024), in the Malaysian context, researchers found that gender diversity and firm efficiency have no significant effect and even noted negative effects in high sectors. K. Wang et al. (2024) Reported similar findings in Japan, attributing them to social norms and organizational culture that limit the influence of diverse members. These findings emphasize that diversity must be embedded within a supportive governance culture to realize its full potential. The following are studies that presented mixed evidence on the relationship between board diversity and firm performance:

Author	Title	Research Objective	Findings
(Kabir et al., 2023)	Board Gender Diversity and Firm Performance: New Evidence from Cultural Diversity in the Boardroom	In the context of European nations, this research contributes to the literature. By demonstrating that, despite numerous cultural constraints, a company's financial success can be enhanced by adding female board members.	Gender diversity's impact on boards on company performance is undermined by masculinity and high-power distance. ROE and ROA are statistically adversely affected by the gender-diverse board, although this effect is lessened by the strength of the distance index.
(T. Wang, 2022)	Board Human Capital Diversity and Corporate Innovation: A Longitudinal Study	To investigate how diversity affects board human capital on corporate innovation, and to examine the relationship between firm innovation and board diversity, as well as the moderating role of internal social capital.	Corporate innovation and board industry diversity have a curvilinear relationship. One important component of internal social capital is experience serving as a board co-tenure, which can improve corporate creativity and reduce the risk associated with board

			industry diversity.
(Simionescu et al., 2021)	Does Board Gender Diversity Affect Firm Performance? Empirical Evidence from Standard & Poor's 500 Information Technology Sector	to investigate how a company's financial and market success is impacted by gender diversity on boards.	Having a corporate board with women improves both business performance measures, aside from the ROA's proportion of female CEOs. The quantity and proportion of women on the board have a beneficial effect on the price-to-earnings ratio, according to the econometric results. Panel data is used to estimate the fixed effects and random effects. Nevertheless, ROA and board gender diversity did not statistically significantly correlate.
(EmadEldeen et al., 2021)	The Effect of Board Diversity on Firm Performance: An Empirical Study on the UK	To explore the effect of board composition, utilizing cross-sectional data from non-financial companies listed on the London Stock Exchange (FTSE 350), with a focus on the impact of board diversity on company performance, with a total of 3961 observations from 2000 to 2016.	Age diversity negatively affects business success; consequently, business performance is enhanced and improved by having young board members. Additionally, diversity in education has a detrimental impact on the performance of the business. On the other hand, gender diversity improves business performance, so if the board of directors has more female members, business performance will rise. Ultimately, diversity in nationality improves business performance.
(Ooi et al., 2017)	The Influence of Board Diversity in Human Capital and Social Capital in Crisis	To determine whether social and human capital diversity on boards can effectively mitigate the negative impact of crises on corporate performance.	Diversity on boards in terms of human and social capital does not substantially enhance business performance; however, it considerably lessens the detrimental consequences of crises that impact the performance of the company. The effects of having a varied board differ from those of abrupt and gradual crises. Board diversity has nonlinear impacts when handling unexpected emergencies. The only way to effectively handle a slow catastrophe is to have a diverse board with strong external connections.

(Lim et al., 2019)	Women Directors and Performance: Evidence from Malaysia	To investigate the relationship between Malaysian listed companies' financial results and the proportion of female board members.	Higher levels of gender diversity result in reduced company performance, possibly due to gender stereotypes and tokenism.

Human Capital Dimensions of Diversity

The Human Capital Theory emphasizes that individuals possess unique attributes, such as education, skills, and experience. Each of these unique attributes plays a crucial role in influencing productivity. The idea that board diversity enhances firm performance when diverse human capital is strategically utilized is supported by this theory.

Educational Background

One of the characteristics that significantly influences decisions made at the board level is educational background. Directors with a variety of academic backgrounds offer a range of strategic thinking and analytical techniques. Boards with interdisciplinary education are better at encouraging innovation, especially in technology-driven industries, according to Wang (2022). However, EmadEldeen et al. (2021) Warned that if not controlled, too much educational diversity can weaken cohesiveness.

Professional Experience

Through industry-specific knowledge and external networks, professional experience enhances a company's performance. Diverse directors improve strategic oversight by contributing risk perspectives and insights into the border market. Li et al. (2025) showed that, when in line with company strategy, career diversity among board members has a positive impact on governance outcomes in multinational corporations.

Age and Tenure

The benefits of age and tenure diversity are complementary. While younger members contribute new perspectives and digital fluency, senior directors frequently have institutional memory and stability. A dynamic governance environment is created by tenure diversity, which guarantees a blend of fresh perspectives and seasoned knowledge. Although balanced age diversity is typically linked to better board performance, (Gardiner, 2024) noted that both the financial and non-financial performance of a firm can yield different outcomes when it comes to generational differences.

Theoretical Integration and Gaps

Related theories

Although Human Capital Theory offers a solid basis for comprehending the benefits of board diversity, incorporating additional theories aids in the explanation of inconsistent results. According to the Agency Theory, companies with diverse boards are more capable of monitoring executive behavior and reducing agency costs because different perspectives deter managerial opportunism (Adams & Ferreira, 2009). Diversity strengthens adaptability by increasing a firm's access to strategic resources and external networks, according to Resource Dependency Theory (Hillman et al., 2000). However, if boards lack inclusive cultures, diversity may result in subgroup formation and cognitive conflict, according to the Social Identity Theory (Tajfel & Turner, 1986).

Research Gaps

Significant research gaps are noted in existing literature. A large portion of the published literature is based on cross-sectional data, which restricts the understanding of causality. Intersectional analyses are seldom examined, such as the joint influence of gender and professional experience on governance. Diversity in social capital and culture is also understudied despite being essential to comprehending board dynamics. Because of their concentrated ownership and diverse regulations, emerging markets like Malaysia pose particular governance challenges, necessitating region-specific research.

Implications for Practice and Policy

Corporate strategy

Companies must match recruitment and retention tactics with overarching business goals to optimize the benefits of having a diverse board. This entails creating inclusive governance cultures, encouraging underrepresented groups to pursue leadership roles, and assessing board performance using both demographic and cognitive contributions. Diversity ought to be seen as a source of strategic advantage instead of a list of requirements for compliance.

Policy Development

The role of policymakers is also crucial. Although they allow for contextual flexibility, soft regulatory frameworks such as Malaysia's Corporate Governance Code (MCCG) can encourage businesses to implement voluntary diversity practices. Requirements for board composition disclosure can improve stakeholder trust and transparency. Supporting programs that help diverse candidates—especially women and minorities—develop their leadership abilities will guarantee that businesses can access skilled talent without resorting to restrictive definitions of qualification.

4. Conclusion and Recommendations

Diversity on the board has become a dynamic aspect of corporate governance and is directly tied to the performance of the business. From the perspective of Human Capital Theory, this paper identifies diversity as a strategic asset, where a variety of professional backgrounds, educational backgrounds, and demographic profiles support innovative capacity, board-level decision-making, and the caliber of oversight. The empirical data reviewed revealed a complex and sometimes contradictory relationship. Some studies showed neutral or negative results, particularly in settings without inclusive governance cultures, while others emphasized the advantages of gender, nationality, and diversity in human capital on performance. Because of this, the relationship between performance and diversity is not always linear; rather, it depends on contextual factors such as organizational procedures and cultural beliefs.

Companies must align the composition of their boards with their strategic goals and create inclusive cultures that allow a variety of directors to contribute significantly if they want to move beyond superficial diversity. Those who sit at the table and their level of decision-making power determine effective governance. Policymakers and regulators complement each other by promoting transparency, giving underrepresented groups leadership opportunities, and presenting diversity as a business need rather than a compliance exercise. To fully reap the benefits of board diversity, strategic action is required in the academic, corporate, and policy domains. Beyond demographic representation, companies should prioritize inclusive board environments that create cultures where different viewpoints can influence how decisions are made.

In the meantime, policymakers are essential in guiding this change in the interim. By adding specific requirements for board diversity to soft law frameworks like the MCCG, accountability can be increased while preserving flexibility. Compulsory disclosures regarding the composition of the board encourage transparency and encourage companies to set measurable diversity targets. Additionally, financing governance education that develops pipelines for minority leadership will support sustainable diversification.

Lastly, researchers are encouraged to continue the discussion by conducting longitudinal studies that show how diversity evolves and affects performance over time. Examining intersectional dimensions, such as the combined effects of gender, age, and professional experience, can reveal subtle patterns in board behavior. Therefore, research needs to be increased to develop inclusive, globally relevant governance models.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Balancing Growth and Sustainability: The Role of Carbon Tax in Malaysia

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Abstract: This concept paper examines the crucial role of the carbon tax as a novel policy tool to strike a balance between economic development and environmental sustainability in Malaysia. The primary objective of this paper is to investigate the potential of carbon taxation to curtail carbon emissions in Malaysia without compromising its economic growth. This study adopts a qualitative approach, incorporating an extensive review of existing literature on carbon taxation, its implementation experiences in other countries, and Malaysia's current environmental and economic landscape. The analysis reveals that carbon taxation has the potential to incentivize carbon-emitting industries to adopt cleaner technologies and sustainable practices while generating revenue for environmental initiatives. The findings suggest that a carefully designed and well-implemented carbon tax policy can lead to a more sustainable development path for Malaysia. This paper contributes to the body of knowledge by presenting a comprehensive analysis of the potential of carbon taxation to address climate change issues in the country. The originality lies in bridging the gap between economic growth imperatives and the need for sustainable environmental practices, particularly in the context of an emerging economy. This paper offers valuable guidance to policymakers, businesses, and other stakeholders involved in shaping Malaysia's environmental and economic policies. By understanding the potential benefits and challenges of carbon taxation, policymakers can design effective and efficient policies that foster economic growth while mitigating the adverse impacts of climate change. Moreover, businesses can strategize for a greener future, ensuring long-term competitiveness and sustainability in the global market.

Keywords: *Carbon tax, economic growth, sustainability, environmental policy, climate change*

1. Introduction

Climate change and environmental challenges have emerged as critical global issues that demand immediate attention and action. The accelerating pace of carbon emissions, primarily driven by industrialization and economic growth, has significantly contributed to the planet's deteriorating ecological balance (Smith & Johnson, 2021). The Intergovernmental Panel on Climate Change (IPCC) has consistently highlighted the consequences of rising global temperatures, including extreme weather events, sea-level rise, and biodiversity loss (IPCC, 2018). Many countries have made various efforts to minimise and control pollution (Tan et al., 2022). The green economy promotes economic activities that aim to lower pollution and carbon emissions, enhance the efficiency of energy transitions and resource use, and minimize harm to ecosystems (Sulistiyanti & Falikhatun, 2023). A key strategy for achieving the objectives of a green economy is to impose taxes on environmentally damaging practices or offer incentives for sustainable initiatives (Nobanee & Ullah, 2023).

Carbon tax has been introduced since the early 1990s in countries like Finland, Sweden, Norway and followed by 36 countries to date (see Table 1). In South East Asia, Singapore and Indonesia are leading countries in establishing carbon pricing policies, while countries like Brunei, Thailand and Vietnam have announced plans to implement carbon tax. Malaysia, like many other developing nations, is confronted with the pressing need to address these challenges while ensuring continued economic progress. As a signatory to international agreements such as the Paris Agreement, Malaysia has acknowledged the urgency to reduce its emissions intensity by 45% by 2030 (relative to its 2005 levels) as part of its Nationally Determined Contributions (NDCs) (George, 2024). In 2022's Budget, the Voluntary Carbon Market Initiative was introduced to support more carbon reduction projects evidencing a well-designed carbon market. Following this, Bursa Malaysia has launched the Bursa Malaysia Carbon Exchange, the first carbon credit auction in March 2023 as a response to more transparency in pricing mechanisms and carbon credit trading in the country. More importantly, the most recent development towards encouraging the use of low-carbon technology is the announcement to introduce a carbon tax on the iron, steel and energy industries by 2026 in the 2025 Malaysia Budget (Ikram, 2024). It is

a type of levy imposed on emissions of environmentally polluting gases from the consumption of fossil fuels such as coal, petroleum as well as natural gas (see Baumol and Oates, 1988; Koppl and Schratzenstaller, 2023). The implementation of a carbon tax will establish a monetary value for each metric ton of carbon dioxide (CO_2) emissions, beginning at an initial rate of RM45 per ton, with gradual increases anticipated over time. Revenue generated from this taxation is intended to be reinvested by the government into environmentally sustainable initiatives, thereby encouraging businesses to adopt low-carbon operational practices.

Table 1: List of countries that have implemented carbon tax globally

Region	Country	Carbon Tax Rate (USD/tCO2e)	Year Introduced
Europe	Sweden	145	1991
	Switzerland	136	2008
	Liechtenstein	136	2008
	Norway	90	1991
	Finland	85	1990
	France	49	2014
	Ireland	45	2010
	Luxembourg	43	2021
	Netherlands	46	2021
	Portugal	26	2015
	Slovenia	19	1996
	Spain	16	2014
	Estonia	2	2000
	Poland	0.1	1990
	Ukraine	1	2011
	Germany	55	2021
	Austria	55	2022
	United Kingdom	23.65	2013
Asia	Singapore	19	2019
	Japan	2.36	2012
	South Korea	18.75	2015
	Kazakhstan	1.08	2013
	Thailand	5.5	2025
Americas	Canada	80	2019
	Argentina	4.99	2018
	Chile	5	2017
	Colombia	5.01	2017
	Mexico	3.72	2014
	Uruguay	137	2019
Africa	South Africa	9	2019

Source: Compiled by authors using data from the World Bank Carbon Pricing Dashboard (World Bank, 2025) ICAP Carbon Market Reports (ICAP, 2024) and Tax Foundation (2025).

2. Literature Review

Carbon taxation is a cornerstone of climate policy, aiming to internalize societal costs of CO_2 emissions via price signals. While incentivizing reduced emissions, such a policy serves both environmental and economic objectives as portrayed in the Pigouvian and Double Dividend theory. The Pigouvian tax concept posits that the

government should impose taxes on activities that lead to negative externalities. From this perspective, a Pigouvian carbon tax is introduced to internalize the external costs of carbon emissions by pricing them appropriately. Based on Parry, Veung, and Heine (2015), a well-designed carbon tax set equal to the marginal social cost of carbon can lead to a socially optimal level of emissions. The Pigouvian approach aligns private incentives with social welfare, making it a cornerstone of environmental tax policy.

Furthermore, the Double Dividend theory states that carbon taxes can yield two types of gains (dividends): environmental dividend due to reduced greenhouse gas emissions, and economic dividend which is led by the efficiency of the tax system or reduced distortionary taxes. Previous literature reported mixed results on the double dividend hypotheses (Freire-González, 2018). Yamazaki (2017) in his study of the British Columbia revenue-neutral carbon tax reported a positive impact on employment hence supporting the double dividend hypothesis. In another study, Lin and Li (2011) conducted an empirical study on 17 OECD countries and found that carbon taxes contributed to significant reductions in per capita CO_2 emissions, with no statistically significant negative impact on GDP. Similarly, Metcalf and Stock (2020), using macroeconomic indicators from various countries, found that carbon taxes had neutral to slightly positive effects on economic growth, particularly when revenue recycling was employed to offset labor or income taxes.

Moreover, Andersson (2019), in his study of the carbon tax in Sweden, evidenced that carbon emissions declined by 11% without hindering economic development, suggesting that robust institutional frameworks and revenue recycling can support both sustainability and growth. The study further highlighted that with appropriate compensatory policies, carbon taxation can lead to increased efficiency and a gradual shift toward a low-carbon economy. In addition, Nakamura, Yang, and Watanabe (2023) posit that while short-term growth may be affected, long-term positive effects are evident when carbon tax revenues are reinvested in renewable energy and public infrastructure. This further supports the idea that carbon taxes can drive green innovation, create new economic opportunities and foster technological advancement. On the other hand, Hong, Huang, Li, and Tsai (2018) found that environmental taxes produce a short-term double dividend, but benefits decline in the medium to long run unless coupled with R&D and structural reform to sustain innovation A more recent literature, Piluso and Rau (2025) proposed a Keynesian model showing that a carbon tax can produce a triple dividend: environmental gains, employment gains, and economic stability (i.e. reduced macroeconomic instability).

In Malaysia, economic growth has been a top priority to uplift the living standards of its citizens and enhance its position in the global economy (Ministry of Finance, 2019). Rapid economic growth and urbanisation—especially driven by expansion of manufacturing and transportation sectors, are closely linked to increasing carbon emissions. Tan et al. (2020) conclude that the growth-oriented approach in ASEAN countries, including Malaysia, has led to higher energy consumption and environmental impact, reinforcing concerns about sustainability and carbon-intensive industrial development. To mitigate the adverse impacts of climate change and preserve natural resources for future generations, Malaysia must adopt strategies that reconcile economic expansion with sustainable practices. However, striking a balance between economic growth and environmental sustainability remains a complex endeavor. The primary purpose of this paper is to explore the role of carbon taxation as an innovative policy tool to address climate change and balance economic growth with environmental sustainability in Malaysia. The specific research objectives are as follows:

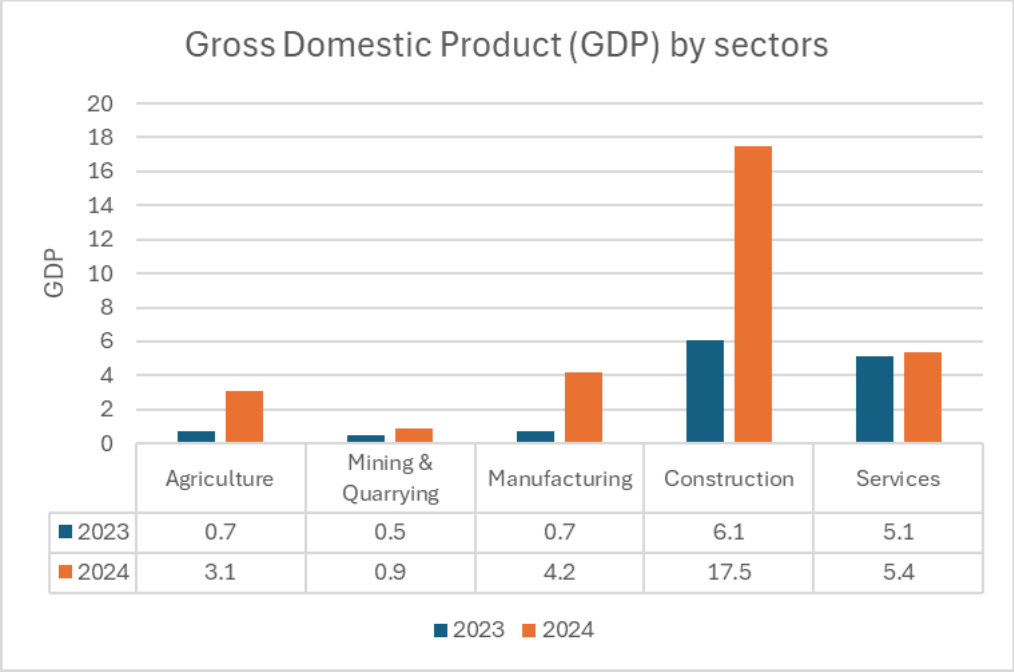
- To examine the theoretical foundations of carbon taxation and its potential implications for curbing carbon emissions in Malaysia.
- To assess the economic and environmental challenges faced by the country in the context of climate change.
- To identify barriers and opportunities for implementing carbon taxation in Malaysia, considering its unique socio-economic and political landscape.
- To propose recommendations for designing an effective and sustainable carbon tax policy that aligns with Malaysia's economic objectives and environmental goals.

Carbon Taxation and Economic Growth in Malaysia

Malaysia, a middle-income country is considered the leading economy in Southeast Asia. Its economy was traditionally driven by the exportation of raw materials including rubber, palm oil and petroleum. Yet, the nation's economic trajectory has changed into a highly industrialised and diversified economy. In 2024, Malaysia's GDP reached RM1.93 trillion at current prices and RM1.65 trillion at constant prices, positioning the country at 38th place globally. Overall, the Malaysian economy recorded a successful expansion of 5.1% in 2024, up from 3.5% in the previous year. The services and manufacturing sectors continued to serve as the main drivers of Malaysia's GDP, collectively contributing 82% to the national output. In addition, sectors such as agriculture, mining and quarrying, and construction also supported economic performance.

As illustrated in Figure 1, all key economic sectors in Malaysia recorded positive growth in 2024 compared to the previous year. The agriculture sector expanded by 3.1%, a significant improvement from 0.2% in 2023. The mining and quarrying sector also saw a modest increase, rising by 0.4 percentage points to reach 0.9% growth in 2024. Meanwhile, the manufacturing sector recorded a growth rate of 4.2%, indicating a strong rebound. The most notable increase was observed in the construction sector, which surged from 6% in 2023 to an impressive 17% in 2024. The strong growth in the construction sector was fueled by double-digit expansion across all its sub-sectors. Leading the way were specialised construction activities, which jumped by 21.0% (up from 6.6% in 2023), followed by civil engineering, which grew 16.3% (compared to 14.5% previously), and residential building, which saw a remarkable increase of 18.8%, a sharp rise from just 2.4% in the previous year.

Figure 1: Gross Domestic Product according to sectors, 2023-2024



	Agriculture	Mining & Quarrying	Manufacturing	Construction	Services
2023	0.7	0.5	0.7	6.1	5.1
2024	3.1	0.9	4.2	17.5	5.4

Source: The Malaysian Economy in Figures 2024 (Ministry of Economy, 2024)

An increase in GDP is an indicator of economic expansion and more productivity of goods and services by the country. Moreover, the current GDP shows that Malaysia's economy is healthy, and it leads to many positive impacts such as greater government revenues, increased employment and higher personal income. Despite so many benefits being offered, there must be some negative sides to it.

Due to a highly industrialized economy, the environment has been impacted in terms of the emission of carbon. According to the International Energy Agency, in 2022, Malaysia ranked 10th in the regional ranking for carbon dioxide (CO_2) emissions from fuel combustion. The activity of burning fossil fuels in the energy sector is identified as the major contributor to the CO_2 emissions. Moreover, in 2023, the amount of carbon dioxide (CO_2) emissions from energy consumption in Malaysia had also increased from the previous year, which was

approximately 284.7 million metric tons (Statista, 2024). This shows that the carbon emission in Malaysia is significantly contributed by the energy sector, as it emits the highest amount of CO2.

The industrial sector of manufacturing also contributes to the environmental issue due to its similarity to the energy industry where they use fossil fuels and natural resources to produce goods and services (Das Neves Almeida, Cruz, Barata & García-Sánchez, 2017). The other industries that commonly contribute to the large amount of CO2 emissions are the electricity and heat production industry and the transportation sector. The usage of fossil fuels such as gasoline and diesel by vehicles will lead to an increased amount of carbon emissions. Another industry that contributes to carbon emissions is the construction industry. More carbon will be released by this industry, especially during the usage of energy to power up the buildings (Liat et al., 2022). The emissions are generally from materials extraction, transportation, production, consumption, and disposal of debris (Yan, Shen, Fan, Wang, & Zhang, 2010).

All the discussed industries which are directly involved in carbon emissions are among the main active key sectors that contribute to the growth of Malaysia's GDP. Thus, it seems to align with the study by Cracolici, Cuffaro, and Nijkamp (2010) as they found a positive correlation between GDP growth and CO2 emission. Thus, it is necessary to find a balance between economic growth and the sustainability of ecosystems.

3. Environmental Sustainability and Carbon Taxation

Malaysia is among the developing countries that are committed to reducing their carbon emissions. Consistent with the Paris Agreement, Malaysia vowed to achieve its goal of net-zero carbon emissions by 2050. Currently, the Malaysian government plans the use of clean, sustainable and renewable energy (Yahoo, Salleh, Chatri, & Huixin, 2024) as part of achieving the goal of carbon intensity reduction which aims to reduce carbon emission intensity against GDP by 45% by 2030. To meet the goal. For the second goal, Tenaga Nasional Berhad will play an important role to help the government by coming out with the National Energy Transition Roadmap (NETR). This comprehensive plan was launched in 2023 where there will be a transition from fossil fuels to renewable energy sources. The goal of this roadmap is to produce 70% renewable energy by 2050.

To achieve its environmental and sustainability goals, the Malaysian government has considered adopting a carbon pricing strategy, such as the implementation of a carbon tax. A carbon tax is a relatively simple and effective policy tool that can be applied to both individuals and small businesses, requiring them to pay for the carbon emissions they produce (Carattini, Carvalho, & Fankhauser, 2018). Economists widely support this approach, as it creates a financial incentive to reduce emissions and encourages more environmentally conscious behavior (Goulder & Parry, 2008; Baranzini et al., 2017). Moreover, a carbon tax does not impose a financial burden on the government. On the contrary, it can generate additional national revenue while promoting environmental responsibility. At the same time, it serves as a practical measure to lower carbon emissions, aligning Malaysia with international best practices.

Introducing a carbon tax in Malaysia is likely to have significant economic implications. Imposing such a tax on the energy sector would increase the cost of fossil fuels, making renewable energy sources more attractive to consumers. As fossil fuel prices rise, carbon emissions are expected to decline due to a shift toward cleaner alternatives. In the transportation sector, a similar effect may occur. Higher fuel costs could lead to increased transportation expenses, prompting vehicle owners to consider electric vehicles (EVs) and encouraging commuters to utilize public transportation more frequently, both of which contribute to reducing carbon emissions. However, these benefits may come with economic trade-offs.

The carbon tax could raise overall energy prices, placing a financial burden on households and potentially leading to a higher cost of living. For the manufacturing industry, companies might respond by optimizing their use of materials and energy to minimize emissions and reduce their tax liability. This shift could encourage greater efficiency and innovation, though it may also require upfront investment and operational adjustments.

Therefore, the Malaysian government must carefully evaluate the implications of implementing a carbon tax, as such a policy could have far-reaching effects on both the national economy and the well-being of its citizens. While the primary aim of carbon taxation is to reduce greenhouse gas emissions and promote a more

sustainable future, it is crucial to recognize the potential economic burden it may impose on households and businesses, particularly in the form of increased energy prices and a higher cost of living. A useful case study can be drawn from Australia's experience. In 2012, the Australian government introduced a carbon tax with the goal of curbing emissions and encouraging greener practices. However, the policy was met with widespread public concern, mainly due to rising household expenses and increased operating costs for businesses. The tax faced intense political opposition and public backlash, ultimately leading to its repeal in 2014 (Chow, 2024). This experience highlights the importance of understanding and addressing the socioeconomic impacts of carbon taxation before implementing it on a national scale.

4. Challenges and Implementation Issues of Carbon Tax

This section identifies potential challenges and barriers in implementing a carbon tax in Malaysia, drawing insights from other countries' experiences. The introduction of a carbon tax in Malaysia is a strategic move to reduce greenhouse gas emissions and achieve sustainability goals. This policy is emphasised in the Twelfth Malaysia Plan (2021–2025) and emphasises the need for a balanced approach to revenue generation and sectoral impacts. The carbon tax is seen as a viable solution to address persistent environmental problems and improve the country's environmental performance index (Hasnu & Muhammad, 2022). Malaysia has set a target to reduce carbon emissions by 45% by 2030, which requires a robust climate policy, including a carbon tax (Ariffin, Saad, & Mustaphanin, 2024). Compared to regional competitors such as Singapore, which introduced a carbon price in 2019, Malaysia is far behind. Malaysia's carbon tax policy is still in the preparatory phase but has significant potential to drive emissions reductions while promoting sustainable development. Its success will depend on careful policy design, addressing public concerns and learning from international experiences. Modelled on successful models in Denmark, Switzerland and France, the Malaysian carbon tax is intended to reduce carbon emissions and promote the development of green technologies (Hasnu & Muhammad, 2022). Hence, carbon taxes incentivise companies to innovate and find cost-effective ways to reduce emissions. This can encourage the development of new technologies and business models that are more environmentally sustainable. However, the introduction of a carbon tax in Malaysia comes with several challenges and complexities. Overcoming these challenges is an essential prerequisite for successful policy implementation.

Public Acceptance

Malaysia faces numerous obstacles in gaining public support for the carbon tax, mainly due to trust deficits, economic concerns and communication methods. Public acceptance is a critical factor in the feasibility and success of a carbon tax policy. It refers to the extent to which individuals and communities support, tolerate or oppose the implementation of these policies. Acceptance depends on whether the policy is seen as fair and transparent. Understanding public acceptance is critical because it affects compliance, policy feasibility, and the overall effectiveness of carbon taxes in achieving environmental goals.

Furthermore, the introduction of carbon in Malaysia raises questions about trust in the government. Trust in government is critical to public acceptance of the environmental tax. Public trust in government institutions plays a crucial role in shaping attitudes towards carbon taxes. Citizens are more likely to support the measures if they believe that policymakers will use the revenues responsibly and transparently. In addition, investments in green infrastructure, such as public transport and renewable energy, can facilitate behavioural change and increase acceptance. Conversely, perceptions of corruption or mismanagement can weaken support. In Malaysia, factors such as ethnic diversity, religious values and community identity can influence attitudes towards carbon taxes.

Public trust in institutions is often fragile; hence, involving stakeholders in policy design and communicating the benefits of carbon taxes can increase legitimacy. Insufficient involvement of affected sectors in policy design can exacerbate resistance and hinder effective implementation (Wijaya, 2023). Public education campaigns that emphasise the environmental benefits of carbon taxes and the urgency of climate action can also activate these values. Public campaigns that educate citizens about how carbon taxes reduce emissions and combat climate change can increase acceptance, especially in regions with lower environmental literacy. If these campaigns are tailored to Malaysia's particular climate challenges, such as flooding and biodiversity loss, they could resonate with the public (Muhammad, Hasnu, Ibrahim, Abdul Hamid, & Mohd Hanefah, 2022).

Highlighting Malaysia's particular vulnerabilities, such as rising temperatures and flood risks, can contextualise the urgency of carbon taxes. Hence, raising awareness of Malaysia's vulnerability to climate change, such as sea level rise or extreme weather conditions, can encourage support for emission-reducing measures (Muhammad, Hasnu, & Ekins, 2021).

Public acceptance is a multi-faceted challenge that can only be met with a holistic approach. By addressing economic concerns, building trust through transparency, improving environmental knowledge and respecting cultural values, Malaysia can increase public support for a carbon tax. A carefully designed and comprehensive implementation strategy can turn opposition into advocacy and ensure that the policy makes a meaningful contribution to Malaysia's climate and sustainability goals.

Economic burden

The introduction of a carbon tax in Malaysia represents a major opportunity to combat climate change and achieve the country's sustainability goals. However, the economic burden associated with such a policy comes with challenges that need to be carefully managed to ensure successful implementation. These challenges include the financial impact on households, businesses and industry, as well as broader concerns about economic competitiveness and social equity. Carbon taxes are often criticised for their regressive effect. Companies and industries, especially energy-intensive ones, face major challenges in adapting to carbon taxation. Sectors such as manufacturing, transport and the oil and gas industry, which form the backbone of the Malaysian economy, are likely to face higher operating costs. These additional costs could affect their competitiveness in global markets, especially for export-oriented industries. In addition, small and medium enterprises (SMEs) may lack the financial resources to invest in energy-efficient technologies, making them particularly vulnerable to the impact of the tax (Pegels, 2016).

Companies could face higher costs compared to countries without a carbon tax, which could potentially cause them to relocate. Semet (2024) opined that carbon taxes can disproportionately affect low-income households, leading to public opposition and calls for equalisation strategies. In Malaysia, where socio-economic inequalities are significant, understanding economic sensitivities is critical to designing policies that do not disproportionately burden vulnerable groups. Although the economic burden of carbon taxation is a major challenge, these obstacles are not insurmountable. By introducing targeted revenue recycling mechanisms, providing financial support to businesses and ensuring transparency in revenue allocation, Malaysia can mitigate the financial impact of the policy. With a well-designed and inclusive approach, Malaysia can introduce a carbon tax that drives meaningful climate action while promoting economic growth and social equity.

To overcome these challenges, Malaysia could implement a phased approach to carbon taxation. By starting with a low tax rate and gradually increasing it over time, industries would have the opportunity to adapt and adopt cleaner technologies. The government must communicate how carbon tax revenues are allocated and ensure that funds are used for visible and effective projects such as renewable energy infrastructure, public transport improvements and healthcare initiatives. Regular public reporting and independent audits can further strengthen confidence in the integrity of the policy and encourage public support (Barker, Ekins & Foxon, 2007). Furthermore, a lack of understanding of carbon taxes and their environmental benefits often leads to resistance. Government incentives and the promotion of accountability can bridge this gap. Targeted subsidies for low-income households can offset the increased energy costs. Studies show that revenue recycling mechanisms, such as rebates or subsidies for low-income households, can allay these concerns and increase acceptance of the policy (Wang, Hubacek, Feng, Wei, & Liang, 2016).

Administrative Issues

While public acceptance and the economic burden of a carbon tax are major challenges, administrative issues are another major obstacle to its successful implementation. Creating the infrastructure, processes and legal framework for the effective administration of a carbon tax is a complex task that requires careful planning and coordination. In Malaysia, these challenges include accurate measurement of emissions, enforcement, policy integration and addressing gaps in institutional capacity. Accurate emissions data is often not available, making it difficult to enforce carbon taxes and establish effective monitoring systems (Ardhimansyah & Khaddafi, 2024; Wijaya, 2023). Without robust enforcement mechanisms, companies can evade compliance, undermining the effectiveness of the policy.

Administrative capacity is a critical factor in the implementation and administration of a carbon tax. The administrative framework for implementing the carbon tax often lacks clarity, leading to difficulties in coordination between authorities (Ardhimansyah & Khaddafi, 2024). In Malaysia, government institutions may lack technical expertise, resources and staff, particularly in areas such as emissions verification, policy analysis and public engagement. Inadequate infrastructure for monitoring and reporting emissions can delay the effective introduction of carbon taxes (Sofiyati & Hernawan, 2023). These shortcomings may delay implementation and reduce the effectiveness of the carbon tax. Hence, the government should provide funding for training programmes to improve the skills of civil servants and industry representatives. Partnerships with international organisations and private sector experts can provide additional technical support and best practices. The establishment of regional offices or hubs can also improve accessibility and responsiveness, especially for industries in remote areas.

The administrative challenges of introducing a carbon tax in Malaysia are significant but surmountable. By investing in accurate emissions measurement systems, establishing robust enforcement mechanisms and integrating the tax into existing policies, the government can effectively address these obstacles. Strengthening institutional capacity and ensuring administrative transparency are critical to building public and industry confidence. With careful planning and collaboration, Malaysia can overcome these administrative hurdles and implement a carbon tax that promotes meaningful climate action while supporting economic growth and social equity.

The Role of Carbon Tax in Malaysia's Policy Landscape

This section examines how carbon taxation can complement and enhance existing environmental policies in Malaysia. A poorly designed tax policy could affect the competitiveness of the Malaysian economy, especially in export-oriented sectors. Malaysia's carbon tax policy is still in the preparatory phase but has significant potential to drive emissions reductions while promoting sustainable development. Its success will depend on careful policy design, addressing public concerns and learning from international experiences. In developing economies such as Malaysia, there is often tension between pursuing climate goals and maintaining economic growth. Policymakers may be reluctant to introduce carbon taxes for fear that they could slow economic activity, reduce investment and increase unemployment. This challenge is particularly pronounced in Malaysia's emissions-intensive sectors, which play a crucial role in the country's GDP. The involvement of stakeholders, including businesses, civil society and community leaders, in the policy-making process can foster a sense of shared responsibility and commitment (Olpah, Ambarwati, Suwandi, Bachtiar, & Ananda, 2023).

Carbon taxes alone cannot achieve Malaysia's climate targets. If they are integrated into a broader range of measures, their effectiveness will be enhanced. Therefore, carbon taxes should be combined with renewable energy mandates, energy efficiency programmes and investments in public transport. To balance these competing priorities, Malaysia can take a holistic approach that combines carbon taxation with broader economic and environmental strategies. For example, revenue from the tax could be used to create jobs in green sectors such as renewable energy and sustainable agriculture. By linking carbon taxes to investments in labour training and skills development, the government can facilitate a just transition and ensure that workers displaced from carbon-intensive industries are equipped for opportunities in a low-carbon economy (Wijaya, 2023).

An abrupt introduction of carbon taxes can lead to economic shocks and public backlash. A gradual approach can minimise these risks. Therefore, the carbon tax should start at a low rate and increase gradually to give businesses and households time to adjust. Before rolling it out nationwide, the government should test the policy in selected regions or sectors to identify challenges and refine the design. Incorporating fairness into policy by allocating revenue to environmental projects can increase public acceptance (Maestre-Andrés, Drews, & Van den Bergh, 2019). While these challenges are great, they also present opportunities for innovative solutions, such as incorporating evolutionary game theory to improve policy effectiveness and promote the adoption of renewable energy (Goh et al., 2023).

5. Findings and Recommendations

Examining the viability of carbon tax implementation in the long run, together with other proposed initiatives is of utmost importance. In the pipeline, the country also has other initiatives to reduce carbon emissions such as tax exemptions for carbon capture, utilisation and storage (CCUS) activities and an RM300 million allocation for the National Energy Transition Facilitation Fund (George, 2024). Although details on the carbon tax mechanisms are not ready yet, the government has established that proceeds from the tax will be used to fund green technology programmes and research (Ikram, 2024).

Setting a carbon tax at an appropriate level and ensuring well-regulated use of voluntary carbon credits is critical. An appropriately priced carbon tax provides a clear financial incentive for businesses to reduce their carbon emissions, driving innovation and investment in cleaner technologies while supporting economic growth. If the tax is too low, it may fail to alter behavior or achieve meaningful emissions reductions. Conversely, a tax set too high can burden industries and consumers, potentially leading to economic instability. Similarly, if there is a high price differential between the carbon tax and allowable carbon credits, companies may opt to purchase credits rather than pay carbon tax, potentially undermining the intended impact of the tax. Policymakers can mitigate this risk by limiting the proportion of carbon credits that can be accepted.

To summarise, an effective carbon tax policy should be well-designed, equitable and aligned with Malaysia's economic structure and development priorities. The following recommendations and mechanisms are proposed:

Table 2: Recommendations of an effective carbon tax policy in Malaysia

Recommendations	Mechanisms	Justifications
-Start with a moderate, predictable carbon price -This rate should progressively increase to incentivize innovation and emissions reduction while avoiding excessive short-term burden on businesses (World Bank, 2022).	Initial carbon pricing could be set at RM30–RM50 per tonne of CO_2, consistent with estimates from the World Bank and aligned with regional benchmarks such as Singapore.	A gradual and predictable carbon pricing schedule would minimize shocks to industries and allow time for adaptation.
Implement revenue recycling mechanisms	Reducing income or corporate tax rates to maintain competitiveness. Targeted subsidies for low-income households to offset higher energy and goods prices. Investments in green infrastructure and renewable energy to stimulate sustainable growth.	Ensuring public support and economic neutrality.
Phase-In by sector and emissions intensity	Start with large industrial emitters and electricity generation sectors under a measurable, reportable, and verifiable (MRV) system. Introduce exemptions or rebates for sectors with significant trade exposure or those investing in emissions-reducing technologies. Gradually expand to cover transportation and agriculture as administrative capacity improves.	This sectoral approach allows policymakers to balance economic priorities with environmental integrity.

Strengthen institutional capacity and governance	Establish a transparent and accountable carbon pricing authority, possibly under the Ministry of Finance and the Ministry of Natural Resources, Environment and Climate Change (NRECC), to oversee: MRV systems Carbon pricing adjustments Compliance monitoring Use of tax revenue	Enhancing public acceptance due to transparency and integrity in implementing the policy
Conduct stakeholder engagement and public awareness campaigns	● Engage industries, SMEs, NGOs, and state governments early in policy formulation. ● Run awareness programs on the rationale and benefits of carbon taxation. ● Ensure that public communications emphasize long-term gains such as improved health, energy security, and innovation.	Widespread public and business sector buy-in is essential

Source: Compilation from authors' review

Conclusion

The final section summarizes the study's objectives and contributions, restates the importance of balancing growth and sustainability, and emphasizes the significance of adopting carbon taxation as a policy tool in Malaysia. Carbon taxation is a transformative policy tool that is closely linked to the Sustainable Development Goals and combats climate change while promoting equity, public health and economic growth. By using carbon tax revenues to fund sustainable projects and protect vulnerable populations, countries like Malaysia can accelerate their progress towards achieving the SDGs. A well-designed carbon tax not only supports SDG 13: Climate Action but also catalyzes systemic change that promotes resilience and sustainability across economic, social and environmental dimensions.

Designing a carbon tax policy that gains public acceptance, addresses concerns and provides long-term support requires a comprehensive approach. By focusing on equitable use of revenues, transparent administration, phased implementation and public involvement, Malaysia can overcome resistance and foster sustained support for climate action. Such an approach not only ensures the success of the carbon tax but also strengthens Malaysia's ability to achieve its long-term sustainability goals. In conclusion, the literature strongly suggests that carbon taxation, when strategically designed and accompanied by appropriate fiscal and institutional frameworks, does not inherently conflict with economic growth. Instead, it presents an opportunity to align national development strategies with environmental objectives, fostering a more sustainable and resilient economic model.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Smart Forensics: Tracing the Rise of Artificial Intelligence in Forensic Accounting, Fraud Detection and Risk Management

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Abstract: This research examines the evolution of scholarly interest in artificial intelligence (AI) in forensic accounting and risk management. Using a dataset of 261 publications indexed in Scopus between 2002 and mid-2025, the study examines shifts in publication trends, recurring topics, and gaps that remain underexplored. Bibliometric tools, including VOS viewer, Microsoft Excel, and Publish or Perish, were used to analyse citation activity, author collaborations, and keyword patterns. A noticeable increase in published work was seen after 2017, with "forensic accounting" and "fraud" being the most frequently used terms. The results indicate an increasing academic focus on technologies such as blockchain, big data, and advanced analytics. Most studies have been published in peer-reviewed outlets, particularly within the domains of Business, Management, and Accounting. Jordan stands out for its consistent research output, supported by active engagement from several scholars and academic institutions. Eight major themes were identified, covering governance and fraud control, professional skills, financial crime investigation, emerging technologies, forensic audit practices, audit roles, localized education, and analytical methods. Although this review is confined to English-language articles listed in Scopus, it still offers a clear overview of the progression of research in this field over time. It highlights prevailing trends, significant areas of concentration, and existing gaps, providing useful guidance for both researchers and practitioners. With the evolution of AI, this study's results could also guide future developments in forensic accounting, fraud detection, and risk management.

Keywords: *Forensic Accounting, Artificial Intelligence, Fraud Detection, Risk Management, Bibliometric Analysis.*

1. Introduction

Financial crimes and corporate misconduct have become increasingly complex, rendering many traditional forensic accounting approaches insufficient. Conventional methods, such as manual audits and standardized investigative procedures, while still relevant, demonstrate clear limitations when applied to modern digital financial environments, necessitating a shift towards more advanced technological approaches. (Daraojimba et al., 2023). AI has emerged as a critical solution to these challenges, offering substantial improvements in fraud detection capabilities and risk management systems.

Forensic accountants are now able to manage and interpret vast datasets more efficiently due to AI advancements, including tools like machine learning and natural language processing. These advanced analytical tools can identify subtle fraudulent patterns and suspicious transactions that often escape detection through traditional manual review processes. Beyond fraud detection, "AI applications significantly enhance risk assessment methodologies and strengthen organizational control frameworks" (Bello et al., 2023).

Academic research examining AI applications in forensic accounting has expanded considerably in recent years. Numerous studies have investigated various aspects, including the improvement of audit processes and the investigation of complex financial crimes (Adejumo & Ogburie, 2025). Despite this growing body of research, critical knowledge gaps remain regarding the overall development of this research area. There exists a pressing need for systematic analysis of publication trends, identification of influential researchers and institutions, and examination of geographical contributions. Future research should also focus on tracking emerging topics and technological developments within this increasingly important field.

To bridge the identified research gap, this study applies bibliometric analysis to systematically examine and map the evolution of scholarly publications at the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. Based on 261 publications indexed in Scopus from 2002 to July 2025,

this study aims to identify key research trends, dominant thematic clusters, and existing gaps that can inform future academic exploration and professional practice.

In line with this objective, the study focuses on the following research questions:
RO1: What is the current state and publication trend of research on the application of AI in forensic accounting, fraud detection, and risk management?
RO2: Who are the most productive and influential contributors, including authors, institutions, and countries?
RO3: Which documents are most frequently cited in the context of AI applications in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management?
RO4: What are the keywords, thematic clusters, and emerging research topics within this domain?
RO5: What are the emerging research directions for applying artificial intelligence in forensic accounting and fraud detection?

To explore these questions, data were obtained from the Scopus database and examined utilizing Microsoft Excel, VOS viewer, and Publish or Perish software. This research provides important perspectives for scholars, professionals, and decision-makers regarding the changing influence of AI in moulding forensic accounting research and its application.

The next section covers the literature review, followed by the research methodology of this study. The discussion of research findings and conclusions with the identified limitations and suggestions for future research is presented in the subsequent sections.

2. Literature Review

Bibliometric analysis

Researchers now widely adopt bibliometric methods as a robust way to analyze publication patterns and research impacts across disciplines (Yan & Zhiping, 2023). These quantitative methods enable researchers to systematically examine publication patterns, citation networks, and knowledge structures, providing valuable insights into the development of scientific disciplines. Within accounting research specifically, bibliometric analysis serves three fundamental purposes: mapping intellectual structures through co-citation and co-word network visualizations, assessing research impact using citation metrics, and evaluating scholarly productivity via publication trend analysis (Ahmi, 2021).

This approach allows for a deeper understanding of critical issues in specialized accounting fields, tracing how knowledge evolves, how ideas influence one another, and how research priorities shift over time. From a strategic perspective, bibliometric analysis offers three key advantages for researchers: (1) revealing understudied topics and emerging challenges, (2) providing measurable benchmarks to assess a study's alignment with broader disciplinary trends, and (3) highlighting new frontiers that can shape future inquiry (Ogutu et al., 2023). By applying these insights, scholars can refine their research agendas with greater confidence, while institutions and funders can allocate resources more strategically, ensuring their investments drive meaningful progress in the field.

Forensic accounting is empowered by artificial intelligence for fraud detection and risk management.

Several studies have systematically reviewed forensic accounting literature to map its development, identify key themes, and highlight research gaps. However, most of these reviews concentrate on broader fraud typologies and governance without emphasizing how AI technologies are transforming investigative approaches, a gap this study aims to address. These reviews provide valuable syntheses of existing knowledge while revealing opportunities for future research to advance both theory and practice in this field. Mustafa Airout et al. (2024) conducted a bibliometric analysis of 268 articles on forensic accounting published between 2004 and 2023 in the Web of Science database. Using techniques such as keyword cartography, citation analysis, bibliographic coupling, and content analysis, the study identified four main research clusters: financial statement fraud triangle, corporate governance and fraud prevention, fraud detection techniques and methodologies, and the broader consequences of fraud. The analysis highlighted key journals, authors, and institutions contributing to the field, with the USA, Australia, and China leading in research output. The study

provided 58 potential future research questions, offering a comprehensive research agenda to guide scholars and practitioners in advancing forensic accounting research.

While Mustafa Airout et al. (2024) emphasized trends in forensic accounting, AL-Raggad & Al-Raggad (2024) conducted a comprehensive bibliometric analysis to examine trends and patterns in administrative law and forensic accounting in the context of the digital era. The research utilised a comprehensive bibliometric analysis to examine trends and patterns in forensic accounting within the digital era. Using the Web of Science database and VOS viewer software, it analyzes 543 publications from 2010 to 2024 through cluster analysis, co-occurrence analysis, and bibliographic coupling. The findings reveal a growing focus on forensic accounting's role in addressing financial misconduct and regulatory challenges driven by technological advancements. By identifying key contributors and emerging topics, the study highlights the need for adopting advanced technologies and fostering interdisciplinary collaboration to enhance fraud detection and financial transparency in the digital economy.

Recent bibliometric studies by Ellili et al. (2024) and Chávez-Díaz et al. (2024) collectively highlight the increasing focus on artificial intelligence in forensic accounting and fraud detection, mapping the field's development from traditional approaches toward AI-driven solutions. Ellili et al. (2024) conducted a bibliometric analysis of 232 forensic accounting publications from 1991 to 2021 using Scopus and VOS viewer, highlighting limited global research output in the field. Their study mapped key trends, influential contributors, and research gaps, emphasizing the potential of integrating technologies like AI to advance fraud detection and forensic accounting practices. Whereas Chávez-Díaz et al. (2024) conducted a bibliometric analysis to explore research trends at the intersection of artificial intelligence (AI), accounting, auditing, and forensic accounting from 2020 to 2023, using 124 Scopus-indexed publications. Applying the PRISMA model, keyword co-occurrence analysis, and social structure mapping via R Studio, they identified key journals, authors, and institutions contributing to AI applications in accounting fields. The study revealed increasing AI adoption for fraud detection, tax auditing, and financial decision-making, while highlighting ethical concerns and the need for human-AI collaboration in accounting processes. Notably, forensic accounting is increasingly integrating AI and machine learning tools to enhance fraud detection and reduce manual errors. The authors recommended that accountants develop data analysis skills and adapt to AI-driven systems to maintain relevance in the digital era. Their study offers a foundation for future interdisciplinary research, advocating organizational transformation and regulatory adaptation to support AI-based forensic and auditing practices.

Building on the bibliometric analyses of these literatures, which emphasize the growing role of artificial intelligence in forensic accounting and fraud detection, this study extends the scope by systematically mapping research developments at the intersection of artificial intelligence, forensic accounting, fraud detection, and risk management, aiming to identify dominant themes and guide future scholarly and professional advancements.

3. Methodology

This study utilizes a bibliometric analysis, a method for systematically evaluating and quantifying scientific literature to provide an objective, comprehensive assessment of current research trends. Originally introduced by Pritchard (1969), bibliometrics has since become a cross-disciplinary tool, applied in fields ranging from medicine to social sciences (Dao et al., 2023; Donthu et al., 2021). Recent studies have even adopted it to map emerging domains, such as AI in education (Kavitha & Joshith, 2024). At its core, bibliometrics applies statistical and mathematical techniques to analyse patterns in scholarly communication, including publications, citations, and conceptual networks (Ahmi, 2021).

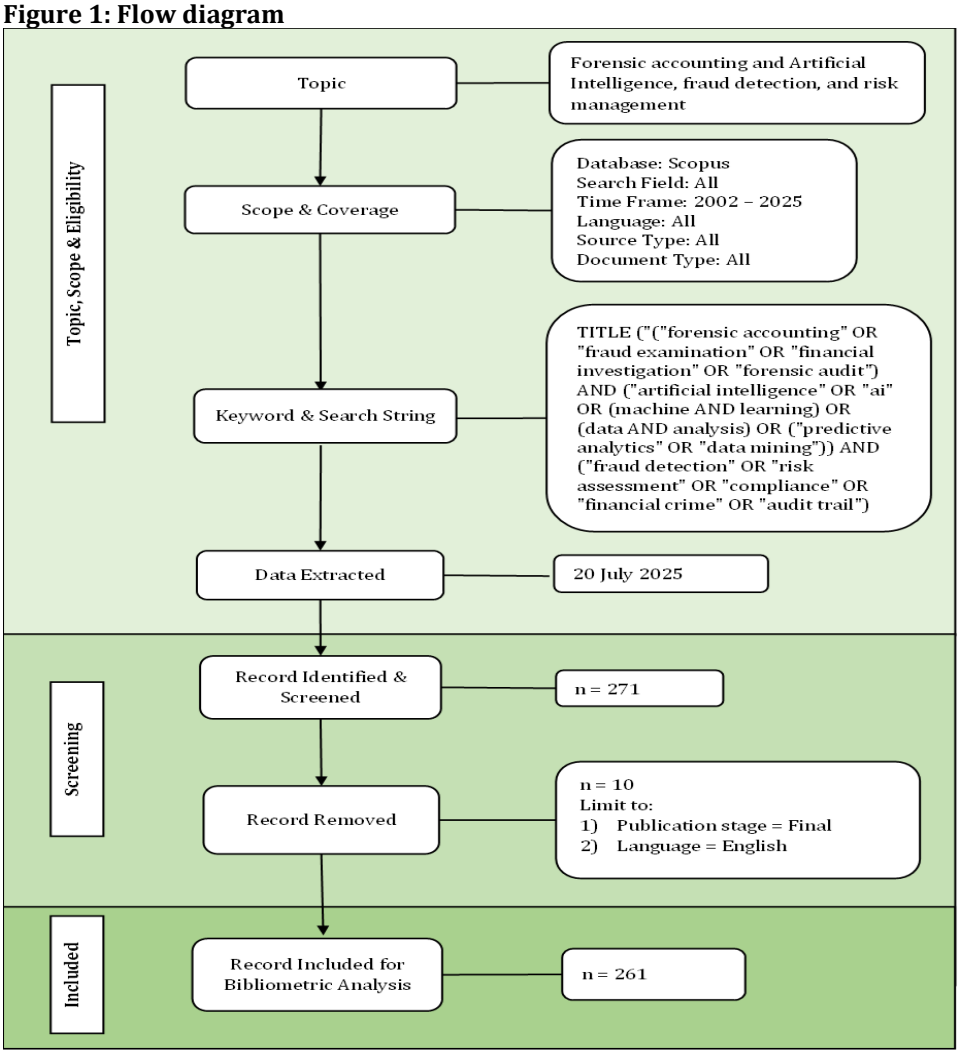
This study retrieved bibliometric data from the Scopus database on 20 July 2025 using the following search phrase: TITLE-ABS-KEY ("forensic accounting" OR "fraud examination" OR "financial investigation" OR "forensic audit") AND ("artificial intelligence" OR "AI" OR (machine AND learning) OR (data AND analysis) OR ("predictive analytics" OR "data mining")) AND ("fraud detection" OR "risk assessment" OR "compliance" OR "financial crime" OR "audit trail"). The search strategy systematically combined three conceptual domains: (1) forensic accounting terminology, (2) AI-related technologies, and (3) application areas in financial crime detection. Scopus was selected for its multidisciplinary coverage and reliability in bibliometric research (Alam

et al., 2025; Chin & Chew, 2021). Following Cora et al. (2024), Scopus AI (Beta) was utilized to optimize keyword selection and refine the search phrase within the TITLE-ABS-KEY field, ensuring alignment with study objectives while maintaining methodological accuracy.

Scopus was chosen for this study due to its comprehensive coverage of peer-reviewed literature and established reliability for bibliometric research (Alam et al., 2025; Chin & Chew, 2021). Its multidisciplinary scope makes it particularly suitable for analysing the intersection of forensic accounting and AI. A total of 271 documents were retrieved from the initial query. However, this study includes only English-language publications at the final stage, resulting in a total of 261 documents for further bibliometric analysis.

Figure 1 illustrates the search strategy flow. A preliminary analysis was conducted to validate the dataset before proceeding with the bibliometric analysis. The study employed a multi-method analytical approach to examine the Scopus data. Descriptive statistics (frequencies, percentages, and visualizations) were used to describe publication trends. Citation metrics, including total citations, cited publications count, and average citation rates, were extracted from Scopus RIS files using Publish or Perish software. For network visualization maps, the dataset was processed in VOS viewer to generate co-occurrence maps. Keywords were standardized by consolidating synonymous terms to ensure greater accuracy and consistency in the co-occurrence analysis.

Figure 1: Flow diagram



4. Results and Discussion

This study employs several bibliometric indicators to examine the publication landscape on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. The analysis focuses on key metrics, including citation analysis and annual publication trends. Reviews document profiles, which involve the number of research documents published in Scopus between 2002 and 2025, categorized by document type, source type, and subject area. Furthermore, the study identifies the most productive contributors by analysing publications by authors, institutions, and countries. In addition, it highlights the most highly cited documents within these research areas. Co-occurrence analysis of authors' keywords is also conducted to determine the most frequently used terms. Additionally, thematic mapping is used to identify the main research themes that have emerged over time. In addition, this study reports several core bibliometric indicators, including the total number of publications (TP), number of cited publications (NCP), total citations (TC), average citations per publication (C/P), average citations per cited publication (C/CP), and the h-index (h).

Bibliometric profile

Table 1 presents the bibliometric profile of the study. Covering 23 years of publications on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management, the analysis includes a total of 261 papers and 3,034 citations. The analysis indicates an average of 131.91 citations per year. On average, each author contributed to 11.62 papers, while each paper involved approximately 2.74 authors.

Table 1: Citations Metrics

Metrics	Data
Papers	261
Number of Citations	3034
Year	23
Citations per Year	131.91
Citations per Paper	11.62
Authors per Paper	2.74
h-index	24
g-index	46

Publication Trends and Research Growth

To answer RQ1 (What is the current state and publication trend of research on the application of AI in forensic accounting, fraud detection, and risk management from 2002 to 2025?), the author examines publication trends in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management using total publications based on year, document type, source type, and subject area.

Figure 2 shows that the number of publications increased significantly between 2013 and 2024. The decline in 2025 is expected, as the data was collected mid-year. The overall upward trend highlights the growing academic interest and relevance of this research area. The steady increase reflects the rising importance of AI, forensic accounting, fraud detection, and risk management, especially in response to global developments such as Industry 4.0 and the rapid adoption of AI technologies. The most productive year was 2024, with 54 publications and 40 citations. Interestingly, 2015, despite having only six publications, recorded the highest citation count, with 410 citations and an average of 68.33 citations per article.

Figure 2: Total publications and citations by year

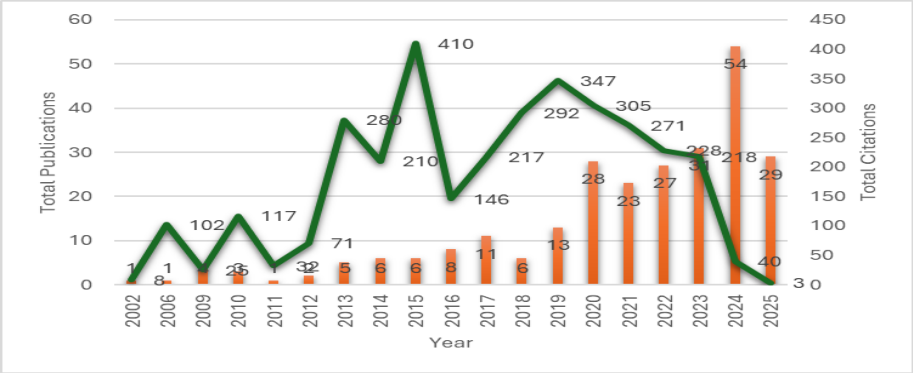


Table 2 outlines the development of publications and citations spanning from 2002 to 2025. The initial documents in this research field emerged in 2002, accumulating a total of 62 citations. In 2017, the area experienced its first year with over 10 published documents, though it fell to 6 publications in 2018. The peak number of publications was noted in 2024, with a total of 54. As for 2025, since data were collected in July, there have already been 31 publications in this domain. This pattern reflects an increasing academic interest and a steady rise in research output, particularly in recent years, highlighting the growing significance of artificial intelligence in forensic accounting, fraud detection, and risk management.

The highest average citations per publication (C/P) and average citations per cited publication (C/CP) were reported in 2012, suggesting that earlier foundational works continue to receive strong academic recognition. The highest h-index (h) was recorded in 2020 (13), indicating that publications during that period had a wider academic impact and influence.

Table 2: Year of Publication - 2002 to 2025 (23 years)

Year	TP	NCP	TC	C/P	C/CP	h
2025	31	10	65	2.10	6.50	6
2024	54	36	157	2.91	4.36	7
2023	31	28	242	7.81	8.64	9
2022	27	22	132	4.89	6.00	7
2021	23	19	263	11.43	13.84	9
2020	28	27	594	21.21	22.00	13
2019	13	13	86	6.62	6.62	6
2018	6	6	89	14.83	14.83	3
2017	11	11	477	43.36	43.36	8
2016	8	5	26	3.25	5.20	3
2015	6	6	173	28.83	28.83	5
2014	6	6	160	26.67	26.67	4
2013	5	4	31	6.20	7.75	3
2012	2	2	329	164.50	164.50	2
2011	1	1	2	2.00	2.00	1
2010	3	3	24	8.00	8.00	3
2009	4	4	53	13.25	13.25	4
2006	1	1	69	69.00	69.00	1
2002	1	1	62	62.00	62.00	1
TOTAL	**261**					

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; and h-index.

The document types published by various scholars are provided in Table 3. Most of the publications are produced as articles (61.30%), while others are as conference papers (13.79%) and book chapters (13.03%). Examining different source types helps to identify the most important literature within a particular discipline.

This helps to understand the main ways in which research is disseminated. Understanding the different categories of documents helps in selecting the appropriate databases and search techniques.

Table 3: Document Types

Documents Type	Total publications	Percentage
Article	160	61.30%
Conference Paper	36	13.79%
Book Chapter	34	13.03%
Book	18	6.90%
Review	10	3.83%
Conference Review	2	0.77%
Editorial	1	0.38%

Table 4 presents the distribution of publications by source type. Journal articles make up the largest proportion, with 170 publications accounting for 65.13% of the total. Books contribute 31 publications (11.88%), while both book series and conference proceedings each account for 30 publications (11.49%). This indicates that, alongside journals, books, book series, and conference proceedings play a modest but balanced role in contributing to this research area.

Table 4: Source Type

Source Type	Total publications	Percentage
Journal	170	65.13%
Book	31	11.88%
Book Series	30	11.49%
Conference Proceeding	30	11.49%

The findings show that this research area spans multiple disciplines. Table 5 highlights Business, Management, and Accounting as the leading contributor, with 49.81% of publications, reflecting the close link between forensic accounting, auditing, and corporate governance. Economics, Econometrics, and Finance follow with 45.98%, driven by interest in AI's role in fraud detection and risk management. Social Sciences contribute 37.93%, focusing on fraud behaviour, ethics, and regulation. Although other fields each contribute less than 30%, their presence is particularly from computer science, law, and criminology. This demonstrates the growing relevance of AI technologies in financial investigations and fraud prevention.

Table 5: Subject Area

Subject Area	Total publications	Percentage
Business, Management, and Accounting	130	49.81%
Economics, Econometrics, and Finance	120	45.98%
Social Sciences	99	37.93%
Computer Science	72	27.59%
Engineering	34	13.03%
Decision Sciences	33	12.64%
Mathematics	15	5.75%
Environmental Science	9	3.45%
Energy	6	2.30%
Medicine	6	2.30%
Physics and Astronomy	5	1.92%
Psychology	4	1.53%
Agricultural and Biological Sciences	3	1.15%
Arts and Humanities	3	1.15%
Earth and Planetary Sciences	3	1.15%
Multidisciplinary	3	1.15%
Biochemistry, Genetics, and Molecular Biology	2	0.77%
Materials Science	2	0.77%

Health Professions	1	0.38%
Nursing	1	0.38%
Pharmacology, Toxicology, and Pharmaceutics	1	0.38%

Leading Contributors: Authors, Institutions, and Countries

To address RQ2 (Who are the most productive and influential contributors, including authors, institutions, and countries?), this section provides a summary of publication data, emphasizing the most prolific authors, institutions, countries, and journals in the research field.

Table 6 lists the ten most prolific authors contributing to research at the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management. Alshurafat, H.**,** from Hashemite University (Jordan), ranks first with 14 publications and 235 total citations, making her the most prolific contributor. Gottschalk, P.**,** affiliated with Handelshøyskolen *BI* (Norway), follows in second place with 11 publications and 56 citations**.** Al-Sartawi, A.**,** from Ahlia University (Bahrain), ranks third with 8 publications and 53 citations.

In fourth and fifth place are authors who have co-authored five publications in the field. Those ranked sixth to tenth have contributed four publications each, though their citation counts vary. Among these authors, Klingelhöfer, H.E. achieved the highest number of citations, totalling 98. Overall, the distribution of authors reflects growing scholarly engagement in this field, with significant contributions from both developed and emerging regions.

Table 6: Most Productive Authors

Author Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	h
Alshurafat, H.	Hashemite University	Jordan	14	13	235	16.79	18.08	8
Gottschalk, P.	Handelshøyskolen BI	Norway	11	8	56	5.09	7.00	5
Al-Sartawi, A.	Ahlia University	Bahrain	8	8	53	6.63	6.63	4
Akinbowale, O.E.	Tshwane University of Technology	South Africa	5	5	119	23.80	23.80	4
Zerihun, M.F.	Tshwane University of Technology	South Africa	5	5	119	23.80	23.80	4
Al Shbail, M.O.	Al Al-Bayt University	Jordan	4	4	81	20.25	20.25	4
Huy, P.Q.	University of Economics Ho Chi Minh City	Vietnam	4	1	3	0.75	3.00	1
Klingelhöfer, H.E.	Tshwane University of Technology	South Africa	4	4	98	24.50	24.50	3
Mathews, J.	Indian Institute of Technology Hyderabad	India	4	4	29	7.25	7.25	3
Mehta, P.	Prin. L. N. Welingkar Institute of Management Development & Research	India	4	4	29	7.25	7.25	3

Notes: TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

Table 7 provides an overview of the distribution of institutional publications in this research area. Hashemite University leads with 21 publications, followed by Handelshøyskolen BI with 11 publications. Other institutions contribute fewer than 10 publications each. Notably, although Tshwane University of Technology has only five publications, it ranks third in terms of total citations among the top institutions. Universiti Teknologi MARA is the only institution from Malaysia featured among the leading contributors in this field.

Table 7: Publications by institutions that publish more than five documents

Institution	Country	TP	NCP	TC	C/P	C/CP	h
Hashemite University	Jordan	21	18	267	12.71	14.83	8
Handelshøyskolen BI	Norway	11	8	56	5.09	7.00	5
Al Al-Bayt University	Jordan	9	8	104	11.56	13.00	6
Ahlia University	Bahrain	9	9	56	6.22	6.22	4

University of Economics Ho Chi Minh City	Vietnam	8	3	18	2.25	6.00	3
Al-Ahliyya Amman University	Jordan	7	7	43	6.14	6.14	4
Bina Nusantara University	Indonesia	7	6	55	7.86	9.17	3
Universiti Teknologi MARA	Malaysia	5	3	44	8.80	14.67	2
Tshwane University of Technology	South Africa	5	5	119	23.80	23.80	4
Al-Balqa Applied University	Jordan	5	3	16	3.20	5.33	2
The University of Jordan	Jordan	5	3	24	4.80	8.00	3

Notes: TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

Table 8 summarizes the publication output from countries contributing ten or more papers in this research area. Jordan produced the largest number of publications (TP = 42) with a total of 337 citations, followed by India with 29 publications and 181 citations. The United States contributed 24 publications and achieved the highest total citations with 510, reflecting strong citation impact. Indonesia ranked fourth, contributed 22 publications (124 citations), while Malaysia produced 12 publications (112 citations), and the average citations per paper was 9.33. Other countries each contributed fewer than 15 publications, with citation counts varying across the group. Overall, the analysis indicates that Asian countries lead in publication output within this area. Contributions from other continents include two African nations, along with one country each from Oceania, North America, and Europe. This distribution highlights Asia's prominent role in driving research in this dynamic field, while also reflecting meaningful contributions from various global regions.

Table 8: Most Productive Countries

Country	TP	NCP	TC	C/P	C/CP	h	Continent
Jordan	42	32	337	8.02	10.53	9	Asia
India	29	22	181	6.24	8.23	7	Asia
United States	24	20	510	21.25	25.50	10	North America
Indonesia	22	17	124	5.64	7.29	6	Asia
Saudi Arabia	13	10	39	3.00	3.90	4	Asia
Bahrain	12	11	62	5.17	5.64	4	Asia
Malaysia	12	8	112	9.33	14.00	6	Asia
Nigeria	11	10	117	10.64	11.70	6	Africa
Australia	10	9	232	23.20	25.78	6	Oceania
Norway	10	7	54	5.40	7.71	5	Europe
South Africa	10	10	145	14.50	14.50	6	Africa
Viet Nam	10	4	20	2.00	5.00	3	Asia

Notes: TP = Total Publications; NCP = Number of Cited Publications; TC = Total Citations; C/P = Average Citations per Publication; C/CP = Average Citations per Cited Publication; h = h-index.

Highly Cited Documents in the Research Area

To address RQ3 (Which documents are most frequently cited in the context of AI applications in the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management?) Citations per publication provide a measure of the relative impact of research within a particular field, whereas total citations reflect the overall number of times articles have been cited within the database (Alam et al., 2025).

Table 9 shows the most popular and most-cited research papers in forensic accounting, fraud detection, and risk management. Older studies, like Nigrini (2012), focused on basic tools like Benford's Law to find fraud. Over time, research started using more advanced technology, like Amani & Fadlalla (2017), who discussed data mining in accounting, and Morales et al. (2014), who looked at why people commit fraud using the fraud triangle idea. More recent papers, like Alshurafat et al. (2021) and Kaur et al. (2022), show that many researchers are now interested in how artificial intelligence (AI) and data analysis can help detect fraud. Even though these newer studies are quite recent, they have already been cited a lot, which shows this topic is getting more attention. Overall, the research has moved from traditional ways of checking fraud to using AI and modern technology to deal with more complex financial crimes.

Table 9: Top 20 highly cited documents

No	Authors	Year	Title	Source	Cites	Cites Per Year
1	Nigrini, M.J.	2012	Benford's law: Applications for forensic accounting, auditing, and fraud detection	Benford's Law: Applications for Forensic Accounting, Auditing, and Fraud Detection	250	19.23
2	Camin, F.	2017	Stable isotope techniques for verifying the declared geographical origin of food in legal cases	Trends in Food Science and Technology	178	22.25
3	Amani, F.A.	2017	Data mining applications in accounting: A review of the literature and organizing framework	International Journal of Accounting Information Systems	133	16.63
4	Morales, J.	2014	The construction of the risky individual and vigilant organization: A genealogy of the fraud triangle	Accounting, Organizations and Society	131	11.91
5	Fragiacomo, P.	2020	Technical-economic analysis of a hydrogen production facility for power-to-gas and hydrogen mobility under different renewable sources in Southern Italy	Energy Conversion and Management	108	21.60
6	Free, C.	2015	Looking through the fraud triangle: A review and call for new directions	Meditari Accountancy Research	83	8.30
7	Nigrini, M.J.	2012	Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations	Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations	79	6.08
8	Schneider, S.	2006	Privatizing economic crime enforcement: exploring the role of private sector investigative agencies in combating money laundering	Policing and Society	69	3.63
9	Marcella, A.J.	2002	Cyber forensics: A field manual for collecting, examining, and preserving evidence of computer crimes	Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes	62	2.70

10	Alshurafat, H.	2021	Strengths and weaknesses of forensic accounting: implications for the socio-economic development	Journal of Business and Socio-economic Development	59	14.75
11	Sadaf, R.	2018	An investigation of the influence of the worldwide governance and competitiveness on accounting fraud cases: A cross-country perspective	Sustainability (Switzerland)	58	8.29
12	Levi, M.	2020	Understanding the laundering of organized crime money	Crime and Justice	57	11.40
13	Levi, M.	2015	Money for Crime and Money from Crime: Financing Crime and Laundering Crime Proceeds	European Journal on Criminal Policy and Research	55	5.50
14	Akinbowale, O.E.	2020	An innovative approach to combating economic crime using forensic accounting techniques	Journal of Financial Crime	54	10.80
15	Alshurafat, H.	2020	Perceptions of the usefulness of various teaching methods in forensic accounting education	Accounting Education	50	10.00
16	Kaur, B.	2023	A systematic review of forensic accounting and its contribution towards fraud detection and prevention	Journal of Financial Regulation and Compliance	49	24.50
17	Yang, C. H.	2020	Developing a strategy map for forensic accounting with fraud risk management: An integrated balanced scorecard-based decision model	Evaluation and Program Planning	49	9.80
18	Van Akkeren, J.	2017	Perceptions on the Causes of Individual and Fraudulent Co-offending: Views of Forensic Accountants	Journal of Business Ethics	49	6.13
19	Wahyuni-TD, I.S.	2021	The effects of good governance and fraud prevention on performance of the zakat institutions in Indonesia: A Sharīʿah forensic accounting perspective	International Journal of Islamic and Middle Eastern Finance and Management	40	10.00

20	Kumari Tiwari, R.	2017	Forensic accounting: a blend of knowledge	Journal of Financial Regulation and Compliance	40	5.00

Keyword Analysis, Thematic Clusters, and Emerging Research Directions

To answer RQ4 (What are the key keywords, thematic clusters, and emerging research topics within this domain?), this study uses VOS viewer to explore and visualize the keywords. A co-occurrence network and overlay map were created based on keywords provided by authors, along with key terms found in the titles and abstracts of the documents. The focus is on keywords that appeared more than 10 times, which were grouped into different themes using keyword clusters. This method helps to highlight the main research topics, identify new trends, and point out any gaps in the current research.

Frequently used keywords were identified using the VOS viewer's co-occurrence analysis, applying a minimum threshold of three occurrences to capture key research themes. In this context, "occurrences" refer to how often a specific keyword appears within the dataset, reflecting its importance and relevance in the field. This method helps pinpoint dominant topics, emerging trends, and potential research gaps.

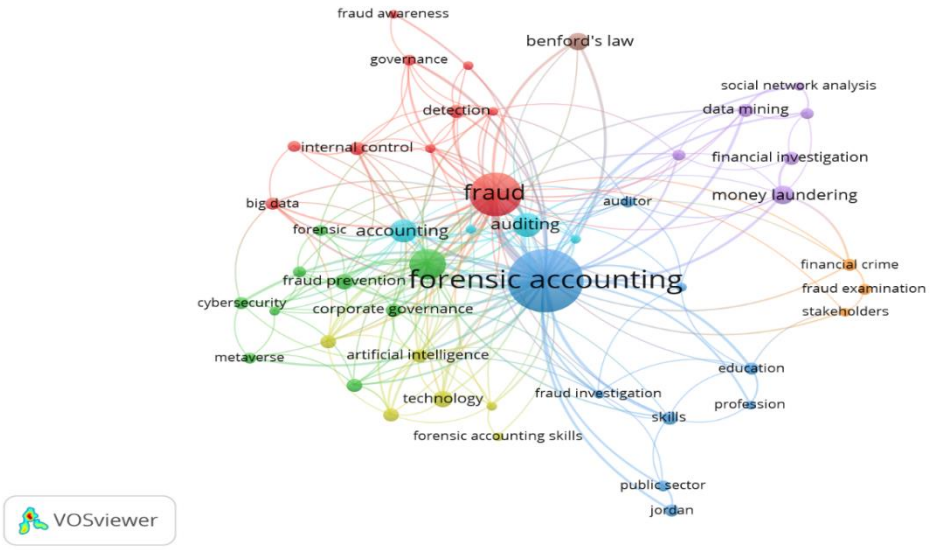
As shown in Table 10, frequently used keywords highlight the main areas of focus in the literature. "Forensic accounting" stands out as the most frequent term, appearing 129 times (27.74%), showing its central role in the research area. This is followed by "fraud" (62 occurrences, 13.33%) and "fraud detection" (31 occurrences, 6.67%), which indicate a strong concentration on fraud-related studies. Other commonly used keywords include "auditing" (20 occurrences, 4.30%), "accounting" (17 occurrences, 3.66%), and "money laundering" (12 occurrences, 2.58%), reflecting continued interest in financial crime and regulatory topics. Overall, the findings demonstrate a growing focus on the intersection of artificial intelligence (AI), forensic accounting, fraud detection, and risk management, highlighting opportunities for future research to explore technology's role in combating financial fraud and strengthening forensic practices.

Table 10: Frequently Used Authors' Keywords

Keyword	Occurrences	Percentage (%)
Forensic accounting	129	27.74
Fraud	62	13.33
Fraud detection	31	6.67
Auditing	20	4.3
Accounting	17	3.66
Money laundering	12	2.58

This study applies the VOS viewer for mapping analysis. As explained by Sedighi (2016) and Alam et al. (2025), "the distance between nodes in this visualization network represents the relationship between phrases or concepts, while the nodes themselves reflect a term or concept." Based on Figure 3, in this network map, each color represents a specific cluster. Based on the analysis, eight clusters were identified: Cluster 1 (Red) focuses on *Forensic Audit Practice and Broader Accounting Discipline*; Cluster 2 (Green) highlights *Governance and Fraud Control*; Cluster 3 (Blue) relates to *Professional Competency and Regional Focus*; Cluster 4 (Yellow/Lime Green) reflects *Emerging Technologies in Forensic Accounting*; Cluster 5 (Purple) covers *Financial Crime Investigation and Data Techniques*; Cluster 6 (Cyan/Teal) represents *Localized Educational Research*; Cluster 7 (Orange) focuses on *Audit and Forensic Practice Specificity*; and Cluster 8 (Brown) includes *Analytical Methods and Fraud Detection Tools*.

Figure 3: Network visualization of the co-occurrence of authors' keywords



The keyword analysis revealed eight main themes in research related to artificial intelligence, forensic accounting, fraud detection, and risk management. Table 11 shows these key themes based on keyword grouping. The themes include governance and fraud control, professional skills, financial crime investigation, emerging technologies, forensic audit practices, audit roles, local education focus, and analytical methods. Overall, the results show that most studies focus on fraud prevention, financial crime, and the increasing use of technology, while also discussing the importance of professional skills and country-specific research areas.

Table 11: Identified Themes from Keyword Clusters

Theme	Description	Focus Areas (Keywords)
1. Forensic Audit Practice and Broader Accounting Discipline	Explores forensic audit work within the larger field of accounting, including issues like corruption, detection methods, and risk management.	Big data, corruption, detection, financial transactions, forensic audit, fraud, fraud awareness, governance, internal control, risk management.
2. Governance and Fraud Control	Focuses on research about governance systems, fraud prevention, internal controls, and how organizations handle fraud risks, especially in forensic accounting.	Corporate governance, business, management, accounting, cybersecurity, digital forensics, forensic, fraud detection, fraud prevention, fraud triangle, metaverse.
3. Professional Competency and Regional Focus	Highlights studies on professional skills in forensic accounting, education topics, and country-specific research, with notable contributions from Jordan, which recorded the highest number of publications in this area.	Forensic accounting, forensic accountant, auditor, education, Jordan, public sector, profession, skills, fraud investigation.
4. Emerging Technologies in Forensic Accounting	Focuses on new technology trends in forensic accounting, such as AI, blockchain, big data, and data analytics. This theme reflects the modern shift toward technology-driven audit and investigation methods.	Artificial intelligence, blockchain, big data analytics, data analytics, forensic accounting skills, and technology.
5. Financial Crime Investigation and Data Techniques	Covers research related to financial crime cases and the use of data techniques to support investigations and fraud detection.	Data mining, financial investigation, financial reporting, money laundering, social network analysis, and tax evasion.

6. Localized Educational Research	Relates to local studies focusing on forensic accounting education in certain countries.	Bahrain, forensic accounting education, accounting, auditing.
7. Audit and Forensic Practice Specificity	Focuses on specific audit roles, professional identity, and day-to-day forensic audit activities.	Financial crime, fraud examination, and stakeholders.
8. Analytical Methods and Fraud Detection Tools	Covers research using special tools and analytical methods for fraud detection, especially Benford's Law.	Benford's Law.

Artificial Intelligence (AI) Adoption in Forensic Accounting: Key Findings

To answer RQ5 (What are the emerging research directions for applying artificial intelligence in forensic accounting and fraud detection?), this study identified publications that mention artificial intelligence in the title and/or abstract. The findings provide useful insights to help future researchers recognize current research gaps and suggest key areas for further exploration and development.

Table 12 shows 12 publications that mention artificial intelligence in the title and/or abstract. Studies by Archna & Bhagat (2024) and Ali et al. (2024) demonstrate AI's effectiveness in enhancing fraud detection, while blockchain technology further improves transparency and real-time monitoring (Badkul et al., 2025). Rule-based expert systems Öztürk & Usul, 2020) and intelligent audit automation Saluja et al., 2024) also show promise, though challenges like implementation costs and data quality remain.

Legal and ethical frameworks are critical for AI-driven forensic accounting, as highlighted by Quang Huy & Kien Phuc (2025) and Naqvi (2020). Innovations like federated learning combined with blockchain (Alshareet & Awasthi, 2025) address privacy and accountability concerns. While AI and blockchain offer significant advancements, future research must focus on scalability, interdisciplinary applications, and long-term impacts to fully realize their potential in forensic accounting.

Table 12: List of Publications Featuring Artificial Intelligence in Title and/or Abstract

No	Authors	Research title	Research Objective	Findings
1	Archna R. & Bhagat N. (2024)	Artificial intelligence challenges and their impact on the detection and prevention of financial statement fraud: A theoretical study	Investigate AI's potential in forensic accounting for financial statement fraud detection and prevention and examine implementation challenges.	Provides valuable insights for organizations, regulators, and professionals in combating financial fraud and promoting accurate financial reporting.
2	Badkul S., Kishor A., & Madvariya S. (2025)	The role of cloud computing in regulating blockchain and virtual currency	Investigate how cloud platforms improve blockchain networks for real-time transaction monitoring and extensive forensic audits in regulating blockchain and virtual currencies.	Cloud services enhance transparency and compliance, with AI and machine learning enabling automated anomaly detection and predictive analytics for fraud prevention.
3	Alshareet O. & Awasthi A. (2025)	A Novel Framework for Integrating Blockchain-Driven Federated Learning with Neural Networks in E-Commerce	Introduce a framework integrating federated learning (FL) with a permission blockchain to ensure verifiable, privacy-preserving, and ethically accountable machine learning collaborations.	Demonstrates stable convergence, reduced communication overhead, robust predictive accuracy, and enhanced adaptability with multi-layered security measures.

4	Ali A.M., Futaih R.F., Shukur M., & Al-Orfali A.K. (2024)	Forensic Accounting and Fraud Detection: Emerging Trends and Techniques	Assess how AI, blockchain, and data analytics improve forensic accounting for fraud detection.	Data analytics (β=0.35) and AI (β=0.30) significantly enhance fraud detection; blockchain improves transparency and traceability. Beneish M-Score supported earnings manipulation detection.
5	Saluja S., Nayyar V., Dawra S., Jain M., & Prakash R.S. (2024)	Artificial intelligence in forensic accounting	Investigate current fraud detection issues and propose a business intelligence framework for financial accounting fraud detection (FAFD).	Illustrates how business intelligence can be used to detect accounting fraud.
6	Huy P.Q. & Phuc M.A.V.K. (2025)	Insight into How Legal and Ethical Considerations Improve Artificial Intelligence Capabilities to Enhance the Performance of Cyber Forensic Accounting	Explore the interconnection between legal and ethical considerations (LEC) and cyber forensic accounting performance (PCFA), and AI's mediating role.	Statistical data confirms LEC's significant interconnection with PCFA, mediated by AI capabilities, aiding practitioners and policymakers in enhancing PCFA.
7	Quang Huy P. & Kien Phuc V. (2025)	Insight into how legal and ethical considerations of artificial intelligence enhance the effectiveness of cyber forensic accounting	Explore the correlation between legal and ethical considerations (LEC) and cyber forensic accounting effectiveness (ECFA), with AI competencies (AIC) as a mediator.	LEC significantly and favorably influenced ECFA, and AIC partially mediated this link, aiding governments in formulating strategies for forensic accounting and AI implementation.
8	Alkababji M.W., Mostafa R.M.A., Freihat A.F., Gad W.N.-E.-D., Alzahrane M., Yami N., Guellim N., & Shaaban M.S.I. (2024)	Forensic Accounting Practices: Evaluating the Current Research	Provide a complete evaluation of current forensic accounting research, covering corporate governance, fraud investigation, digital forensics, and AI integration.	Highlights forensic accounting's efficient role in maintaining financial integrity and promoting ethical corporate behavior.
9	Goyal Y. & Kumar P. (2024)	Forensic accounting and litigation support: Navigating legal challenges with fraud investigation mechanisms	Measure forensic accounting's impact on litigation outcomes and fraud detection, and the influence of legal procedure complexity on detection effectiveness and satisfaction with legal outcomes.	Research has deep legal implications related to litigation processes, highlighting the role of quality investigation and internal control.
10	Mehta C.K., Kaushik V., & Bhargav S. (2021)	A Study of the Impact of Internal Control Measures on the ease of use of Forensic	Investigate AI's mediating role on the perceived usefulness of forensic auditing services (FAS) in	Study outcomes help auditors and professionals understand AI's

		Audit Mediated by Artificial Intelligence Techniques	tracking financial scams and fraud in financial institutions.	usefulness in forensic accounting for tracking fraudulent activities.
11	Öztürk M.S. & Usul H. (2020)	Detection of accounting fraud using the rule-based expert systems within the scope of forensic accounting	Determine accounting fraud in enterprises using rule-based expert systems within forensic accounting.	Rule-based expert systems enable enterprises to better detect existing fraud and prevent future irregularities.
12	Naqvi A. (2020)	Artificial Intelligence for Audit, Forensic Accounting, and Valuation: A Strategic Perspective	Provide a strategic viewpoint on comprehensively integrating AI within audit management, forensic accounting, and valuation to help organizations compete.	AI is a critical competitive factor for audit and accounting firms, necessitating firm-wide AI capabilities for modernization.

5. Conclusion

This study looks at how research on artificial intelligence (AI), forensic accounting, fraud detection, and risk management has grown from 2002 to 2025. The findings show that interest in this area has increased a lot since 2017, with most research coming from countries like Jordan, India, and the United States. Some universities, like Hashemite University, and authors, like Alshurafat H., stand out as the most active contributors. This suggests there are key experts in the field who could lead more joint research in the future.

AI tools such as machine learning, data mining, and natural language processing are transforming forensic accounting practices, particularly in detecting and preventing fraud. An analysis of keywords revealed eight primary research themes, with emerging technologies such as blockchain and big data beginning to gain traction. Nonetheless, there are ongoing obstacles, especially in promoting the broader and responsible use of these technologies, particularly in less-studied nations.

In short, this study gives a useful overview of where the research stands today. It shows that some regions are still underrepresented and suggests future studies should involve more global cooperation. New technologies like blockchain, metaverse, and advanced data analytics are also areas with a lot of potential for future research. This study focuses only on Scopus and English-language articles, so it may miss some local studies. Future research should use more sources and encourage wider participation to give a more complete picture of this field.

Declaration of Competing Interest: The authors declare that there are no conflicts of interest related to this publication. All authors contributed equally to the conceptualization and development of the article.

Acknowledgement: The authors wish to convey their profound appreciation to Universiti Teknologi MARA Cawangan Terengganu (UiTMCT) for its steadfast institutional support and the provision of essential technological resources. Such contributions were pivotal in enabling the successful execution and completion of this research.

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The Role of Financial Reporting Behavior in Determining Audit Quality

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Abstract: In corporate governance, the integrity of financial reporting is fundamental to stakeholder confidence and market efficiency. The quality of audits is crucial in maintaining the integrity of financial accounts. High audit fees typically signify comprehensive audit initiatives and rigorous controls, demonstrating auditors' dedication to identifying and mitigating misstatements in financial reporting. This study examines the impact of financial reporting practices, including earnings management, financial manipulation, and accounting conservatism, on audit quality. This analysis, grounded in agency theory, investigates the impact of audit quality as a governance mechanism on firms' financial reporting strategies, as evidenced by fluctuations in audit fees that signify perceived audit risk and effort. The approach suggests that assertive financial reporting procedures could lead to enhanced audit quality, whilst accounting conservatism might indicate diminished audit risk. This research seeks to establish a theoretical framework for comprehending the relationship between financial reporting behavior and audit quality through the synthesis of existing knowledge. The proposed model offers practical insights for auditors, regulators, and policymakers seeking to reinforce audit effectiveness and enhance financial reporting integrity in an increasingly complex corporate environment. This study emphasizes the significance of audit quality in enhancing company transparency and safeguarding financial integrity.

Keywords: *Earnings Management, Financial Manipulation, Accounting Conservatism, Audit Quality, Corporate Governance*

1. Introduction

Financial information is crucial for external stakeholders to evaluate a company's performance and predict its future potential. For investors and shareholders, obtaining high-quality financial reports is essential for making informed economic decisions that can greatly influence their returns. The dependability and thoroughness of financial statements are essential for presenting a precise representation of a company's financial standing. Errors or gaps in information can result in misguided decisions, possible financial setbacks, and a decline in trust in the organization. Financial reporting that is overly assertive frequently includes

upward earnings management, wherein companies intentionally enhance their profits, irrespective of whether these actions align with the actual economic situation. Earnings management, often viewed as a type of creative accounting, typically operates within the confines of Generally Accepted Accounting Principles (GAAP). However, it has the potential to obscure the genuine financial performance and standing of the company. Furthermore, certain companies partake in more egregious activities, including financial manipulation, to artificially enhance their reported profits. The topic of financial manipulation is widely examined in the current corporate landscape, where managers may distort financial information for personal or organizational benefit. Due to economic pressures and sustaining a competitive edge, organizations frequently utilize intricate accounting strategies. Although these strategies may be defended to uphold investor confidence and showcase profitability, they can undermine the clarity of financial reporting and result in suboptimal management decisions and misinterpretations by stakeholders. Grasping how earnings management and financial manipulation impact audit quality will provide policymakers with valuable insights into the early indicators of financial fraud within corporations. Consequently, it is essential to assess the extent of financial manipulation to identify potential solutions that can be applied to reduce such activities within organizations.

Moreover, the application of accounting conservatism in financial reporting continues to be a contentious and extensively discussed subject in modern accounting discussions. This concept emphasizes the careful practice of acknowledging expenses and liabilities at the earliest reasonable opportunity, whereas income and assets are recognized only when there is certainty surrounding them. This unequal treatment is frequently defended by the rationale that it aims to safeguard stakeholders from undue optimism in financial reports. Nonetheless, detractors contend that an overly cautious approach may misrepresent a company's financial standing by downplaying its performance and the worth of its assets. The concept has garnered significant interest within scholarly circles as investigations persist regarding its influence on earnings quality, investor choices, and auditing methodologies (El-Habashy, 2019). Some individuals perceive conservatism as a protective measure against managerial opportunism, whereas others argue that it may hinder transparency by concealing a company's actual economic performance. Consequently, the impact of accounting conservatism on the quality of financial reporting remains a topic of continuous investigation.

Auditors play a crucial role in external corporate governance, tasked with identifying material irregularities in annual financial statements. This task necessitates that auditors possess both technical expertise and professional judgement, along with the essential resources to conduct comprehensive and impartial evaluations. Their duties extend past merely meeting legal obligations; auditors play a crucial role in sustaining public trust in financial reporting. Thorough audits and robust corporate governance practices are essential for reaching this objective. Through meticulous evaluation of financial records and adherence to relevant accounting standards, auditors play a crucial role in enhancing the credibility and transparency of financial information. Kamarudin et al. (2020) indicate that the effectiveness and efficiency of audit procedures directly influence the reliability of financial statements. When audits are performed meticulously and ethically, the resulting financial reports accurately reflect an organization’s financial status and performance. This reliability facilitates more accurate and confident decision-making for users like investors, lenders, and other stakeholders. In conclusion, reliable financial reporting enhances investor trust and contributes to overall economic stability by fostering transparency, accountability, and effective capital allocation.

In this context, the quality of audits is crucial for overseeing and addressing diverse financial reporting practices, such as earnings management, financial manipulation, and accounting conservatism. These methods, whether intended to exaggerate earnings, obscure inadequate performance, or mitigate risk, can substantially affect the audit process and the requisite level of assurance. Accurate and timely financial information is a crucial resource for investors, creditors, and regulators to evaluate a firm's performance and potential. Investors and shareholders rely on the integrity of financial statements to make informed decisions that can impact their capital allocation and return on investment. Although a growing number of studies have examined the relationship between managers' reporting behavior and audit quality, much of the existing literature focuses on developed markets. There remains a notable gap in understanding how these dynamics operate in emerging markets such as Malaysia, where institutional characteristics, regulatory structures, and governance practices differ significantly. The distinctive regulatory landscape in Malaysia, marked by progressive corporate governance reforms and notable financial scandals, presents a compelling setting for further examination. Despite the increasing academic attention on the individual effects of earnings management (EM),

accounting conservatism (AC), and financial manipulation (FM), few studies have empirically investigated their direct relationships with audit quality in the Malaysian environment. This study fills this gap by providing a proposed conceptual framework on how these different financial reporting practices affect audit quality, thereby contributing to the broader discourse on audit governance and financial transparency in emerging markets.

2. Literature Review

Audit Quality

Financial reporting is an essential instrument for conveying a company's financial status and performance to stakeholders. In this procedure, external auditors serve as intermediates, tasked with diminishing knowledge asymmetry between management and shareholders. Auditors' responsibilities extend beyond simple compliance; they are increasingly seen as protectors of financial integrity. The Public Company Accounting Oversight Board (PCAOB) asserts that audit quality must prioritize not just adherence to auditing standards but also the integrity of the audit opinion to guarantee a dependable evaluation of a company's financial statements. According to Saleh et al. (2023), audit quality serves as a crucial control mechanism for financial reporting, enabling owners to assess management's performance with greater reliability. Consequently, superior audit quality enhances the reliability of financial statements and reconciles the disparity between management's judgments and shareholders' interests.

In recent years, the audit landscape has undergone a substantial transformation due to technological advancements, regulatory changes, and evolving stakeholder expectations. The external audit landscape has undergone substantial transformation due to heightened regulatory scrutiny and the evolution of auditing standards, especially regarding audit scope, execution time, and cost. The heightened requirements will undoubtedly result in extended engagement durations and elevated audit fees, as auditors will need to allocate additional time and resources to perform thorough audits. Grigoras-Ichim et al. (2024) highlighted the importance of allocating adequate audit resources to effectively identify financial misstatements and irregularities, particularly in complex or high-risk situations. In situations where audit firms face resource limitations or tight deadlines, the integrity of audit evidence may be jeopardized, heightening the likelihood of audit failures. In a similar vein, research conducted by Lugli and Bertacchini (2023) indicates that audit firms that prioritize specialized training, digital audit tools, and industry knowledge demonstrate enhanced capabilities in identifying discrepancies and elevating audit quality.

Furthermore, the latest technological advancements have introduced an additional layer to the audit process. Digital tools like data analytics and artificial intelligence can enhance the audit process, but their successful implementation necessitates considerable initial investment, training, and technological infrastructure (Mansour, Popoola & Znaimat, 2022). Audit firms encounter the significant challenge of navigating digital transformation while upholding the necessary rigor and thoroughness mandated by regulatory bodies. Consistent with the findings of Yaacob et al. (2024), who performed an extensive bibliometric analysis on the factors influencing audit fees, the level of regulation and the intricacy of the audit were repeatedly identified as the primary contributors to variations in audit pricing.

In conclusion, the heightened demands from regulators and the growing intricacy of financial reporting necessitate that auditors allocate additional time and resources to effectively meet their obligations. The demands exert influence on the cost structure of the audit while also highlighting the critical role of robust audit practices in upholding financial integrity. To maintain audit quality, it is essential for companies to persist in their investment in training, technology, and compliance infrastructure, thereby reinforcing the auditor's role as a vital component in the corporate responsibility framework.

The Relationship between Earnings Management and Audit Quality

Within the framework of agency theory, the division of ownership and control in corporations frequently results in an information imbalance between shareholders (principals) and managers (agents). This imbalance may prompt managers to take part in self-serving actions, like manipulating earnings, to safeguard their interests. Thorough audits serve as a crucial external control mechanism to address these risks by guaranteeing the precision and reliability of financial reporting. The significance of upholding the integrity of

financial statements is further illustrated by notable corporate failures. Instances like Enron, Sunbeam, and WorldCom demonstrate that excessive manipulation of earnings can result in a company's downfall. The 1MDB scandal in Malaysia has sparked significant concerns regarding the role of auditors in misleading reporting practices. The Securities Commission of Malaysia imposed a fine of RM2.2 million on Deloitte for not reporting irregularities, highlighting the critical importance of auditors upholding their independence and professional standards.

Empirical findings highlight the significance of audit quality in curbing earnings management. Khalil and Ozkan (2016) discovered that high-quality audit reports play a crucial role in significantly curbing earnings management. In a similar vein, Alzoubi (2016) suggested that audit quality serves as a control mechanism for shareholders, restricting managers' capacity to manipulate earnings for their benefit. Recent investigations consistently validate these conclusions. For instance, Mwangi (2024) illustrated that enhanced audit quality correlates with reduced earnings management practices, resulting in improved financial reporting. Donatella et al. (2019) discovered that auditors view companies exhibiting elevated levels of earnings management as presenting greater audit risk, necessitating more comprehensive audit procedures and, as a result, increased audit fees. Alzoubi (2018) provided empirical evidence supporting this view, indicating that companies engaging in earnings management practices typically incur higher audit fees, which reflect the greater audit effort necessary to ensure the accuracy of financial statements. Furthermore, Amara et al. (2025) identified a notable inverse correlation between audit quality and earnings management, highlighting the critical role of audit quality in enhancing the integrity of financial reporting. Therefore, this investigation proposes that:
H1: *There is a positive relationship between earnings management and audit quality.*

The Relationship between Financial Manipulation and Audit Quality
In the framework of agency theory, the division between ownership and control in corporations frequently results in an information imbalance between shareholders (principals) and managers (agents). This imbalance may result in managers participating in self-serving actions, like manipulating earnings, to safeguard their interests. Thorough audits serve as a crucial external control mechanism to address these risks by guaranteeing the precision and reliability of financial reporting. The importance of maintaining the integrity of financial statements is also demonstrated by spectacular corporate collapses. Cases such as Enron, Sunbeam, and WorldCom illustrate how excessive earnings management can lead to the collapse of a company. In Malaysia, the 1MDB scandal raised concerns.

Financial manipulation refers to the deliberate alteration or exclusion of financial data designed to mislead stakeholders, frequently to fulfil managerial goals like achieving performance benchmarks, obtaining compensation, or leading stock prices. This practice undermines the integrity of financial reporting and raises significant issues for those involved in the market. In this situation, the quality of audits serves as an essential governance mechanism to guarantee that financial statements comply with recognized accounting standards and provide a truthful and precise representation of a company's financial status. Involving reputable audit providers diminishes the chances of misreporting and bolsters the confidence of investors, regulators, and other stakeholders (Ayogu, 2023).

A positive correlation must have been observed between financial manipulation and audit quality, which may seem contradictory at first. This relationship can be analyzed by examining how companies facing heightened manipulation risks may deliberately choose to hire reputable auditors to signal reliability and shape external perceptions. Ashraf et al. (2024) indicate that organizations that adopt aggressive financial reporting often seek the services of reputable audit firms, not mainly to prevent misreporting, but to mitigate potential consequences from regulators and investors. In this way, respected auditors serve a dual role as both monitors and confirming agents, especially in situations where external validation is crucial for maintaining investor confidence.

Empirical studies indicate that companies under heightened reporting pressure often pursue the services of esteemed or well-respected audit firms. Prior investigations suggest that engaging a reputable auditor may reflect a company's strategic efforts to protect its reputation and reduce legal or regulatory risks, rather than showcasing a true commitment to transparency (Christianah Pelumi Efunniyi et al., 2024). The positive relationship between financial manipulation and audit quality underscores the complex dynamics of audit

demand, reputational risk, and corporate signaling behavior in today's financial reporting landscape.
H2: *There is a positive relationship between financial manipulation and audit quality.*

The Relationship between Accounting Conservatism and Audit Quality

Accounting conservatism involves the unequal acknowledgment of economic occurrences, with expected losses being recognized more swiftly than possible gains. This principle encourages caution in financial reporting and acts as a check against excessively optimistic managerial conduct. Conservative financial statements exhibit a cautious approach and are less prone to earnings inflation, which in turn bolsters their credibility with investors and creditors. Previous studies indicate that conservatism enhances the quality of financial disclosures by curbing aggressive reporting and restricting opportunistic accounting decisions (Abdallah, 2025). Consequently, conservative accounting is often viewed as an essential tool for enhancing the reliability and informativeness of financial reports.

Based on an audit perspective, the implementation of conservative reporting practices can impact the allocation of audit resources. When firms demonstrate elevated levels of accounting conservatism, auditors might recognize a diminished level of inherent and control risk throughout the engagement. The reasoning is that conservative firms tend to be less inclined to manipulate earnings or hide financial difficulties, which in turn necessitates less rigorous audit processes. The study conducted by previous researchers reinforces this idea, indicating that conservative accounting diminishes audit effort as it represents effective internal controls and a decreased probability of material misstatements (Elshafie, 2022). Essentially, conservatism serves as a mechanism for independence that minimizes the demands placed on external auditors.

This relationship supports the hypothesis that a negative association exists between accounting conservatism and audit quality. As companies embrace more cautious financial reporting practices, their perceived necessity for esteemed or skilled auditors might diminish. In these situations, the risk environment is perceived as fundamentally simpler, reducing the firm's incentive to use expensive audit firms. Çiftci (2023) found that companies exhibiting more conservative reporting practices were less likely to transition to qualified auditors, thereby reinforcing the notion that accounting conservatism may serve as a substitute for specific elements of audit assurance. This strategic substitution holds significant importance in environments with limited resources or within organizations that maintain stable governance structures.

It is essential to recognize that this negative relationship does not inherently suggest that conservatism undermines the significance of auditing. Instead, it emphasizes how conservative accounting may diminish the additional advantages of premium audit services. Professionals in the field, acknowledging the rigor inherent in conservative accounting practices, might favor substantive analytical procedures over extensive testing, which can lead to a decrease in both audit hours and associated fees (Ndaba et al., 2021). Consequently, although conservatism and audit quality both play a role in enhancing the credibility of financial reporting, their interplay indicates a complex relationship in which conservative reporting simplifies audit processes, potentially leading to a decreased need for rigorous or significant audit services.
H3: *There is a negative relationship between accounting conservatism and audit quality.*

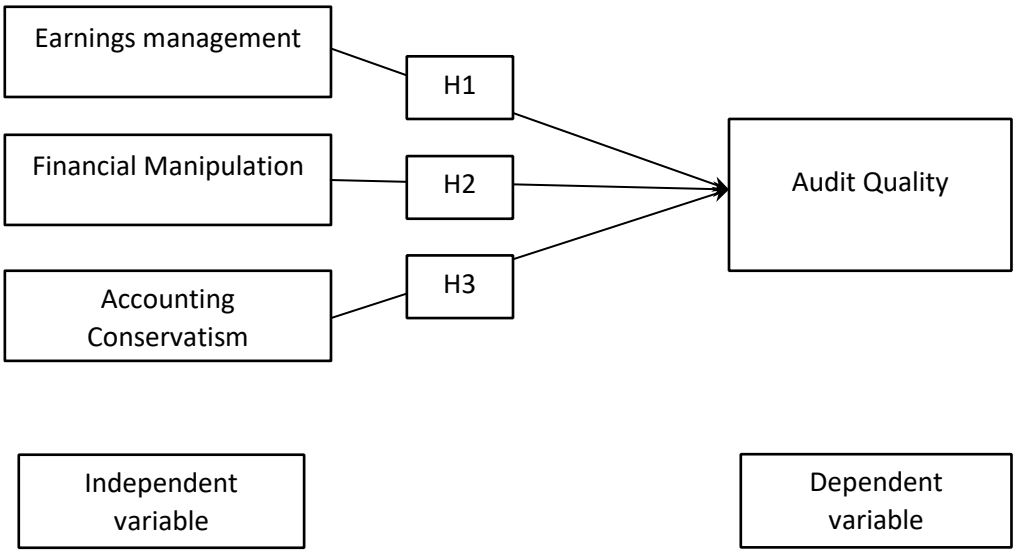
Therefore, as illustrated in Table 1, audit quality plays a critical role in shaping the dynamics of key financial practices such as earnings management, financial manipulation, and accounting conservatism. High-quality audits serve as a vital governance mechanism to curb opportunistic behavior by managers, ensuring the accuracy and credibility of financial reporting. In the case of earnings management and financial manipulation, a positive relationship with audit quality suggests that reputable auditors are often engaged either to enhance transparency or to signal reliability in the face of heightened risk and scrutiny. Conversely, the negative relationship between accounting conservatism and audit quality indicates that conservative reporting practices may reduce the perceived need for extensive audit assurance due to their inherent risk-reducing nature. Collectively, these findings emphasize that while audit quality is essential in enhancing financial reporting integrity, its effectiveness can vary depending on a company's risk profile, financial position, and strategic motivations. This underscores the importance for auditors to uphold independence and professional scepticism to maintain stakeholder trust and ensure robust oversight in financial reporting.

Table 1: Relationships Between Key Financial Practices and Audit Quality

Variable	Description	Nature of Relationship with Audit Quality	Justification	Hypothesis
Earnings Management	The use of accounting techniques by managers to manipulate reported earnings, often due to agency conflicts and information asymmetry.	Positive	High audit quality acts as a governance mechanism that restricts managerial opportunism. Empirical studies (e.g., Khalil & Ozkan, 2016; Alzoubi, 2016, 2018; Mwangi, 2024; Amara et al., 2025) confirm that better audit quality significantly limits earnings manipulation, improves transparency, and increases audit effort when earnings are perceived to be manipulated.	H1: Positive relationship between earnings management and audit quality
Financial Manipulation	Deliberate distortion of financial information to mislead stakeholders, often for managerial benefits (e.g., hitting earnings targets or stock price inflation).	Positive	Although manipulation increases audit risk, firms engaging in such practices often hire prestigious auditors to signal credibility and reduce regulatory or investor scrutiny. Studies (e.g., Ayogu, 2023; Ashraf et al., 2024; Efunniyi et al., 2024) highlight that firms use audit quality as a reputational shield, not necessarily as a tool for transparency.	H2: Positive relationship between financial manipulation and audit quality
Accounting Conservatism	A cautious approach in financial reporting where losses are recognized promptly and gains are delayed, limiting overstatement of performance.	Negative	Conservative firms signal lower risk, leading to reduced audit effort and demand for prestigious auditors. Research (e.g., Abdallah, 2025; Elshafie, 2022; Çiftci, 2023; Ndaba et al., 2021) supports that conservative reporting diminishes audit intensity and cost, as it serves as an internal check against misreporting, reducing perceived need for high-end audit services.	H3: Negative relationship between accounting conservatism and audit quality

3. Conceptual Framework

Figure 1: Conceptual Framework



The conceptual framework underlying this study, as depicted in Figure 1, is based on agency theory, which emphasizes the inherent conflicts arising from the separation of ownership and control in corporate structures. Managers acting as agents may pursue self-serving interests that are not aligned with those of shareholders (principals). In this context, audit quality serves as a key governance mechanism that aims to mitigate such agency problems by improving the credibility and transparency of financial statements. In this study, audit quality, as measured by audit fees, is considered as a dependent variable that is influenced by three key governance practices: Earnings management, financial manipulation, and accounting conservatism. Each of these independent variables is hypothesized to have a direct impact on audit quality. Earnings management is expected to increase audit effort as auditors must assess and respond to the increased risk of earnings manipulation. Financial manipulation involving the deliberate distortion of financial information is also likely to have an impact on audit quality as it increases the complexity and risk profile of the audit engagement. In contrast, accounting conservatism, characterized by the timely recognition of losses and the deferral of gains, can reduce information asymmetry and audit risk, which could reduce audit effort and associated fees. Hence, this study aims to empirically examine these hypothesized relationships in the Malaysian context, where the evolving regulatory environment and corporate governance reforms provide an appropriate backdrop for examining the determinants of audit quality. By integrating these constructs into a cohesive model, the framework offers a theoretical foundation for comprehending the impact of financial reporting behavior on the external audit process.

4. Conclusion

This conceptual paper explored the connection between financial reporting behavior, specifically earnings management, financial manipulation, and accounting conservatism, in relation to audit quality. Drawing from agency theory, this demonstrates the role of audit quality as a governance mechanism that can both react to and shape management's financial reporting discretion. By examining audit fees as an indicator of audit effort and perceived risk, the paper establishes a conceptual framework for understanding how auditors distribute their resources in relation to varying degrees of aggressiveness or conservatism in reporting.

The practice of earnings management, frequently employed by managers to portray deceptively stable or positive financial outlooks, necessitates heightened vigilance from auditors. In these situations, auditors might enhance their oversight and evaluation processes, resulting in elevated audit fees. This indicates that the quality of audits improves in contexts where financial reporting is less transparent or more prone to manipulation. Conversely, a conservative approach to accounting, which embodies a more cautious and risk-averse stance in reporting, could indicate a lower audit risk, necessitate less auditor involvement, and lead to a decrease in audit expenses. The significance of financial manipulation, characterized by the intentional

distortion of financial outcomes, is especially critical when viewed through a management lens. Although these practices are intended to enhance auditors' vigilance, prior studies indicate that manipulation may remain unnoticed if the integrity of the audit is undermined. This highlights the necessity for ongoing oversight by authorities and a strengthening of auditing standards to avert audit failures and rebuild public trust in the financial reporting framework.

This paper presents a conceptual model that emphasizes the connection between financial reporting behavior and the quality of audits. It acknowledges that external factors like the institutional framework, regulatory enforcement, audit firm capacity, and industry complexity can greatly impact this relationship. Audit quality should be regarded not merely as a passive result, but as an active management response influenced by contextual and behavioral factors. This paper offers a structured perspective that enhances the understanding of how accounting practices influence audit quality, thereby contributing to the broader conversation surrounding audit governance. Further empirical investigation is necessary to substantiate the conceptual framework and explore variations across sectors, regions, and institutions. This approach lays the foundation for stronger policy initiatives, enhancements in auditor training, and regulatory changes designed to uphold the reliability and integrity of financial reporting within the corporate sector.

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Engaging Generation Z in Accounting Education: A Student-Centred and Technology-Enhanced Approach to Overcoming Passive Learning

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Abstract: This conceptual paper proposes a pedagogical framework for transforming accounting education to meet the learning needs and expectations of Generation Z. Drawing on constructivist learning theory and self-determination theory (SDT), the framework advocates for a shift away from passive, lecture-centric models to a student-centred, technology-enhanced, and engagement-driven approach. Generation Z students are characterized by digital fluency, autonomy-seeking behaviors, and a preference for experiential learning, which requires innovative instructional strategies that foster deeper cognitive engagement, motivation, and real-world skill development. The paper introduces a three-pillar framework comprising student-centred learning, technology-enhanced instruction, and active engagement design, each reinforced by empirical evidence and contemporary teaching practices. Key pedagogical strategies such as flipped classrooms, gamification, collaborative technologies, and real-world simulations are discussed as practical applications of the framework. The integration of these approaches supports autonomy, competence, and relatedness, which are psychological needs central to SDT, while promoting knowledge construction through authentic, interactive experiences. The paper concludes with implications for educators, institutions, policymakers, and industry, offering a blueprint for curricular innovation that aligns accounting education with the demands of the modern profession and the learning profiles of Generation Z.

Keywords: *Active learning; Accounting education; Constructivism; Digital pedagogy; Generation Z; Self-Determination Theory; Student-centred learning; Technology-enhanced instruction*

1. Introduction

The landscape of accounting education is evolving rapidly, influenced by technological disruption, global business complexity, and changing learner expectations. Generation Z, individuals born between 1995 and 2012, has emerged as the dominant demographic in higher education. These learners have been shaped by digital technologies, real-time information access, and socially networked environments. As a result, they value autonomy, interactivity, and meaningful engagement over traditional teaching instruction. Despite this shift, accounting education remains largely restricted to lecture-based delivery, emphasizing memorization and compliance over critical thinking and application. This traditional model fosters passive learning, where

students receive information but engage minimally in constructing knowledge. Research indicates that passive learning environments contribute to reduced motivation, poor retention, and insufficient skill development (Bui & Porter, 2010).

This paper proposes a conceptual framework for overcoming passive learning through student-centred pedagogy and the integration of digital technologies. Anchored in constructivist and self-determination theories, the framework emphasizes active engagement, learner autonomy, and authentic learning experiences aligned with Generation Z's cognitive and motivational profile. Generation Z is often described as the most connected, mobile, and tech-savvy generation in history (Mohr & Mohr, 2017). They are accustomed to accessing information on demand and prefer visual, interactive, and personalized content. In educational settings, Generation Z students expect immediate feedback, collaborative opportunities, and technology integration (Seemiller & Grace, 2016). In accounting education, these expectations often go unmet. The traditional curriculum relies on standard lectures, textbook assignments, and individual exams, misaligned with Generation Z's learning style. This misfit contributes to disengagement, surface-level learning, and a lack of readiness for the dynamic accounting profession. Addressing this gap requires pedagogical redesigns that embrace digital tools, flexibility, and learner agency.

2. Theoretical Framework

The conceptual framework presented in this paper is grounded in two complementary educational theories: constructivism and self-determination theory (SDT). These theoretical perspectives provide a robust foundation for reimagining accounting education in a way that actively engages Generation Z learners and addresses the shortcomings of traditional, passive pedagogical models.

Constructivism, rooted in Vygotsky's work (1978), emphasizes the active role of learners in constructing knowledge. Rather than being passive recipients of information, students are considered co-constructors of meaning who learn most effectively through experiences that require them to interact, reflect, and apply concepts in authentic contexts. This perspective is particularly important in accounting education, where learners must develop the ability to interpret, analyze, and make judgments based on financial and non-financial information. According to constructivist theory, meaningful learning occurs when students are given opportunities to engage with content through collaboration, problem-solving, and contextualized inquiry, which are practices often absent in lecture-dominated classrooms (Zainuddin & Halili, 2016).

Vygotsky's idea of the Zone of Proximal Development (ZPD) supports this approach by suggesting that learners can achieve a deeper understanding when guided by peers or more knowledgeable facilitators. For Generation Z students, who value peer collaboration and social learning, this theory highlights the importance of designing learning environments that incorporate teamwork, dialogic interaction, and peer feedback. The use of digital tools such as collaborative platforms and real-time discussion boards operationalizes constructivist principles by enabling synchronous and asynchronous knowledge building (Yuan et al., 2025).

Self-Determination Theory (SDT), developed by Deci & Ryan (1985), complements constructivism by offering a psychological framework for understanding intrinsic motivation and its role in learner engagement. SDT proposes that individuals are naturally inclined to grow and learn when their psychological needs for autonomy, competence, and relatedness are fulfilled (Ryan & Deci, 2020). Supporting the psychological needs of students enhances intrinsic motivation and classroom engagement (Niemiec & Ryan, 2009). In educational contexts, these needs play a critical role in determining whether students experience genuine engagement and motivation.

Applying SDT to accounting education suggests that when learning environments are designed to support these three psychological needs, students are more likely to engage meaningfully with content. Autonomy can be fostered by allowing students to choose project topics or presentation formats. Competence is nurtured through scaffolded learning activities, adaptive technologies, and formative feedback. Relatedness, which is often lacking in passive learning settings, is strengthened through group work, peer support, and teamwork tools, especially when these technologies mimic real-life professional interactions (Wang et al., 2024).

Integrating constructivist and SDT-based approaches creates a powerful pedagogical synergy. Constructivism provides the epistemological rationale for active, experiential, and student-led learning, while SDT offers a motivational structure to sustain engagement over time. Together, these theories advocate for a shift from transmissive to participatory learning, in alignment with the values and preferences of Generation Z learners (Yuan et al., 2025; Ryan & Deci, 2020).

For instance, a constructivist–SDT-informed lesson on financial reporting might involve small student groups analyzing real-world financial statements using collaborative software. They could present their findings via digital dashboards or short video reports, receiving both peer and instructor feedback. Such an environment fosters critical thinking (constructivism) while promoting autonomy (through choice), competence (through scaffolding), and relatedness (through collaboration), thus aligning with SDT.

In summary, constructivism and self-determination theory provide both the philosophical grounding and practical direction for designing educational experiences that are responsive to the needs of Generation Z. They encourage a shift in focus from content delivery to learner empowerment, aligning pedagogy with the cognitive, emotional, and social dimensions of modern learners. For accounting educators seeking to overcome passive learning and promote deep engagement, these theories offer a compelling and evidence-based blueprint for innovation.

Key Pedagogical Strategies

To operationalize the conceptual framework and effectively engage Generation Z learners in accounting education, this section presents four interrelated pedagogical strategies. These strategies are based on ideas from constructivist and self-determination theory (SDT) and turned into practical ways to encourage independence, skill development, connection with others, and active learning. By leveraging educational technologies and student-centred designs, they address the limitations of traditional passive learning models and enhance both motivation and real-world applicability.

Flipped Classrooms

The flipped classroom model reimagines the learning process by assigning content such as recorded lectures or interactive media for students to review outside of class, reserving in-class time for higher-order tasks like discussion, analysis, and collaborative problem solving. This approach aligns with Generation Z's preference for flexible, self-paced digital learning (Zainuddin & Halili, 2016) and supports autonomy by allowing students to engage with content on their terms. In accounting education, flipped classrooms can be particularly effective for topics such as financial reporting or cost management. Students may watch a lecture on IFRS principles before class, then apply those concepts through group case analyses or journal entry critiques during in-class sessions. This format fosters accountability, encourages active learning, and promotes peer interaction. It also aligns with constructivist pedagogy by encouraging learners to build knowledge collaboratively and reflectively. From an SDT perspective, the approach enhances autonomy (through flexible learning), competence (through structured in-class tasks), and relatedness (through peer collaboration) (Ryan & Deci, 2020; Wang et al., 2024).

Gamification

Gamification involves applying game-based elements such as points, badges, leaderboards, and challenges to non-game educational contexts to improve motivation and engagement (Subhash & Cudney, 2018). For Generation Z, who have grown up with interactive digital platforms, gamification makes learning both familiar and stimulating. In accounting, gamification can be implemented using tools like Kahoot!, Quizizz, or Socrative to reinforce concepts through competitive quizzes and real-time feedback. More advanced applications include business simulation games where students manage virtual firms or act as auditors, resolving ethical dilemmas. These tools promote competence by enabling progressive learning and feedback loops, while also supporting constructivist learning through hands-on engagement with real-world scenarios (Yuan et al., 2025). Gamified systems also allow for iteration, encouraging students to try, fail, and improve without penalty, which aligns closely with SDT's emphasis on mastery-based motivation (Wang et al., 2024).

Collaborative Technologies

Generation Z learners thrive in digitally connected environments and are accustomed to collaboration through platforms like Google Workspace, Microsoft Teams, or Slack. Integrating these tools into accounting instruction

supports social learning and nurtures relatedness, a core SDT component (Yuan et al., 2025). For instance, students might co-develop financial reports using shared documents, brainstorm in Jamboard or Padlet, or conduct remote audit simulations using Zoom breakout rooms. These practices facilitate constructivist learning by encouraging peer feedback, negotiation of meaning, and shared problem-solving (Zainuddin & Halili, 2016). Collaborative technologies also promote student agency, as learners take on roles, distribute responsibilities, and engage in iterative content creation, reinforcing both autonomy and competence (Ryan & Deci, 2020).

Real-World Simulations

Real-world simulations represent the most immersive form of experiential learning. In accounting, this may involve using industry-standard tools like Xero, QuickBooks, or Sage to mimic real business processes. Students might simulate month-end closing, prepare and interpret financial statements, or investigate control failures in a forensic accounting context. These simulations encourage students to apply theoretical concepts in dynamic, professional scenarios, enhancing deep learning and practical readiness. Generation Z students, in particular, respond positively to authentic learning experiences that mirror real workplace challenges (Wang et al., 2024). From a theoretical perspective, simulations represent constructivist learning because they require students to combine and organize their knowledge, and they support Self-Determination Theory by promoting independence (making their own choices), skill development (facing realistic challenges), and teamwork (working with others).

3. Conceptual Framework

The proposed conceptual framework for engaging Generation Z in accounting education is built on three interconnected and mutually reinforcing pillars: Student-Centred Learning, Technology-Enhanced Instruction, and Active Engagement Design. These pillars are grounded in constructivist and self-determination theory (SDT) and are strategically aligned with the unique characteristics and learning preferences of Generation Z. Together, they form a cyclical model that emphasizes feedback, personalization, and continuous pedagogical refinement (Wang et al. 2024; Sharma, 2025).

Student-Centred Learning

Student-centred learning (SCL) is a shift from teacher-directed instruction to learner-driven engagement. In this model, educators act as facilitators who guide students in setting goals, reflecting on progress, and collaborating to solve problems (Ryan & Deci, 2020). For Generation Z learners, who seek autonomy, relevance, and personalized experiences, SCL creates opportunities for greater agency and intrinsic motivation. Studies show that such learner-centred approaches not only enhance academic performance but also develop higher-order thinking skills and metacognitive awareness (Nugraheni et al., 2022; Yuan et al., 2025). In accounting education, SCL can take the form of student-led case analyses, peer-teaching activities, or customizable project work that promotes autonomy and reflective practice (Sharma, 2025).

Technology-Enhanced Instruction

Technology plays a crucial role in enabling flexible, accessible, and interactive learning environments. For a generation that is digitally fluent and accustomed to mobile, real-time content, technology-enhanced instruction (TEI) responds directly to their cognitive and behavioral expectations (Dinata, 2024). TEI includes the use of accounting software for practice, AI-enabled feedback tools, and virtual simulations that mimic workplace environments. These tools support differentiated instruction, provide instant feedback, and enhance data-driven decision-making by educators (Wlodarski et al., 2025). TEI aligns with constructivist principles by promoting experiential and contextualized learning, and with SDT by fulfilling students' psychological needs for competence and autonomy (Wang et al., 2024; Ryan & Deci, 2020).

Active Engagement Design

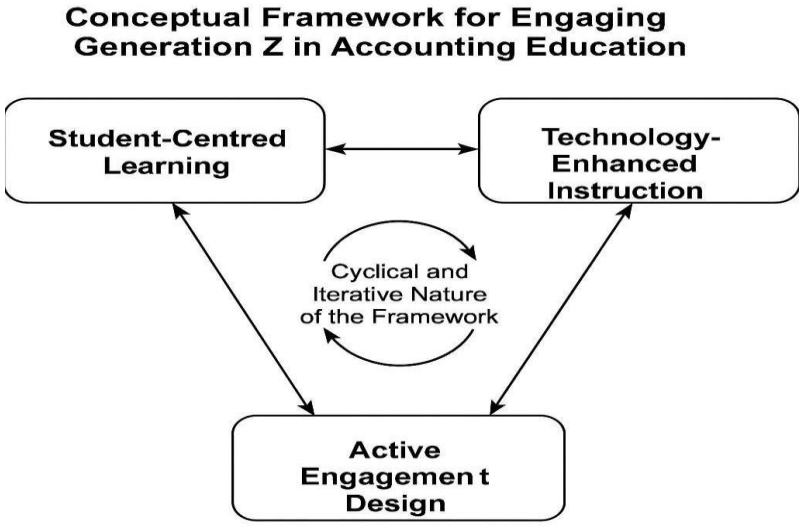
Active engagement design refers to the intentional structuring of learning experiences that require participation, collaboration, and critical thinking. This includes flipped classrooms, gamification, real-world simulations, and problem-based learning (Subhash & Cudney, 2018; Zainuddin & Halili, 2016). These strategies transform students from passive observers into active participants in constructing knowledge. For example, gamified accounting tasks and financial simulation games have been shown to improve learning motivation

and conceptual understanding among Gen Z students (Dinata, 2024; Wlodarski et al., 2025). Such environments stimulate relatedness through teamwork, promote competence via scaffolded challenges, and enhance autonomy by giving learners choices in their learning processes (Yuan et al., 2025; Sharma, 2025).

Cyclical and Iterative Nature of the Framework

The integration of these three pillars is non-linear and cyclical. Learning is conceptualized as an ongoing process, shaped by continuous feedback, iteration, and adaptation. For instance, a flipped classroom may begin with self-paced learning (student-centred), supported by video content and adaptive tools (technology-enhanced), followed by in-class simulation tasks (active engagement) and concluded with peer and instructor feedback. This feedback loop encourages reflection, refines pedagogical strategies, and enhances learning outcomes over time (Nugraheni et al., 2022; Wang et al., 2024). As both learners and educators engage in this iterative cycle, the learning environment evolves to better address emerging needs, preferences, and industry demands.

Figure 1: Conceptual Framework for Engaging Generation Z in Accounting Education



4. Implications for Curriculum and Policy

The adoption of this conceptual framework has significant implications for curriculum design, institutional policy, and broader educational reform in accounting programs. To bridge the gap between traditional instruction and the expectations of Generation Z learners, stakeholders at all levels must commit to a systemic transformation of accounting education. This transformation requires the coordinated involvement of four key stakeholder groups: educators, institutions, policymakers and accreditation bodies, and industry employers. Plays a distinct yet interconnected role in implementing and sustaining meaningful changes to accounting education. Each of these stakeholders plays a distinct role in ensuring that accounting curricula are not only content-rich but also technologically integrated, student-centred, and professionally relevant (Sharma, 2025). Their collective commitments are essential to creating a learning ecosystem that is student-centered, technologically integrated, and responsive to the evolving demands of the accounting profession.

Educators must shift from being content deliverers to learning facilitators. This role requires a deep understanding of pedagogical theory, familiarity with educational technologies, and a commitment to ongoing professional development. Faculty should be supported in developing competencies related to instructional design, digital pedagogy, and formative assessment. Moreover, educators should adopt reflective and adaptive teaching practices, regularly analyzing student feedback and performance data to refine their approach. This also means fostering inclusive and supportive environments that accommodate diverse learning preferences and promote student well-being. Research highlights the importance of ongoing professional development and adaptive teaching informed by student feedback and learning analytics (Wang et al., 2024; Yuan et al., 2025).

At the institutional level, investment in digital infrastructure is essential. This includes not only hardware and software but also the human support systems, such as instructional designers, e-learning specialists, and IT support staff, which enable effective implementation of technology-enhanced instruction. Institutions must also prioritize faculty training and incentive structures that reward innovation in teaching. Teaching excellence should be recognized along with research output in performance evaluations and promotion criteria. Cross-disciplinary collaboration between education, technology, and accounting faculties can further support pedagogical innovation. A cross-disciplinary approach involving accounting, education, and IT departments has been shown to enhance the implementation of technology-driven pedagogies (Dinata, 2024; Nugraheni et al., 2022).

For policymakers and accreditation bodies, the framework calls for revised standards that prioritize student engagement, technology integration, and skill alignment with industry needs. New accreditation benchmarks should include experiential learning, real-world simulations, and evidence of learner agency. Professional bodies and regulators, such as accounting associations and chartered institutes, should provide guidelines and resources that encourage the integration of digital tools and active learning strategies into accredited programs. Recent guidelines from education councils and professional associations stress the need to embed soft skills and digital literacy in accounting curricula (Sharma, 2025; Wlodarski et al., 2025). These efforts will ensure that accounting graduates are not only technically competent but also adaptable, collaborative, and ethically grounded professionals.

From an industry perspective, the proposed framework supports the development of future-ready graduates equipped with analytical, ethical, and digital competencies. In today's volatile and technology-driven business environment, employers increasingly seek candidates who can think critically, collaborate across disciplines, and leverage digital tools for effective decision-making, traits that are nurtured through active, student-centred instruction (Yuan et al., 2025; Ryan & Deci, 2020). By institutionalizing a pedagogical approach grounded in autonomy, collaboration, and real-world engagement, accounting education can align more closely with the demands of the 21st-century workforce. This framework ensures that students not only acquire foundational accounting knowledge but also develop the professional and technological skills essential for thriving in dynamic roles such as financial analysts, auditors, consultants, and data-driven decision-makers.

5. Conclusion

The evolution of accounting education is not merely a matter of updating course content or incorporating digital tools; it demands a fundamental rethinking of pedagogical paradigms in response to generational change and technological transformation. Generation Z students bring with them distinct expectations shaped by a digitally saturated and socially networked upbringing. They value autonomy, relevance, real-time feedback, and experiential learning; preferences that contrast sharply with the passive, lecture-dominated methods that have long characterized accounting instruction.

This paper has presented a conceptual framework that addresses this disconnect by integrating three core pillars: student-centred learning, technology-enhanced instruction, and active engagement design. Grounded in constructivist and self-determination theories, the framework promotes participatory, personalized, and purpose-driven learning environments that empower students to take an active role in their educational journey. It encourages pedagogical strategies that cultivate curiosity, competence, collaboration, and critical thinking.

Approaches such as flipped classrooms, gamified assessments, collaborative technologies, and real-world simulations exemplify the kind of innovation needed to transform accounting education into an interactive and meaningful experience. These strategies not only enhance engagement and satisfaction but also foster professional capabilities like analytical reasoning, ethical judgment, and digital fluency as demanded by the modern accounting profession.

By adopting this framework, educators can move beyond content delivery and embrace a more dynamic, reflective, and responsive teaching approach. Institutions that support this transformation through investment in infrastructure, faculty development, and curricular innovation will be better equipped to meet the evolving

expectations of both learners and employers.

Ultimately, this conceptual model offers more than just a set of techniques; it provides a sustainable roadmap for revitalizing accounting education in the digital age. It challenges all stakeholders to view pedagogy as an evolving process of engagement, adaptation, and co-creation. By aligning educational practices with the realities of Generation Z and the demands of a data-driven economy, accounting programs can produce graduates who are not only technically proficient but also innovative, adaptable, and ready to lead in a rapidly changing world.

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Abstract: This study examines the current adoption of Audit Data Analytics (ADA) among external auditors in Malaysia and explores their perceptions regarding adoption plans, perceived opportunities, and challenges associated with ADA implementation. While ADA has the potential to transform traditional audit practices, its adoption remains inconsistent across audit firms, raising concerns about readiness and perceived benefits. A quantitative survey methodology was adopted, using a structured questionnaire distributed to external auditors from audit firms in Klang Valley, Penang, and Johor. A total of 221 responses were collected and analyzed using descriptive statistics and reliability assessments via SPSS. The findings reveal that while many firms recognize the benefits of ADA, such as improved audit quality and greater transaction testing capabilities, actual adoption levels vary significantly across audit areas. Key challenges identified include client concerns over data confidentiality, insufficient ADA expertise, and inadequate technological infrastructure. This study contributes to current literature by providing empirical insights into ADA adoption within Malaysia's external auditing sector, an area previously underexplored. The findings offer practical implications for audit firms, regulators, and professional bodies seeking to promote ADA adoption and advance digital transformation in the auditing profession.

Keywords: *Audit Data Analytics (ADA), External Auditing Practices, Digital Transformation, Adoption Barriers, Malaysian Audit Firms*

1. Introduction

The evolution and latest innovations in technology over the past three decades have enabled auditors to leverage several modern technologies within the auditing sector (Mugwira, 2022). The auditing profession is increasingly exploring the usage of technology to enhance audit quality, efficiency, and effectiveness. One such innovation is the use of Audit Data Analytics (ADA), which has the potential to transform traditional audit practices. However, the level of adoption and the perceptions of external auditors regarding ADA remain underexplored, particularly in the Malaysian context. External auditors' views on the opportunities and challenges in adopting ADA, as well as their firms' plans to adopt this technology, are critical in understanding the pace and direction of this shift. The lack of comprehensive insights into ADA adoption in current audit practices, coupled with the uncertainties surrounding its perceived benefits and barriers, may hinder the broader implementation of data analytics in auditing.

This study seeks to address this gap by examining the current state of ADA adoption among external auditors in Malaysia and exploring their perceptions on the adoption timeline, the opportunities, and the challenges that come with embracing ADA in the audit process. Understanding these perspectives will be vital for audit firms, regulators, and professional bodies aiming to facilitate the successful integration of ADA into audit practices. To understand the current practices of ADA implementation and the perceptions of the external auditors, the following research questions are formulated:

- What is the current state of ADA adoption among external auditors in Malaysia?
- What are the perceptions of external auditors regarding their firm's plan to adopt ADA?
- What are the perceptions of external auditors regarding the opportunities of adopting ADA?
- What are the perceptions of external auditors regarding the challenges of adopting ADA?

The rest of this paper is structured as follows. Section 2 presents the literature review, and this is followed by Section 3, which discusses the research methodology. The next section presents the findings and discussion of

the research, and finally, section 5 concludes the study, research implications and future research agenda.

2. Literature Review

Recent literatures highlight the growing intersection of the accounting field and digital technologies such as artificial intelligence (AI) and data analytics. Ellili, Nobanee, Haddad, Alodat, and AlShalloudi (2024) identified AI applications as an emerging frontier in forensic accounting research, emphasizing their potential for enhancing fraud detection and bridging gaps in existing audit practices. Supporting this, Chávez-Díaz, Aquiño-Perales, De-Velazco-Borda, Villagómez-Chinchay, and Flores-Sotelo (2024) conducted a bibliometric analysis confirming AI's expanding role in accounting and auditing, particularly in automating fraud detection and supporting financial decision-making processes. Similarly, Mustafa Airout, Abu Azam and Airout (2024) highlighted global trends in forensic accounting's adoption of data analytics tools to improve investigative accuracy and fraud risk management, though they also noted persistent challenges such as data privacy concerns and limited technical expertise. Collectively, these studies highlighted the accelerating digital transformation of auditing and accounting, as well as the technological factors shaping its implementation.

Audit Data Analytics (ADA) is a key part of digital transformation, using advanced tools to analyze large datasets for risk identification, fraud detection, and improving audit assurance. The benefits of ADA adoption are well-documented in the literature. Salijeni, Samsonova-Taddei, and Turley (2019) described ADA as enabling auditors to transition from sample-based methods to full-population data testing, thereby increasing the scope and reliability of audit findings. Brown-Liburd and Vasarhelyi (2015) further emphasize ADA's capacity to support fraud detection, improve risk assessment, and strengthen audit evidence through data-driven insights. Eilifsen, Kinserdal, Messier and McKee (2020) argued that ADA enabled more comprehensive transaction analysis, improved anomaly detection and supported the generation of actionable audit insights. By facilitating real-time and continuous audit processes, ADA enhances audit efficiency and quality. Technologies such as big data analytics enhance audit productivity, financial management, and risk management processes (Hanfy, Alakkas & Alhumoudi, 2024).

However, practical adoption remains uneven, particularly in applying advanced ADA techniques such as predictive analytics and machine learning. From a practitioner perspective, Vitali and Giuliani (2024) reported that digitalization can lead to changes in the organizational structure of audit firms and further widen the gap between Big Four and non-Big Four firms. This technological divide is supported by Eilifsen et al. (2020), who highlighted that the use of Audit Data Analytics (ADA) remains relatively limited, with the adoption of more advanced ADA techniques being particularly rare. Liew, Boxall and Setiawan (2022) provided evidence of ADA adoption within Big Four firms. Their study highlighted that ADA implementation requires not only technological investments but also staff training, leadership support, and organizational restructuring. Despite these efforts, challenges such as data integration complexity, security concerns, and internal resistance persist even among large firms. The study also highlights that smaller audit firms often lack the resources and infrastructure necessary for effective ADA integration.

In Malaysia, Jacky and Sulaiman (2022) found that while auditors recognize ADA's potential to improve fraud risk evaluation, substantive testing, and audit planning, its adoption remains limited, especially among small and mid-tier firms. Most Malaysian auditors reportedly rely on basic tools like Excel rather than more advanced applications such as Power BI or Tableau, due to constraints in technical skills, financial resources, and organizational readiness. Regulatory ambiguity and a lack of clear professional guidelines further compound these adoption challenges.

In conclusion, while global and regional studies highlighted ADA's transformative potential in enhancing audit effectiveness, fraud detection, and risk management, adoption remains hindered by technological, organizational, and regulatory constraints. Larger firms are more advanced in ADA implementation, whereas small and mid-sized firms, particularly in Malaysia, lag due to practical and structural challenges. Existing studies focus mainly on how audit firms, at the organizational level, plan and manage the adoption of Audit Data Analytics (ADA), with limited attention given to how practitioners themselves use and perceive these technologies in practice. To address this gap, the present study explores current ADA practices and the perceptions of Malaysian external auditors regarding its opportunities and barriers, providing a practical

understanding that complements the broader theoretical discourse.

3. Methodology

A survey questionnaire was developed to assess the current adoption and plans to adopt the ADA among audit firms. The survey questionnaire is sent via email to auditors attached to the audit firms located in Klang Valley, Penang, and Johor using the list of audit firms registered with MIA. A total of 300 questionnaires were sent out, representing approximately 20% of the population. The respondents were selected through a stratified random sampling method to ensure representation across different sizes and types of audit firms. Follow-up emails are made at intervals, and regular personal telephone calls are made to solicit responses from these audit professionals. Data collected from the survey questionnaire are analyzed using the Statistical Package for the Social Sciences (SPSS).

Reliability Test Analysis

Cronbach's Alpha is a systematic measure of the scale and scores of variances (Brown, 2002). This is a useful tool to measure the reliability score and results. The score of scale reliability is a correlation efficiency measure between the range of 0 to 1. There is a rule of thumb pertaining to the Cronbach's alpha value as shown in Table 1.

Table 1: Rule of Thumb on Cronbach's Alpha

Alpha Coefficient Range	Strength of Association
<0.6	Poor
0.6 to < 0.7	Moderate
0.7 to < 0.8	Good
0.8 to < 0.9	Very Good
0.9	Excellent

Source: (Hair, J. F. Jr., Babin, B., Money, A. H., & Samouel, 2003).

The reliability test was conducted based on 221 respondents. The results of the reliability test in Table 2 below showed that all constructs have Cronbach's Alpha values greater than 0.8. In conclusion, all constructs have met the required reliability.

Table 2: Summary of Reliability Test Analysis

No.	Components	Cronbach's Alpha	No. of items
1	Audit Data Analytics Applications	0.947	17
2	Plans to adopt and apply data analytics	0.953	17
3	Perceived Opportunities	0.951	10
4	Perceived Challenges	0.862	11

Source: Developed for the research.

4. Findings and Results

The results section will present the findings from the data analysis, including descriptive statistics, reliability, and validity assessments.

Descriptive Statistics

This section will provide an overview of the demographic characteristics of the respondents, such as firm size, number of years in operation, and the extent of ADA use.

Demographic Characteristics

Gender

The survey questionnaire gathered perceptions from 132 (59.7%) male respondents and 89 (40.3%) female respondents (N = 221) from the audit professionals in the external audit field.

Table 3: Frequency Distribution for Gender

Gender	Frequency, N =221	Percent
Female	89	40.3
Male	132	59.7

Source: Developed from the research.

Age

The largest age group is between 25-34 years (29.0%), followed by those between 35-44 years (23.1%), 45-54 years (22.2%), over 55 years (18.1%), and the smallest age group is less than 24 years (7.7%).

Table 4: Frequency Distribution for Age

Age	Frequency, N =221	Percent
< 24	17	7.7
25 - 34	64	29.0
35 - 44	51	23.1
45 - 54	49	22.2
> 55	40	18.1

Source: Developed from the research

Qualification

Respondents holding professional qualifications only are the highest with 74 (33.5%), and those with both professional qualifications, either undergraduate and postgraduate qualifications, are 49 (22.2%) and 4 (1.8%) respectively. Only one respondent (0.5%) attained a PhD qualification. While 81 (36.7%) indicated that they only possessed professional qualifications.

Table 5: Frequency Distribution for Qualification

Qualification	Frequency, N =221	Percent
Bachelor degree	74	33.5
Master degree	4	1.8
PhD	1	0.5
Professional qualification	81	36.7
Professional qualification, Bachelor's degree	49	22.2
Professional qualification, Master's degree	4	1.8
Bachelor's degree, Master's degree	5	2.3
Bachelor's degree, Master's degree, Professional qualification	3	1.4

Source: Developed from the research

Years of Experience

More than half of the respondents have been in the industry for a while, with over 10 years of experience, with 130 (58.8%). The remaining respondents' years of experience are almost evenly distributed. With both less than 2 years and between 2-4 years with 23 (10.4%) each, between 5-7 years with 25 (11.3%), and 8-10 years with 20 (9.0%).

Table 6: Frequency Distribution for Years of Experience

Years of Experience	Frequency, N =221	Percent
< 2 years	23	10.4
2 - 4 years	23	10.4
5 - 7 years	25	11.3
8 - 10 years	20	9.0
More than 10 years	130	58.8

Source: Developed from the research

Current Position

A significant majority of the respondents are partners, totaling to 100 (45.2%) responses, followed by audit managers with 49 (22.2%), junior auditors with 30 (13.6%), semi-seniors with 29 (13.1%), assistant audit manager with 10 (4.5%) and senior auditor with 3 (1.4%) respondents respectively. Overall, decision makers consisting of partners and audit managers make up 67% of the survey respondents.

Table 7: Frequency Distribution for Current Position

Position	Frequency, N =221	Percent
Junior Auditor	30	13.6
Semi-Senior	29	13.1
Senior Auditor	3	1.4
Assistant Audit Manager	10	4.5
Audit Manager	49	22.2
Partner	100	45.2

Source: Developed from the research

Firm Size

Audit firms operating as sole proprietors make up 34.4% (87 firms), followed by firms with 2-4 partners with 38.0% (84 firms), more than 10 partners with 15.8% (35 firms), and the smallest group with 5-9 partners with 6.8% (15 firms).

Table 8: Frequency Distribution for Firm Size

Firm Size	Frequency, N =221	Percent
Sole proprietor	87	39.4
2 - 4 partners	84	38.0
5 - 9 partners	15	6.8
> 10 partners	35	15.8

Source: Developed from the research

Current Practices of Audit Data Analytics (ADA)

Table 9 Explained the current practices of data analytics among audit firms. The “areas” column lists the seventeen audit areas or tasks being analyzed in the audit process. Frequency indicates the number of occurrences or instances related to each audit area. The “percent” column represents the percentage of occurrence of each audit area out of the total. These frequencies and percentages indicate the relative importance or focus on each area within the context of data analytics adoption among the audit firm.

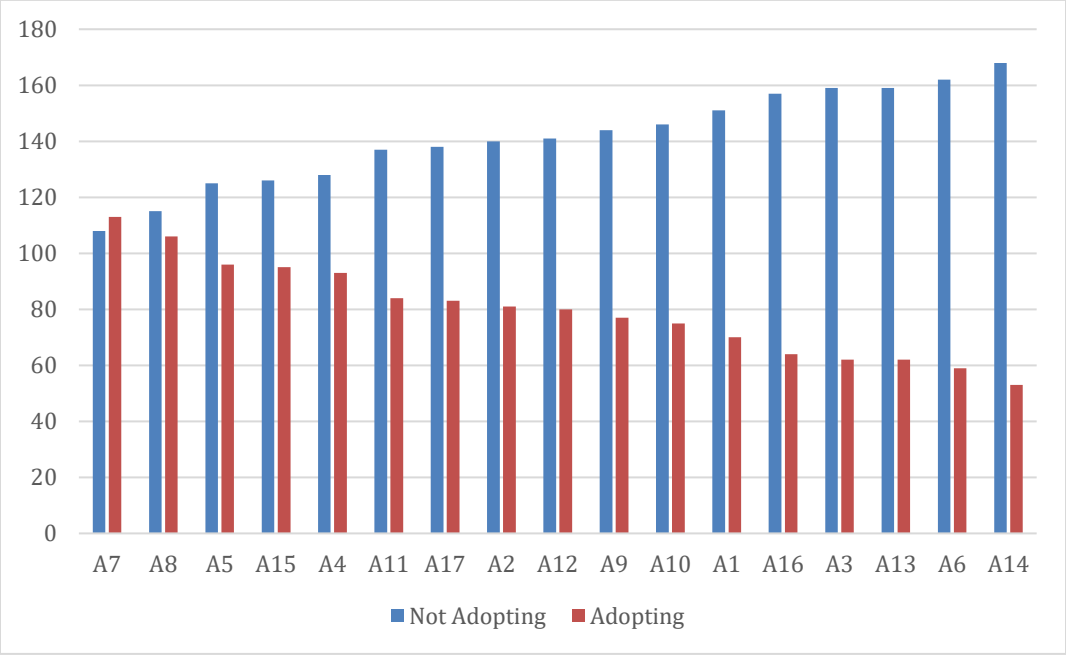
According to Figure 1, the area of map sales, receivables, receipts processes (A7) has the highest frequency of 113, accounting for 51.1% of the total occurrences. Map purchase, payables, and payment processes (A8) closely follow with a frequency of 106, representing 48.0% of the total occurrences. Analyze journal entries with unusual frequency or timing of entries (A5) and identify significant changes in general ledger account balances between years and correlations (A15), also have relatively high frequencies at 96 and 95, respectively. Analyze journal entries with unusual amounts (A4) follows closely with a frequency of 93. The map production process to track inventory movements (A6) and map costs charged to fixed assets, payments, and capitalizing labor costs (A14) has the lowest frequency at 59 and 53, respectively.

Table 9: Current Practices of ADA among audit firms

	Areas	Frequency	Percent
A1	Test unauthorized log entries	70	31.7
A2	Divide accounts and log entries	81	36.7
A3	Test inactive accounts	62	28.1
A4	Analyze journal entries with unusual amounts	93	42.1
A5	Analyze journal entries with unusual frequency or timing of entries	96	43.4
A6	Map production process to track inventory movements	59	26.7
A7	Map sales, receivables, and receipts processes	113	51.1
A8	Map purchase, payables, payment processes	106	48.0
A9	Map customers' orders, shipping documents, and sales invoices	77	34.8
A10	Map shipping documents, sales invoices, and receipts	75	33.9
A11	Map purchase orders, supplier invoices and payments	84	38.0
A12	Map dates of suppliers' invoices with dates on purchase orders	80	36.2
A13	Map the pay earned by employees to the amount paid to employees	62	28.1
A14	Map costs charged to fixed assets, payments, and capitalizing labor costs	53	24.0
A15	Identify significant changes in general ledger account balances between years and correlations	95	43.0
A16	Search for loans receivable and interest-bearing liabilities for abnormally high or low interest rates	64	29.0
A17	Search for duplicate purchase orders, duplicate payments to suppliers, or any unusual information relating to suppliers	83	37.6

Source: Developed from the research

Figure 1: Adoption and non-adoption of DA



Source: Developed from the research

Plan to adopt Data Analytics.

Table 10 Shows the plan to adopt data analytics in relation to the different audit areas. The table categorizes the plan to adopt data analytics within 2 years, within 3-5 years, no plan to adopt, and not applicable (NA). These timeframes represent the organizations' intended plans to incorporate data analytics into their audit processes.

Table 10: Plan to adopt Data Analytics

	Areas	Within 2 years	Within 3-5 years	No plan	NA
A1	Test unauthorized log entries	43	55	53	70
A2	Divide accounts and log entries	35	56	46	84
A3	Test inactive accounts	41	53	63	64
A4	Analyze journal entries with unusual amounts	29	57	45	90
A5	Analyze journal entries with unusual frequency or timing of entries	29	53	47	92
A6	Map production process to track inventory movements	42	61	59	59
A7	Map sales, receivables, and receipts processes	30	48	37	106
A8	Map purchase, payables, payment processes	34	47	39	101
A9	Map customers' orders, shipping documents, and sales invoices	43	52	47	79
A10	Map shipping documents, sales invoices, and receipts	40	57	45	79
A11	Map purchase orders, supplier invoices, and payments	38	55	44	84
A12	Map dates of suppliers' invoices with dates on purchase orders	35	53	49	84
A13	Map the pay earned by employees to the amount paid to employees	39	61	62	59
A14	Map costs charged to fixed assets, payments, and capitalizing labor costs	42	63	62	54
A15	Identify significant changes in general ledger account balances between years and correlations	33	52	42	94
A16	Search for loans receivable and interest-bearing liabilities for abnormally high or low interest rates	35	66	52	68
A17	Search for duplicate purchase orders, duplicate payments to suppliers or any unusual information relating to suppliers	37	56	46	82

Source: Developed from the research

In several audit areas, such as test unauthorized log entries (A1), map customers' orders, shipping documents and sales invoices (A9), map costs charged to fixed asset, payments, and capitalizing labor costs (A14) and map production process to track inventory movements (A6), a significant number of organizations have indicated plans to adopt data analytics within 2 years (Figure 3). This suggests that these areas are gaining attention, and organizations recognize the need to leverage data analytics shortly to enhance their audit capabilities.

According to Figure 4, audit areas such as search for loans receivables and interest-bearing liabilities for abnormally high or low interest rates (A16), map costs charged to fixed asset, payments, and capitalizing labor costs (A14), map production process to track inventory movements (A6) and map pay earned by employees to amount paid to employees (A13) revealed that a significant number of organizations have indicated plans to adopt data analytics within the next 3-5 years.

Figure 2 Showed the plan to adopt data analytics among audit firms in Malaysia. It highlights the organizations' intended plans to adopt data analytics in different audit areas. It shows the varying adoption plans to adopt data analytics in various audit areas among audit firms in Malaysia. While some areas are expected to see adoption within 2 years or the next 3-5 years, others have no plan to adopt data analytics, depending on the audit areas. The varying adoption plans reflect the diverse approaches and priorities of organizations in integrating data analytics into their audit processes based on their specific needs, capabilities, and strategic objectives.

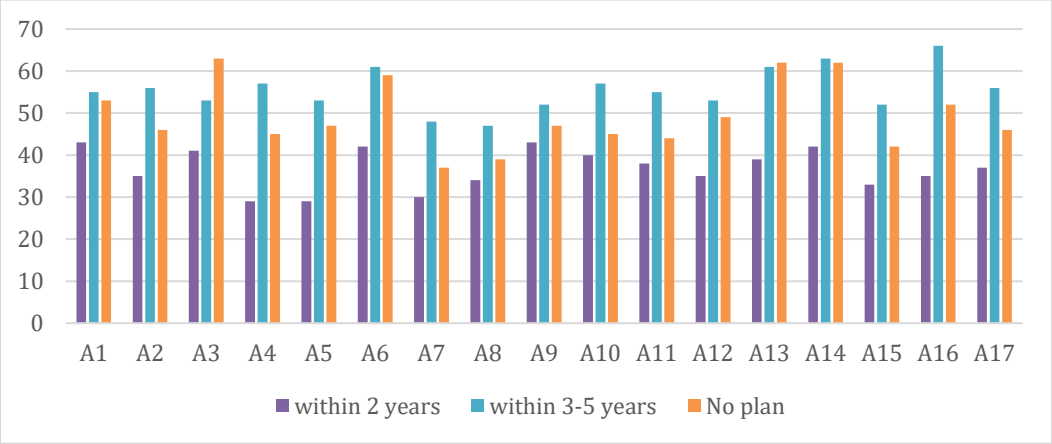
The results also highlight that different audit areas have varying adoption plans. Some areas, like mapping sales, receivables, and receipts processes (A7) and mapping purchase, payables, and payment processes (A8), have organizations with a mix of plans, including adoption within 2 years, adoption within 3-5 years, no specific plan, or considering it not applicable or currently adopting. This indicates that the adoption of data analytics in these areas depends on factors specific to individual organizations, such as resource availability, technological readiness, and strategic priorities.

In certain cases, organizations have indicated either no specific plan to adopt data analytics or have found it not applicable to the respective audit areas. This could be due to various reasons, such as a lack of perceived value, limited resources, or the nature of the audit area not requiring extensive data analytics.

In several audit areas, such as test unauthorized log entries (A1), map customers' orders, shipping documents and sales invoices (A9), map costs charged to fixed asset, payments, and capitalizing labor costs (A14) and map production process to track inventory movements (A6), a significant number of organizations have indicated plans to adopt data analytics within 2 years (Figure 3). This suggests that these areas are gaining attention, and organizations recognize the need to leverage data analytics shortly to enhance their audit capabilities.

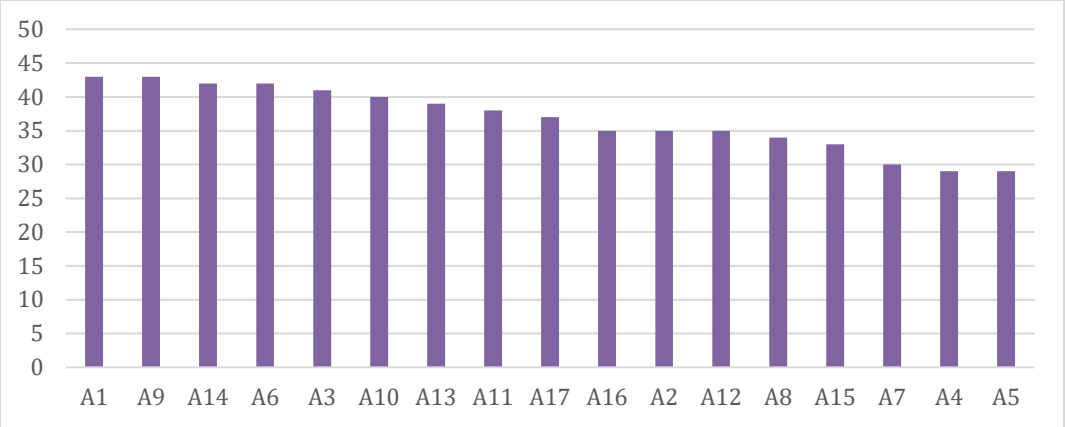
According to Figure 4, audit areas such as search for loans receivables and interest-bearing liabilities for abnormally high or low interest rates (A16), map costs charged to fixed asset, payments, and capitalizing labor costs (A14), map production process to track inventory movements (A6) and map pay earned by employees to amount paid to employees (A13) revealed that a significant number of organizations have indicated plans to adopt data analytics within the next 3-5 years.

Figure 2: Plan to adopt DA



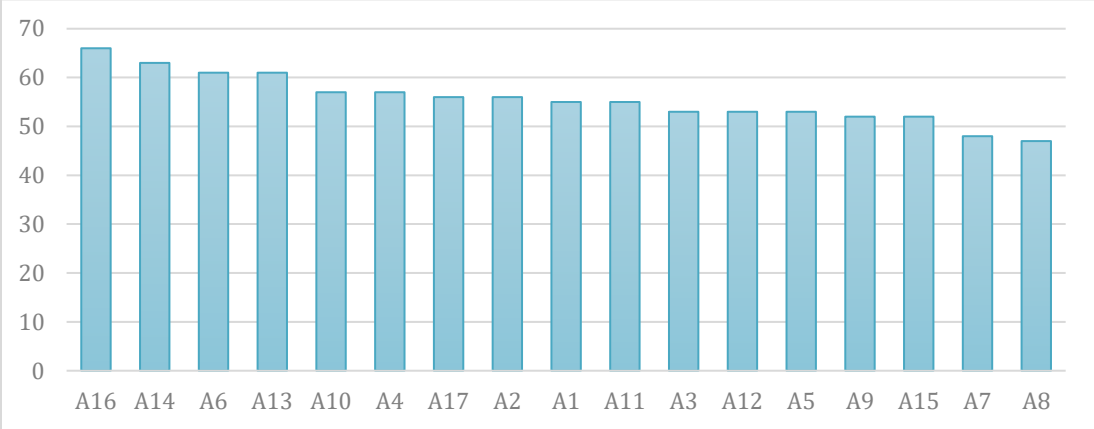
Source: Developed from the research

Figure 3: Plan to adopt DA within 2 years



Source: Developed from the research

Figure 4: Plan to adopt DA within 3-5 years



Source: Developed from the research

Perceived Opportunities in Data Analytics Applications

Table 11 lists the means of each perceived opportunity in data analytics applications in audit, while Figure 5 shows the perceived opportunities with the highest mean value to the lowest. The use of DA in audit to 'test a greater number of transactions' has the strongest support when it comes to perceiving opportunities in DA, with an overall mean of 4.09. This is followed by 'useful to auditors in performance of substantive and analytical procedures' and 'increase the quality of audit' with a mean of 4.04 for both instances.

However, 'to reduce cost' is the lowest with a mean of 3.81, showing that auditors do not believe that cost savings can be achieved with the application of DA in audit activities.

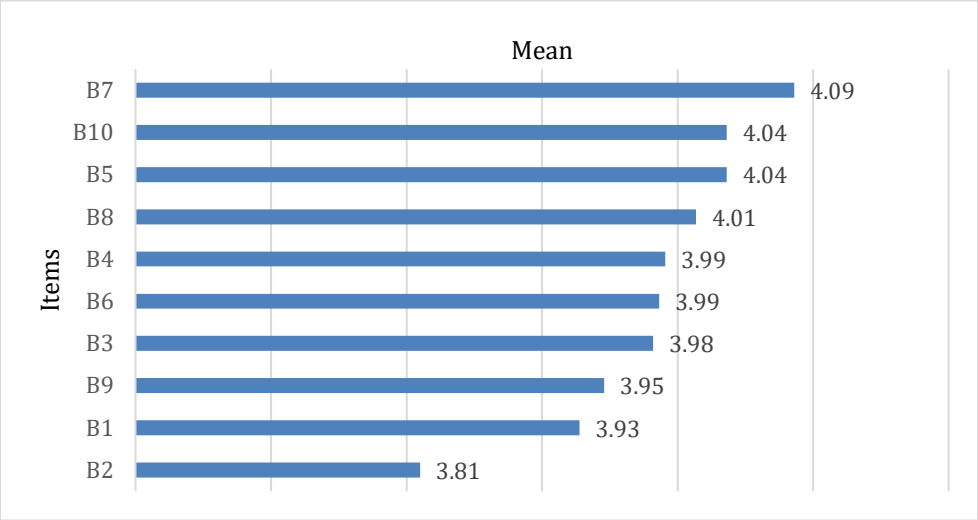
Table 11: Perceived Opportunities in ADA applications

No	Items	Mean	Std. Deviation
B1	Analyse data quickly and on a real-time basis	3.93	0.844
B2	To reduce the cost	3.81	0.853
B3	Better understand the client's business	3.98	0.842
B4	Better identify risk areas/fraud	3.99	0.837
B5	Increase the quality of the audit	4.04	0.819
B6	Presents new opportunities for audit firms to expand their advisory services	3.99	0.866
B7	Test a greater number of transactions	4.09	0.813
B8	Useful to auditors in audit planning	4.01	0.789

B9	Useful to auditors in evidence gathering	3.95	0.813
B10	Useful to auditors in the performance of substantive and analytical procedures	4.04	0.836

Note: *Responses are based on a Likert Scale where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.*
Source: Developed from the research

Figure 5: Perceived Opportunities in DA applications



Source: Developed from the research

Challenges in Data Analytics Applications

The challenges faced by respondents, with the mean of each item, are displayed in Table 12. The findings showed that respondents perceive that clients' concern over data privacy and confidentiality is a top concern, with a mean of 3.81 when it comes to the challenges of applying DA in audit. While 'difficulties in identifying and distinguishing relevant sources of information when using data analytics' is the lowest in terms of challenges with a mean of 3.29.

Table 12: Challenges in DA applications

No	Items	Mean	Std. Deviation
C1	Do not provide sufficient training on data analytics	3.33	1.012
C2	Lack of requisite skills and expertise to apply data analytics techniques in audit activity	3.46	1.015
C3	Difficulties in identifying and distinguishing relevant sources of information when using data analytics	3.29	0.985
C4	Not given sufficient access to the client's data in performing data analytics	3.35	1.037
C5	Clients are concerned about data privacy and confidentiality	3.81	0.939
C6	Standards do not explicitly define the type of analytical approaches that should be undertaken by auditors	3.52	0.851

C7	The government does not provide support for the adoption	3.69	0.851
C8	DA technology is complex to use	3.38	0.869
C9	DA adoption is a complex process	3.42	0.904
C10	Existing firm infrastructure is not compatible with data analytics technology	3.29	0.952
C11	Clients are using systems that are not compatible	3.42	0.924

Note: *Responses are based on a Likert Scale where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.*
Source: Developed from the research

Discussion

The findings revealed a significant trend in the adoption of audit data analytics (ADA) among audit firms, highlighting both the growing recognition of its benefits and the challenges hindering its implementation. The results indicate that while many firms actively incorporate ADA into their audit processes, the level of adoption varies by audit areas. Key areas such as mapping sales, receivables, and payment processes (A7, A8) show relatively higher adoption rates, suggesting that firms acknowledge ADA's role in improving transactional accuracy and efficiency. However, certain areas, such as tracking inventory movements (A6) and capitalizing labor costs (A14), exhibited lower adoption rates, possibly due to the complexity of data integration in these domains.

Furthermore, the study identified significant perceived benefits of ADA, with increased transaction testing (mean = 4.09) and improved audit quality (mean = 4.04) being the most acknowledged incentives. This aligns with the broader global trend where ADA is increasingly seen as a tool for enhancing audit effectiveness, reducing human error, and improving fraud detection. However, despite these benefits, there remains a gap in adoption readiness. While some firms plan to integrate ADA within the next two to five years, others either lack a concrete plan or deem ADA adoption unnecessary. This variance could be attributed to factors such as firm size, available resources, and the technological readiness of different organizations. Smaller firms, for instance, may struggle with the financial and infrastructural investment required to implement ADA, whereas larger firms with established technological ecosystems may find integration more feasible.

Additionally, the study highlighted several challenges impeding ADA adoption, with client concerns over data privacy (mean = 3.81) and a lack of requisite expertise (mean = 3.46) emerging as major adoption barriers. The reluctance of clients to share data due to confidentiality issues limits auditors' ability to leverage ADA for comprehensive analysis, suggesting a need for enhanced regulatory frameworks to address data security concerns. Moreover, the lack of sufficient training in DA (mean = 3.33) underscores a skills gap in the auditing profession, necessitating targeted capacity-building initiatives. To bridge this gap, universities, professional bodies, and firms must collaborate to integrate ADA training into accounting and auditing curricula, ensuring that future auditors are equipped with the necessary technical expertise.

The findings also suggested that while ADA is recognized as a valuable tool, its adoption is not uniform across the industry. Government support for ADA adoption (mean = 3.69) is another area that requires attention, as regulatory incentives and policy initiatives could accelerate the transition toward data-driven auditing. Additionally, firms need to assess the compatibility of their existing infrastructure with DA technologies to overcome implementation challenges. Given the increasing reliance on data in auditing, firms that fail to embrace ADA risk are falling behind in an industry that is rapidly shifting toward digital transformation. Thus, a multi-stakeholder approach involving regulators, audit firms, and clients is essential to addressing barriers and unlocking the full potential of DA in the audit profession.

5. Conclusion and Recommendations

This study provides valuable insights into the current state of Audit Data Analytics (ADA) adoption among external auditors in Malaysia. The findings highlighted that while ADA is increasingly recognized for its potential to enhance audit quality, efficiency, and scope, particularly in transactional processes like sales, receivables, and payments, its adoption remains inconsistent across different audit areas and firms. The study

emphasized that external auditors perceived significant opportunities in using ADA, especially for increasing the volume of transactions tested and improving audit quality. However, several critical challenges persist, including clients' concerns over data privacy, limited expertise, and inadequate technological infrastructure within firms.

The study contributes to the current body of knowledge by offering empirical evidence specific to Malaysia's auditing landscape, where prior research has been limited. By identifying the key opportunities and barriers perceived by external auditors, this study extends the understanding of how ADA adoption is unfolding in practice and where gaps still exist. Practically, the findings offer regulators, audit firms, and professional bodies insights about the necessary interventions required to support the adoption of ADA. These include enhancing client trust regarding data security, providing specialized training, and encouraging policy support at the national level.

However, this study is not without limitations. First, the sample is restricted to audit firms in Klang Valley, Penang, and Johor, which may not fully represent firms in other Malaysian regions. Second, the study focuses primarily on perceptions rather than actual usage behavior, which may not capture the depth of operational realities faced during ADA implementation.

Future research should address these limitations by expanding the sample to include a broader geographic representation and adopting a longitudinal approach to track the progression of ADA adoption over time. Qualitative methods, such as interviews or case studies, could provide deeper insights into the practical challenges and success stories associated with ADA implementation. Additionally, future studies could explore the role of regulatory frameworks, client-related dynamics, and comparative studies across different countries to offer a more comprehensive understanding of ADA integration in the auditing profession. In conclusion, this study underscores the importance of multi-stakeholder collaboration in overcoming adoption barriers and advancing the application of data analytics in external auditing. By addressing identified challenges, audit firms in Malaysia can better leverage ADA to enhance audit effectiveness and maintain competitiveness in an increasingly digital business environment.

Acknowledgement: The authors would like to extend our sincere appreciation to the reviewers for their valuable comments and constructive feedback on this paper. We gratefully acknowledge the financial support provided by Universiti Tunku Abdul Rahman (UTAR), which contributed to the successful completion of this research. We also acknowledge the continuous support provided by Universiti Teknologi MARA Cawangan Terengganu, Kampus Dungun.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Examining the Rising Trend of Elderly Financial Scams in Online News: A Content Analysis of Media Reporting in Malaysia

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Abstract: The increasing prevalence of elder financial scams, particularly those perpetrated through online platforms, has become a significant concern for both the elderly population and society as a whole. This study examines the nature and scope of elder financial scams as reported in online newspapers, emphasising their financial consequences for victims. Using content analysis to explore the cases reported in online media from 2020 to 2024, this research aims to shed light on the patterns of fraud targeting older adults, the media's role in raising awareness, and the broader implications for social policy. Findings revealed 119 reports of financial scam cases across 36 online media outlets involving the elderly in Malaysia. Most financial scams involve phishing, followed by investment and love scams. Furthermore, financial repercussions for elderly victims are severe, sparking an urgent need for enhanced public awareness and regulatory frameworks to protect vulnerable individuals.

Keywords: *Elder financial scams, online newspapers, media reporting, financial fraud, elderly victims*

1. Introduction

In Malaysia, the elderly are defined as individuals aged 60 years and older, in line with the United Nations' classification of older persons. Ageing is recognised as a progressive process, beginning at conception and continuing through to death, encompassing physical, social, and psychological changes. The proportion of elderly individuals in Malaysia is steadily increasing, driven by significant socioeconomic and demographic transformations. (Karim, 1997). For instance, the elderly population in the country increased from 6.1% in 2000 to 11.1% in 2022 (Abdullah et al., 2024).

Financial exploitation of older adults is not a recent issue. Still, the surge in online fraud, such as phishing, fake investments, and identity theft, has significantly increased the scale of these scams. Elderly individuals are particularly vulnerable to fraud due to factors like reduced cognitive function, poor psychological well-being, as well as limited health and financial literacy. It was reported that between 2021 and 2023, the loss involving financial scams on senior citizens was estimated at RM540 million, where 20% of the total RM2.7 billion loss reported on financial fraud cases in Malaysia. (Zolkepli, 2024). It was also reported that between 2021 and 2023, senior citizens in Malaysia lost RM540 million to scams, making up 20% of the total RM2.7 billion reported in financial fraud cases. (Zolkepli, 2024). The rampant case of exploitation of the elderly in society exposed their vulnerability to increasingly sophisticated scams, such as phone fraud, investment schemes, and online deception. This worrying trend highlights the urgent need for enhanced awareness, protective measures, and policy interventions to safeguard senior citizens from financial exploitation.

This study investigates how financial scams involving the elderly are reported in online newspapers, with a particular attention to the nature of the scams and their financial implications for the victims. Its objective is to assess the scope of the problem and the role of the media in creating public awareness.

Understanding how financial scams targeting the elderly are depicted in online news media is vital for several reasons. Firstly, media coverage plays a pivotal role in shaping public perception and awareness of social issues, including financial crimes against vulnerable populations. By examining the nature and extent of media reporting, this study can uncover patterns in the portrayal of scams, highlight gaps in public knowledge, and

identify potential areas for improved communication. Additionally, such insights are essential for informing policymakers, advocacy groups, and stakeholders on the real-world impact of these scams, thereby assisting the development of targeted interventions and preventive measures. Eventually, this study may contribute to the wider discourse on elder protection and the social responsibility to uphold their financial and psychological well-being.

2. Literature Review

Financial scams targeting the elderly represent an alarming global concern and are widely identified as a type of elder abuse. The following paragraphs specifically discuss the issue in terms of its scope and nature, risk factors, methods of abuse, preventive measures, and the role of media in spreading awareness and preventing financial fraud against the elderly.

Scope and Nature of Elder Financial Scams

A study by Weissberger et al. (2021) Revealed that financial manipulation is among the commonly reported forms of elderly abuse, with a noticeable increase in scam reports during the COVID-19 pandemic. The increase in digital scams has further deepened the issue, as raised by Gavett et al. (2017), stressing that online fraud (phishing) targeting the elderly has grown faster than efforts to control it. This weakness is not uniformly distributed. Dong in 2015 revealed that Black and Hispanic elders reported significantly higher occurrences of financial exploitation than their White counterparts, suggesting that sociocultural and systematic factors aggravate exposure to scams. Demographic features, such as living alone, minority status, or low-income conditions, were claimed to be interrelated to increasing risk among certain groups.

On the other hand, investment scams often target the elderly, as they often possess accumulated wealth and limited time to recover financial losses. (Deliema et al., 2020). The financial outcomes can be devastating, leading to loss of life savings, reduced quality of life, and increased dependency on others. It is reported that the perpetrators often use affinity fraud, where they exploit trust within familiar social or demographic groups to enhance credibility and manipulate the elderly. (Amoah, 2018; Hidajat et al., 2025). The scheme was designed to appear legitimate and typically challenging to detect without proper financial knowledge.

Risk Factors and Methods of Exploitation

Prior studies consistently relate elder financial ill-treatment to psychological, social, and technological vulnerabilities. Intellectual decline, poor mental health, social isolation, and lack of digital literacy all contribute to vulnerability (Labrum, 2017). Labrum (2017) recognised cognitive impairment, depression, and low social support as key predictors of victimisation, while Mansell et al. (2009) and Allen-Devlin and Freyne (2013) Emphasised the risk caused by living alone, having homeownership, or undergoing moderate mental health or cognitive challenges.

Beyond internal factors, specific scam methods pose a risk. For instance, Chen et al. (2025) argued that livestream shopping, insecure online networks, and aggressive online promotions intensify retail fraud exposure. Elder citizens' strong trust in digital platforms and unwillingness to admit being scammed (face-saving bias) led to more substantial losses. Furthermore, manipulation by trusted individuals, including family and caregivers, is common, especially with the presence of financial dependency (Rosen et al., 2016).

There are numerous factors that contribute to the vulnerability of the elderly to investment fraud. Cognitive decline and weakening decision-making function, even in the absence of a dementia diagnosis, reduce their ability to detect any fraudulent elements posed to them. (Ueno et al., 2021). Poor executive functioning, coupled with reduced thinking ability, makes it difficult for the elderly to assess potential risk effectively. (Martin et al., 2020). Moreover, the perpetrators often manipulate the elderly's condition on cognitive biases, including liking bias, to create trust and familiarity. (Hidajat et al., 2025). Social engineering techniques are adjusted to manipulate the elderly's emotional responses, as they are inclined to trust peers or members of the same cultural group. (Amoah, 2018).

It is also revealed that lower levels of financial literacy led to further increases in susceptibility to financial fraud among the elderly. Many elderly retirees are not well-versed in modern and sophisticated fraud

techniques, thus often resembling legitimate investment opportunities (Kasim et al., 2023; Li et al., 2015; Mao & Liu, 2022). Phishing activities expose the elderly to answering unfamiliar phone calls or participating in sweepstakes that encourage interactions with potential fraudsters, particularly in the absence of caretakers. (Deliema et al., 2020). Further social isolation and declining cognitive function among the elderly exacerbate vulnerability. Unclear oversight further contributes to the rampant scam cases. Woker (2013) Opined that the gap in consumer protection, especially in property syndication or similar plots, exposes the elderly investors to financial scams.

Consequences and Preventive Measures

The outcomes of elder financial scams vary, impacting economic stability and psychological health. Scam victims often encounter serious financial setbacks, including the weakening of retirement savings, reduced quality of life, and increased reliance on public support systems. Kaur et al. (2015) Documented that perceived financial scams correlate with anxiety and depressive symptoms, while the study by Chao et al. (2020) Found elevated psychological distress among the US Chinese elderly affected by financial fraud. The COVID-19 pandemic worsened these outcomes, with Du and Chen (2021) Disclosing that financially strained caregivers are more likely to manipulate the elderly under their care, emphasising the need for proactive support systems and strong interventions. Empowering the social support system can function as an informal safety net, assisting the vulnerable elderly in making their financial decisions. Regular check-ins and active community engagement programmes can offer necessary measures to intercept fraud attempts. (Button et al., 2024).

Apart from that, continuous education and intervention strategies are necessary to mitigate the impact of investment scams. Financial literacy initiatives tailored to the elderly can help them identify potential scam activities. It is argued that personal financial risk assessment has shown positive results in reducing fraud susceptibility among the elderly. (Martin et al., 2020). Kasim et al.'s (2023) The study also mentioned that increased financial awareness, improved financial behaviour, and reduced financial stress among retirees are correlated with better recognition of fraudulent activities. Li et al. (2015) Suggested that educational programmes should also focus on encouraging the elderly to seek advice and report on dubious financial activity. Moreover, according to Gavett et al. (2017), reasonable educational initiatives can reduce phishing vulnerability among elders, whereas James et al. (2014) Have long emphasised the significance of financial and health literacy to reduce potential exploitation risk.

The Role of Media in Awareness and Prevention of Elderly Fraud

The media plays a significant role in protecting the elderly from fraud by functioning as a medium for awareness and educational outreach. Recent studies featured vulnerabilities encountered by elderly citizens, such as cognitive decline and unfamiliarity with digital environments, making them prone to scams. (Ueno et al., 2021). On this matter, Button et al. (2024) Stressed the importance of using multiple media channels, ranging from traditional methods like radio and newspaper to modern tools such as social media and video conferencing, to publicise fraud prevention messages. The study concluded that peer-based education, relatable messaging, and digital literacy integration can significantly improve the effectiveness of these campaigns.

In addition, media-driven educational efforts have shown positive responses in increasing digital literacy among the elderly, thereby reducing their exposure to online fraud. In a study by Apriya et al. (2023)It was highlighted that promoting digital literacy through social media can empower the elderly in recognising financial scams, particularly within the online banking setting. Similarly, Shi and Chang (2023) Explored the connection between digital ageing and financial fraud, emphasising the need for media news that reflects real-world experiences. These studies collectively affirm that media can be a powerful tool in promoting fraud-resistant behaviours and fostering a sense of community resilience among the elderly population when used strategically.

In summary, the literature has extensively discussed the scope and nature of financial fraud targeting the elderly, including its associated risk factors, methods of abuse, and several preventive approaches. Previous studies acknowledged the critical role of media in disseminating awareness and shaping protective behaviours among the elderly. Yet, despite its potential as a powerful instrument for education and prevention, media

participation, particularly in the context of how financial scams involving the elderly are reported, remains underexplored in academic literature. This gap is especially evident in the Malaysian setting, as there is limited empirical analysis of media trends on elderly financial fraud. Hence, this study aims to fill that void by examining the pattern and focus of media reporting on financial scams affecting the elderly in Malaysia, to inform more effective media-based interventions and policy responses.

3. Methodology

This study employed a qualitative content analysis of elder financial scams reported in online newspapers for the last five years, specifically between 2020 to 2024. The sample consisted of 186 articles selected from reputable online news sources, namely Astro Awani, The Star, Berita Harian, and Bernama. These articles were chosen based on their focus on elder financial scams, particularly those involving online fraud. The search engine used was Google search with keywords of "*financial scam + elderly", "scam + elderly", "scam + elderly", and "scam + senior citizen"*.

The data was analysed to identify common patterns in the reporting of scams, including the types of fraud mentioned, the demographics of victims, the reported financial consequences, and the media involved. Additionally, articles were examined for the presence of preventive advice, calls to action, and policy recommendations. A thematic analysis was then conducted to assess the impact of these reports on public awareness and potential solutions to the issue.

4. Findings and Discussion

Demographics of Victims

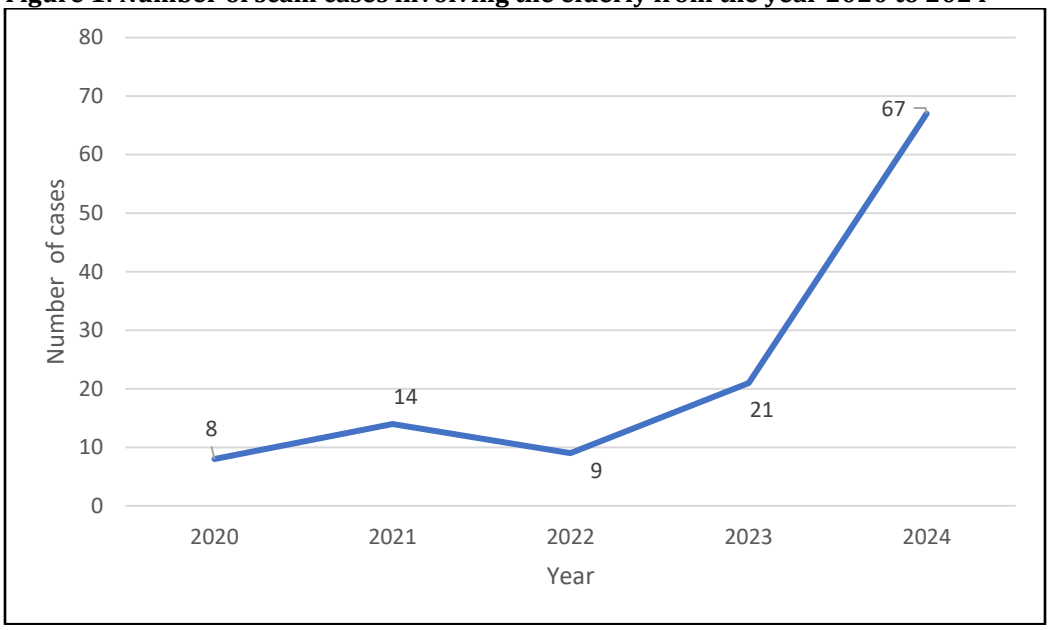
Appendix 1 below displays the distribution of financial scam cases over five years (2020 to 2024) reported in Malaysia by online media reporting. A total of 119 cases were reported involving 122 victims, comprising 45 males, 71 females, and six of unidentified gender in the media reporting. The female senior citizens were identified as the majority of victims, accounting for 59.7% of total scam victims. Analysis of the age group showed that the victims were between the ages of 60 to 85. Reporting in the media also revealed that many victims live alone, socially, remotely, or lack a staunch support system with limited knowledge of technology literacy, making them more susceptible to financial scams. These findings confirmed that the elderly who live alone and lack social support are very susceptible to financial scams. This is in line with a prior study, which highlighted social isolation and living arrangements as critical risk factors in elderly financial manipulation (Allen-Devlin and Freyne, 2013; Mansell et al., 2009).

Number of financial scams

The number of cases can be seen in Appendix 1 and shown graphically in Figure 1 overleaf. Sadly, the reported cases by the media have demonstrated an increasing trend. In 2020, only eight cases were reported; the cases have doubled in 2021 with 14 cases and have kept increasing in 2023 with 21 cases, followed by a 219% increase to 67 cases in 2024. The only year when a slight decrease in several cases was reported was in 2022, with nine cases, a drop of 35.7% from the prior year, 2021.

The rise in the number of scams involving the elderly may be partially attributed to shifts during the COVID-19 pandemic, which intensified financial stress. These findings conform to the study by Weissberger et al. (2021) Reporting a noticeable increase in scam reports during the social turmoil, such as pandemics. It is interesting to highlight that the lowest number of cases was reported during COVID-19 in Malaysia in 2020, with eight cases reported, possibly due to more elderly people relocating to live closer to family members. This may suggest a protective effect of proximity and oversight, which aligns with findings by Du and Chen (2021) On changes in caregiving arrangements. Even though the cases reported were small in numbers, it is believed that the actual number could be higher, as victims were too ashamed to admit their mistakes, suggesting that a significant number of cases may have gone unreported.

Figure 1: Number of scam cases involving the elderly from the year 2020 to 2024



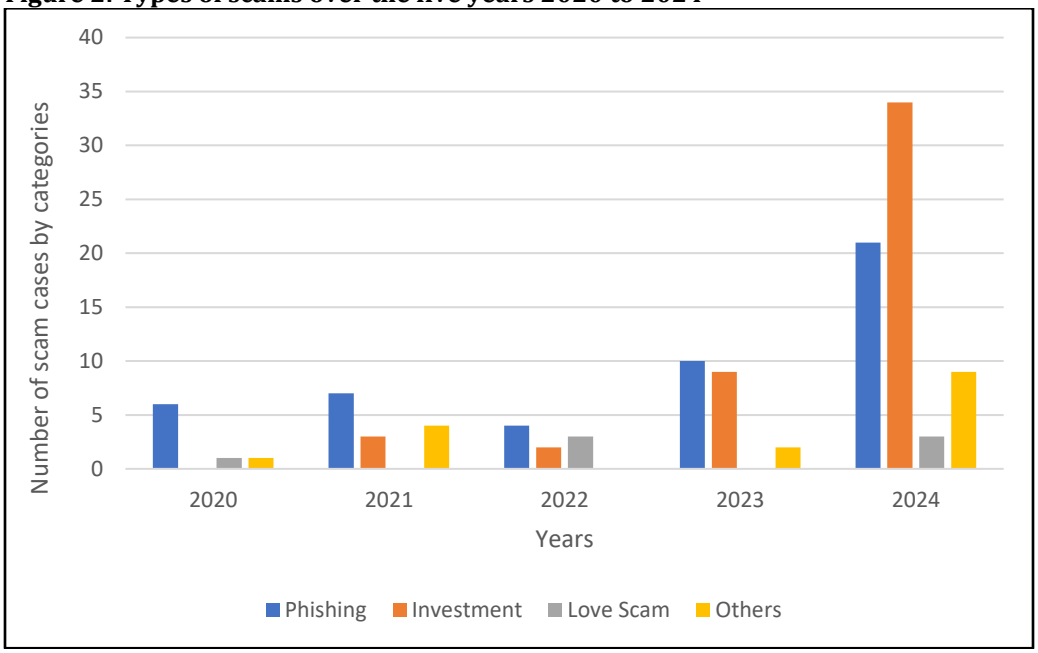
Types of Scams Reported

Analysis in Appendix 1 (and shown graphically in Figure 2) shows several types of elderly scams reported in online newspapers. For this study, they can be categorised into four types, namely phishing, investment, romance, or love scams, as well as other scams. Other scams include scams involving financial assistance, job scams, lottery, water filters, sweepstakes, land sales, as well as online businesses. It can be seen from the table that reports on phishing and investment scams were equal over the last five years, with 48 cases reported for each. On the other hand, seven cases were reported on a love scam, while 16 cases were reported on various other scams.

Over the years, the number of phishing cases where fraudulent phone calls impersonate legitimate entities or authorities such as banks, government agencies, and technical support services has been increasing significantly. It started with only six reports in 2020, increasing exponentially to 67 in 2024. The same goes for investment scams, where scammers promote fake investment opportunities or "get-rich-quick" schemes to these unfortunate elderly, which demonstrated a sharp increase from the year 2021 to 2024, even though cases reported in 2021 only started with three. On the other hand, the romance or love scam cases, where individuals disguised as potential suitors or romantic partners manipulate the victims into sending money to them, have only been reported by the online news, with seven cases over five years.

Media reports analysed in this study showed that over five years, investment scams constituted the highest number of reported cases, followed by phishing. These align with the study by Chen et al. (2025), emphasising the evolution of online fraud tactics aimed at the elderly. Phishing susceptibility has also been linked to inadequate literacy and a decline in cognition. Nevertheless, Gavett et al. (2017) Argued that modest educational interventions can improve the elderly's ability to detect and avoid phishing attempts. These patterns implied that targeted awareness and literacy programmes could be instrumental in reducing exposure to specific high-risk scams.

Figure 2: Types of scams over the five years 2020 to 2024

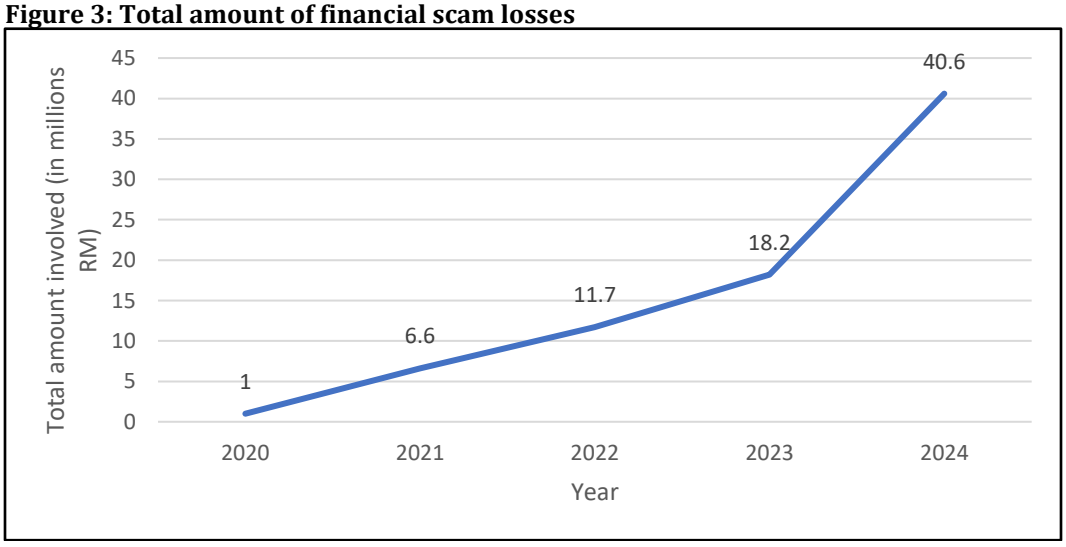


Financial implications

As depicted in Appendix 1, the total amount of losses has been increasing over the years, with the trend that can be seen in Figure 3 below. In the year 2020, only RM1,052,800 losses were reported; over the years, the amount kept increasing, with the highest recorded in 2024 with RM40,615,337. In total, over five years, a total of RM78.234,918 has been reported. The amount of money involved ranged from RM5,000 to a staggering RM4 million in one case in 2024. In this case, the 67-year-old elderly woman lost RM4 million after falling victim to a shock investment scam. She was lured by an investment opportunity advertisement on social media and joined a WhatsApp investment group promising a 380% return. She has then made several transfers to company accounts advised by the syndicate but never received any returns.

The findings of this study demonstrated that the financial implications of elderly scams have become more serious, with victims often losing a substantial portion of their savings over the five years, as shown in Figure 3 overleaf. In the same vein, Kaur et al. (2015) Stressed that financial scams not only diminish economic resources but also contribute to increased psychological distress, including anxiety and depression.

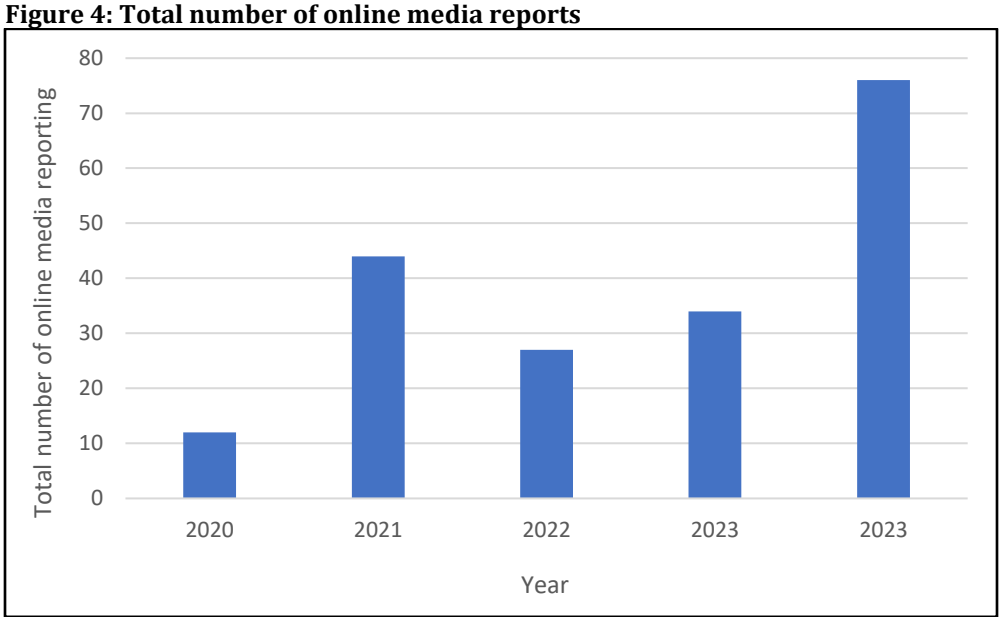
Figure 3: Total amount of financial scam losses



Role of Media Coverage

This study analysed the reporting of the media in a total of 36 media outlets. Some of the news was reported in several media, which explained the number reported in Appendix 1 being 186, as opposed to 119 cases recorded. Some prominent cases, especially those involving millions of losses, have been reported in at least two media outlets.

Figure 4: Total number of online media reports



The media have been highly informative as they also report on the actions taken by the authorities and the respective sections involved. In the context of Malaysian law, scam cases are investigated under Section 420 of the Penal Code (fraud). As shown in Figure 4 below, the number of cases reported in the media kept increasing annually from 2020 to 2024. It can thus be assumed that the Malaysian media has played its role in reporting the case, and that media coverage in fraud prevention cannot be overstated.

5. Recommendations

The findings highlight the growing financial and emotional toll facing older adults from elder financial scams, as well as the significant role played by online newspapers in educating the public. While media coverage has been effective in raising awareness, more robust measures are needed to address the issue. This includes greater efforts to improve digital literacy among older adults, more stringent regulations for online platforms, and stronger enforcement of laws to hold perpetrators accountable. Moreover, the data indicate that although media reports frequently discuss the consequences of these scams, there is a lack of in-depth discussion on the systemic factors contributing to the rise of elder fraud. Addressing these underlying issues, such as the digital divide and inadequate cybersecurity, requires a more comprehensive approach that involves collaboration between media, policymakers, and technology companies.

In addition, public service announcements, community forums, and social media campaigns can effectively disseminate knowledge and create awareness of the latest scam techniques and protective measures that can be taken by individuals. These media-based strategies can complement formal interventions by increasing public vigilance and normalising conversations about financial vulnerability among the elderly.

Conclusion

Elder financial scams in online media are a growing concern that warrants urgent attention. As the elderly population becomes increasingly active online, they face an ever-expanding range of digital threats. While online newspapers play a critical role in reporting these scams and educating the public, more needs to be done to protect vulnerable seniors from financial exploitation. Future research should explore the effectiveness of

media campaigns, regulatory interventions, and technological solutions in mitigating the risks of elder fraud. Policymakers must also recognise the importance of digital literacy initiatives and stronger consumer protections to safeguard the financial well-being of older adults in an increasingly digital world.

Policy Implications

To address the rising threat of financial scams among the elderly, policymakers should prioritise the development and implementation of comprehensive digital literacy programmes tailored for the elderly. These programmes should be integrated into community centres, senior associations, and government outreach initiatives. Additionally, regulatory frameworks must be updated to require digital platforms targeted at high-risk age groups. On top of that, collaborative policies involving the media, cybersecurity agencies, and social welfare departments are also essential to create a more secure and informed environment for elderly citizens navigating the digital space.

Contribution of the study

This study contributes to the growing body of literature on the financial exploitation of elderly citizens by specifically focusing on the number of incidents disclosed by online newspapers in Malaysia. By analysing the pattern, frequency, and depth of media reports, this research offers valuable insight into the media's role in shaping public awareness and discourse on elder fraud cases. Moreover, it highlights existing gaps in systemic understanding and reporting, advocating for a more proactive and preventive media strategy. The findings can inform future academic inquiries, media plans, and policy development in gerontology and digital communication fields.

Acknowledgement: The authors would like to acknowledge Universiti Teknologi MARA Melaka for providing a grant for this study with grant reference no: 600-TNCPI 5/3/DDN (04)(004/2024).

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Appendix 1
Distribution of Financial Scam Cases Involving the Elderly Reported by Online Media in Malaysia

Year	Total Victims	Total cases reported	Age group range	Total cases reported	Type of Financial Scam											Total online media reporting	Range of losses (RM)	Total amount involved (RM)
					Phishing	Investment	Love Scam	Others*										
								1	2	3	4	5	6	7	8			
2020	8	8	60 - 76	8	6		1				1					12	5,000 – 516,000	1,052,800
2021	14	14	60 - 80	14	7	3		1				1	2			44	20,000 – 3,800,000	6,626,268
2022	10	9	60 - 77	9	4	2	3									27	390,000 – 4,300,000	11,714,207
2023	24	21	60 - 75	21	10	9				1	1					34	40,000 – 3,830,000	18,226,306
2024	66	67	60 - 85	67	21	34	3	2	4		1			1	1	76	5,000 – 4,000.000	40,615,337
Total	122	119		119	48	48	7	3	4	1	3	1	2	1	1	186	5,000 – 4,300,000	78,234,918

*

1 - Financial Assistance
2 - Job Scam
3 - Lottery
4 – Black magic
5 – Water filter
6 - Gifts
7 – Land sale
8 – Online business

(Source: Online media)

Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Factors Influencing the Purchase Intention of Modest Fashion Products: A Study on Muslim Women Consumers in Malaysia

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Abstract: Recognized as one of the Muslim dominated countries, Malaysia is seen to have a good prospect for marketing modest fashion products. Nevertheless, modest fashion presents unique marketing challenges due to its sensitivity to religious issues and its niche consumer base. While established brands like dUCk, Naelofar, and Jovian are believed to benefit greatly from having well-known figures as their founders, other businesses require effective marketing strategies to compete in the market. Therefore, this research aims to identify the primary factors that drive Muslim women consumers in Malaysia to purchase modest fashion products. The study adopts a quantitative research method, with data collected through an online survey from a sample of 116 valid responses. Data analysis was conducted using SPSS version 29 and AMOS version 29 for Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). The result revealed that two out of three hypotheses were supported. Muslim Influencers (MI) had a significant positive effect on Purchase Intention (PI), while Design and Trend (DT) demonstrated a significant negative effect, suggesting that consumers prioritize modesty over trends. Brand Consciousness (BC), however, was revealed to be insignificant in influencing the PI of Muslim women consumers for modest fashion products. The findings contribute to the understanding of Muslim women's consumer behavior in purchasing modest fashion, offering practical guidelines for brands to prioritize value-aligned marketing strategies. The study also discusses its limitations and provides directions for future research.

Keywords: *Modest fashion, Muslim Influencer, Design and Trend, Brand Consciousness, Purchase Intention*

1. Introduction and Background

Fashion has always been a significant part of our lives. It is a way of portraying one's personality and expressing oneself regarding one's values, beliefs, and attitudes. Over time, trends in fashion evolved, especially with the emergence of new technology and the Internet. The rise in social media use within the community has also influenced the shift in fashion trends. People are now depending on social media influencers and e-Word of Mouth (eWOM) when deciding on which fashion trend to follow. It is believed that fashion reflects societal norms, economic conditions, and technological advancement. As fashion demand increases, so does the number of business players. Businesses in the fashion industry can be described as "any business producing or selling clothes, footwear, and accessories, which may involve manufacturers, wholesalers, or retailers that sell the products through physical or online stores" (Leu & Ridzuan, 2020). According to reports, the global fashion retail market size was estimated to be worth USD 91.25 billion in 2023 and is expected to continue increasing from 2024 to 2032 (Howard, 2024). Considering the nature of the fashion business, it is widely believed that this industry can greatly benefit from digital marketing, given its powerful advantages such as impactful product display, access to a diverse audience, high engagement and interactivity, as well as the ability to identify and respond to industry trends. Consequently, fashion and apparel have become the most popular online shopping categories worldwide.

Within the broader growth of the global fashion industry, modest fashion has become an increasingly prominent niche, driven largely by demand from Muslim consumers. Modest fashion is a term that refers to a fashion style characterized by wearing less-revealing clothes, which usually aligns with religious principles. For Muslims, any clothing worn must comply with the Shariah law in covering the *Aurah,* in which the *aurah* of a man is between the navel and knees, while the *aurah* of a woman is her whole body except face and palms. The dress codes defined in the Quran and Hadith provide guidelines on modest dress for both men and women, emphasizing the importance of covering certain parts of the body with loose and non-revealing garments. As stated in the Quran, Surah Al-A'raf verse 26, "O children of Adam, We have bestowed upon you clothing to conceal your private parts and as adornment. But the clothing of righteousness - that is best". Adhering to these guidelines serves as guidance, allowing Muslims to conduct their lives with respect, humility, and dignity

(Javaid, 2022). Dressing modestly does not mean that Muslims cannot wear stylish or trendy clothes. Many established brands such as Zara and Tommy Hilfiger are now offering modest fashion options specifically tailored for Muslim consumers (Abdelaziz et al., 2021). As the global Muslim population continues to expand, the modest fashion market is also expected to experience substantial growth. It is reported that Muslims' spending on fashion products such as apparel and footwear is expected to rise, reaching 375 billion dollars by 2025 (Bianchi, n.d).

Malaysia stands as one of the global leaders in the modest fashion market. It is known to be one of the Muslim dominated countries with 63.5% of the total population being Muslims (Kaur, 2022). This has made Malaysia a promising market for modest fashion products. For Muslim women in Malaysia, modest attire such as the *Baju Kurung* and Hijab serves as an expression of their faith and identity. Like other fashion shows, Modest Fashion Week has also been held in Malaysia, allowing designers to present their talent and creations while respecting the beliefs and values of their models and customers. Jovian, Duck, Naelofar, and Mimpikita are some of the well-known brands that have gained recognition for their offerings in modest fashion. Supported by the rise in e-commerce use among consumers, Malaysia is expected to experience tremendous growth in its modest fashion market (Lim, 2020). Furthermore, the talent of local designers and their innovations in the field have demonstrated remarkable skills, particularly in modernizing modest fashion while still upholding the cultural heritage and tradition of the region. These innovations have also brought positive changes to the modest fashion market by making it more appealing, trendy, and relevant to a wider audience. Moreover, these designers play a crucial role in producing fresh and fashionable designs, particularly during festive seasons when customers put extra thought and effort into looking their best for such occasions (Leong, 2022).

Nevertheless, understanding the modest fashion market can be challenging as it involves Shariah rulings in marketing activities (Zainudin et al., 2019; Hisham et al., 2023). Various studies have examined the drivers of Purchase Intention (PI) on modest fashion products (Aruan & Wirdania, 2020; Sumarliah et al., 2022; Zaki & Elsaidi, 2023). However, previous studies focused solely on one factor while examining PI. Hence, there is a lack of clarity regarding which factors businesses should emphasize in their marketing strategies, as other factors were not examined simultaneously. Following this, the study is guided by the central question: "Which factors primarily drive Muslim women consumers in Malaysia to purchase modest fashion products?". Through the Stimulus-Organism-Response (SOR) theory, this study aims to investigate the primary factors that drive Muslim women consumers in Malaysia to purchase modest fashion products, focusing on the influence of Muslim Influencers (MI), Design and Trend (DT), and Brand Consciousness (BC).

The structure of this study comprises five main sections. The introductory section outlines the background and objectives, followed by a review of the relevant literature. The third section details the methodology employed, while the fourth discusses the research findings. The final section concludes the study with a summary, implications, limitations and directions for future research.

2. Literature Review

Women's fashion had a profound influence on various aspects of society and the global economy. It was reported that the women's fashion industry is projected to grow by nearly 5% by 2025, driven by women's empowerment, the increasing number of working women, evolving fashion trends, greater spending on emerging products, and the rising use of online shopping platforms. While it is widely believed that every woman is inseparable from fashion, Islam, however, has set guidelines for the dress attire of its followers, especially women, as it places high respect for women and aims to protect their dignity. This clothing, which should cover the head and body, adheres to the Shariah principle of wearing a loose outfit made of material that is thick enough to conceal the body shape and the color of the skin (Nestorovic, 2016 as cited in Zainudin et al., 2019). Although modest fashion products are often synonymous with Muslim women, it has been revealed that non-Muslims are also interested in them. The Star reported that modest fashion continues to attract a rising number of followers worldwide, primarily due to its loose and comfortable clothing, as well as its minimalist style, but always inclusive (Agency, 2023).

As the concept of modest fashion wear gains attention worldwide, many researchers have also become interested in studying this area. Zainudin et al. (2019), Zaki et al. (2021), and Zaki and Elseidi (2023) have

investigated the impact of brand personality on the PI of Muslim consumers for modest fashion products. Results of the studies highlighted the importance of brand personality in creating brand differentiation and gaining a competitive advantage over competitors. Righteousness, simplicity, femininity, modesty, and Islamic dimensions were revealed to have a positive influence on the brand personality of modest fashion, as well as brand loyalty. The findings have then provided businesses in this industry with insights on which factors to focus on in building their brand personality, which in turn, influenced the PIs of their customers. Nevertheless, these studies solely discussed the role of brand in influencing customers' PIs. As religious concern was reported to be still a dominant factor in Muslim women consumers' purchasing decisions, there is a need to look beyond branding and investigate other Islamic marketing factors, such as MI and modesty in design, which may shape Muslim women's purchase decisions.

The rise in social media use has opened up opportunities for businesses to explore influencer marketing, which significantly influences consumer purchase decisions. Social media is a cost-effective digital marketing tool that offers numerous advantages to businesses. With social media, people on the Internet are now more active than ever (Jan et al., 2020). It has opened doors for businesses to expand their reach and increase brand awareness, particularly through social media ads and influencer partnerships. Chetioui et al. (2020) stated that influencer marketing is a strategic marketing tool that allows fashion brands to enhance brand awareness, increase market share and generate purchase intention from existing and potential customers. This is especially evident in partnerships collaborating with social media influencers who possess a substantial follower base and demonstrate high levels of audience engagement.

Numerous studies have examined to investigated the influence of social media influencers on consumers' PI of fashion products. Moreover, Tiwari et al. (2024) reported that consumers demonstrate a higher likelihood of purchasing fashion products promoted by social media influencers, especially when the influencers are perceived as trustworthy in their reviews. This finding aligns with Wiedmann and Matteinheim (2021), who revealed that influencers' trustworthiness has the most substantial impact on PI. While prior studies have established social media influencers as a valuable marketing tool for promoting fashion products, the role of MI in influencing the PI of Muslim female consumers regarding modest fashion products is still scarce. Hence, this study will also investigate the effect that MI has on the PI of modest fashion products among Muslim women, aiming to fill the existing research gap.

Theoretical Foundation – Stimulus Organism Response (SOR) Theory

The theory underpinning the present study is the Stimulus–Organism–Response (SOR) theory, originally developed by Mehrabian and Russell (1974) to understand the complexity of human behavior (Duong, 2023). The model suggests that an external stimulus (S) triggers emotional responses in the organism (O), which then results in a behavioral response (R) (Zhu et al., 2020). Although it originated in environmental psychology, its application has been extended into various areas such as consumer behaviour, organizational behaviour, and leadership studies (Hochreiter et al., 2023). As the world faces complex technological advancements, researchers have studied the effects, roles, and influences of digital marketing on consumers' PI and behaviors based on the SOR model (Zhu et al., 2020; Lin et al., 2022; Liu et al., 2023).

The conceptual framework for this study is constructed based on the SOR model and theory. The stimulus (S) for this study will be the factors influencing the PI of modest fashion products, namely MI, DT, and BC, while the response (R) will be the consumer's actual PI. According to Senanu et al. (2022), marketing stimuli can directly influence consumers' engagement behaviors even in the absence of internal organismic processes. Hence, the study omits the element of organism (O) from the framework.

Hypotheses Development

Muslim Influencers

Influencers are individuals who can influence the behaviour of others, especially regarding their purchasing decisions or opinions. These influencers typically have thousands to millions of followers, also known as mega-influencers (Geyser, 2024). Given their wide audience reach, influencer marketing is now considered one of the most effective marketing strategies, particularly with the rise in social media use among customers. Fashion brands are among others that can highly benefit from the influencer marketing strategy. Through this opportunity, businesses can reach their niche target audience by approaching or collaborating with influencers

whose expertise or content aligns with a brand's identity.

According to Anuar (2023), Muslim women influencers from Generation Z and Y in Malaysia actively engaged in producing fashion-related content on social media platforms such as TikTok, which receive high impressions and engagement from their followers. The study by Arianti and Hadiprawoto (2024) also revealed a strong positive relationship between social media influencers and modest fashion consumer behavior (Arianti & Hadiprawoto, 2024). Additionally, influencers with strong audience engagement can significantly affect consumer purchase decisions, as their reviews are often perceived as credible by their followers (Sanno, 2022). Accordingly, it is hypothesized that:
H1: Muslim influencers have a positive impact on Muslim women consumers' purchase intention of modest fashion products.

Design and Trends
According to Cham et al. (2018), consumers of fashion products typically create interest through sensory cues, including its appearance, texture and overall feel of the item. The quality of a fashion product is also usually associated with its intrinsic attributes, including design, size, shape, material used, and perceived durability. It is believed that fashion consumers are more interested in the design of clothes than in their materials, as they seek public acceptance by following the latest designs and trends, especially with the increased use of social media (Shafaat et al., 2020). In addition, Hu and Shiau (2015) stated that fashion consumers are easily influenced by the design and style of clothing during their fashion-oriented shopping process, which has also become a significant factor in customers' PI.

Nevertheless, a study by Park and Park (2021) reported that religious concerns still have a greater influence on Muslim women's choice of preferences, regardless of the fashion trends and design. It was revealed that veiled women (Hijabis) who are highly interested in modest fashion abide by Islamic rules while continuing to explore fashion trends. They chose to adhere to their religious principles, especially when the latest fashion sometimes conflicts with the concept of modesty (Haidar, 2019). Furthermore, it is believed that Muslims are more involved in sustainable practice as Islam also teaches them the responsibility for the environment. Therefore, the fast fashion trend of trendy clothes may be a setback for consumers as it is seen as a major contributor to unsustainable fashion consumption (Razzaq et al., 2018). Following this, it is hypothesized that:
H2: Design and trends hurt Muslim women consumers' purchase intention of modest fashion products.

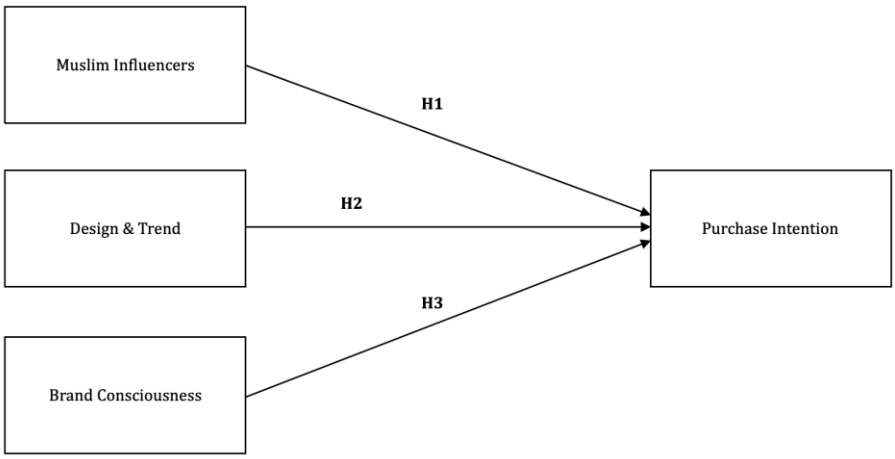
Brand Consciousness
Samaddar et al. (2024) defined Brand Consciousness (BC) as a cognitive and emotional tendency that emphasizes preference for brand-name products. According to Giovannini et al. (2015), brand familiarity reduces consumers' perceived risk involved in purchasing behaviour. Brand-conscious customers often exhibit behaviors such as high sensitivity towards brands during the shopping process, a deep understanding of the product quality associated with various brands, and a willingness to invest more in a branded product that they perceive as superior and of higher quality (Çavuşoğlu et al. 2021). The concept of BC and brand image is interdependent. A strong brand image can enhance BC through effective marketing strategies, making the brand more recognizable and desirable to customers. Studies have shown that BC is a key determinant of consumer product knowledge, which in turn influences PI (Ye & Bose, 2022). Concerning modest fashion products, Islamic brands that have effectively conveyed their personality of providing modest fashion wear, usually due to extensive advertising and market awareness, are believed to have higher popularity among Muslim consumers. The association of modest fashion brands with characteristics like honesty, trust and moral integrity reflects the core teachings of Islam, which advocate for fairness, justice, and ethical behaviour, especially in terms of quality and attention to detail (Zaki & Elseidi, 2023). Hence, the study expects that:
H3: Brand consciousness has a positive impact on Muslim women consumers' purchase intention of modest fashion products.

Purchase Intention
Purchase intention (PI) reflects a consumer's willingness or planned effort to acquire a specific product or service at a future time (Nguyen et al., 2022). A PI can be influenced by many factors, depending on the context of the products. Past studies have identified several factors that are believed to influence the purchase of fashion products (Saleem & Ellahi, 2017; Din et al., 2018; Cham et al., 2018; Chetioui et al., 2020). These include

influencer marketing, social media marketing, eWOM, e-commerce, brand image, and perceived quality. It was revealed that the mentioned factors positively influence the PI of fashion products. However, the present study differs from the previous one in that it aims to examine the influence of factors such as BC, DT, and MI in the context of modest fashion products. As Malaysia is a Muslim dominated country, examining the influence of these factors on Muslims, especially women consumers' PI on modest products, is crucial to guide the marketing strategies of businesses in this industry.

Based on the analysis of the literature, a research framework has been developed with three exogenous variables acting as the stimulus (S), namely MI, DT, and BC, and one endogenous variable, namely PI, which acts as the response (R), as illustrated in Figure 1.

Figure 1: Research Framework



Source: Author's work

3. Research Methodology

Instrument and Data Collection

The study employed a quantitative research design utilizing Google Forms with a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to measure the various research variables. The constructs of the questionnaires are adapted and adopted from previous studies that have been established. The adopted constructs were based on the work of Giovannini et al. (2015), Kartajaya et al. (2019), and Cham et al. (2020). The adapted constructs, in contrast, were based on the work of Chetioui et al. (2019) and Widyanto and Sitohang (2022). Demographic variables, including gender, age, occupation, monthly income, and monthly expenditure on fashion products, were also included in the initial section of the questionnaire. It is essential to note that this study exclusively targeted Muslim women consumers. Hence, the "gender" option was limited to only "female" to ensure that only female respondents participated in the questionnaire.

Sampling Method

The population of this study consists of general Muslim women consumers of modest fashion products in Malaysia. As the aim of the study is to identify the primary factors influencing Muslim women's consumption of modest fashion products, the present study employed a purposive sampling method to collect data exclusively from female respondents. The rule of thumb was used to determine the minimum number of samples, which involved multiplying the number of items in the questionnaire by a factor of 5. The study consists of 21 items, which require a minimum of 105 samples. The sample for this study initially consisted of 157 female respondents. However, some outliers were identified and removed during the data screening process, resulting in 116 valid responses. Despite the small sample size, the model fit indices demonstrate satisfactory results, suggesting that the data are appropriate for statistical testing of the proposed framework. In addition, Reinartz et al. (2009) highlighted that SEM remains statistically robust despite limited sample sizes.

Aligned with this, the 116 sample also exceeded the minimum sample required based on the commonly accepted rule of thumb. Nonetheless, it is worth noting that the sole focus on Muslim women consumers in Malaysia may limit the generalizability of the results across different regions and genders. Therefore, caution should be taken when applying the results to a more diverse population.

Data Analysis Procedure

The data were then analyzed to identify its factors using Exploratory Factor Analysis (EFA), checked on the compatibility of the model using Confirmatory Factor Analysis (CFA), and tested the hypothesis using SEM. The EFA test was performed using SPSS version 29, while CFA and SEM were conducted using AMOS version 29.

4. Results

Demography

Table 1 presents the demographic information of respondents, including their gender, age, occupation, monthly income level, and monthly expenditure on fashion products. Aligned with the study's objective, a total of 116 valid responses were recorded from female participants. In terms of age, the majority of respondents (37.1%) fell within the 25-30 year old range. In addition, the respondents were predominantly government servants, students, and private employees, accounting for 33.6%, 30.2% and 29.3%, respectively. Regarding monthly income, the majority of respondents (32.8%) have a monthly income of more than RM 5,000, while the second-highest category is less than RM 1,500 (30.2%). Lastly, it can be observed that the majority of them (38.8%) spend less than RM 100 on fashion products monthly.

Table 1: Demographic information of the respondents (n=116)

Characteristics	Frequency	Percent (%)
Gender		
Female	116	100
Age		
<25	27	23.3
25-30	43	37.1
31-35	23	19.8
36-40	12	10.3
>40	11	9.5
Occupation		
Student	35	30.2
Entrepreneur	5	4.3
Government Servants	39	33.6
Private Employee	34	29.3
Pensioner	1	0.9
Other	2	1.7
Monthly Income		
<RM 1500	35	30.2
RM 1500 - RM 2500	11	9.5
RM 2500 - RM 3500	14	12.1
RM 3500 - RM 4500	9	7.8
RM 4500 - RM 5000	9	7.8
>RM 5000	38	32.8
Monthly Spending on Fashion Products		
<RM 100	45	38.8
RM 100 - RM 200	38	32.8
RM 200 - RM 300	22	19.0
RM 300 - RM 400	6	5.2
RM 400 - RM 500	2	1.7
>RM 500	3	2.6

Exploratory Factor Analysis (EFA)

The data screening process was conducted before proceeding to the EFA stage. Some outliers were removed from the data to ensure the total sample remained above the minimum number of samples. Following this, 21 items were examined using EFA regarding multicollinearity, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test of sphericity, anti-image matrices, communalities, Total Variance Explained, as well as the rotated component matrix.

The initial stage of EFA led to the removal of four items due to multicollinearity issues and low communalities. Consequently, the remaining 17 items were analyzed, which demonstrated a determinant value of 0.0006 (def > 0.0001), indicating no evidence of collinearity issues. As presented in Table 2, the KMO measure of sampling and Bartlett's test of sphericity were also conducted, with a KMO value of 0.824, surpassing the threshold value of 0.50, and Bartlett's test of $p < 0.001$, indicating that the data were suitable for EFA.

Table 2: Kaiser-Meyer-Olkin (KMO) measure of sampling and Bartlett's test of sphericity

Kaiser-Meyer-Olkin (KMO)		.824
Bartlett's Test of Sphericity	Approx. Chi-Square	1048.892
	df	136
	Sig.	< .001

As for anti-image Measure of Sampling Adequacy (MSA) and communality, all values were ensured to be more than 0.50, indicating acceptable sampling adequacy and shared variance across items. The results of the EFA were later extracted into four factors, using eigenvalues greater than 1, which accounted for 69.222% of the total variance. In order to identify the factor structure, Varimax rotation was employed, and items with a factor loading higher than 0.50 were retained for further analysis. As presented in Table 3, the factor loadings of each item ranged from 0.698 to 0.874, indicating the robustness of the factor model. Reliability analysis was performed for each factor using Cronbach's alpha (α), with all values exceeding 0.7, indicating strong internal consistency among the items within each construct. Accordingly, the individual items belonging to the four factors are presented in Table 4.

Table 3: Results of EFA and Cronbach's alpha (α) for each factor

	Factor			
	1	2	3	4
X12	0.730			
X13	0.814			
X14	0.786			
X16	0.864			
X17	0.874			
X7		0.793		
X8		0.814		
X9		0.787		
X10		0.785		
X1			0.723	
X2			0.848	
X4			0.705	
X5			0.825	
X18				0.698
X19				0.705
X20				0.796
X21				0.819

Cronbach's Alpha	0.903	0.869	0.810	0.763

Note: KMO = 0.824; Bartlett's test of sphericity, $p < 0.001$

Table 4: Individual items belonging to the four factors

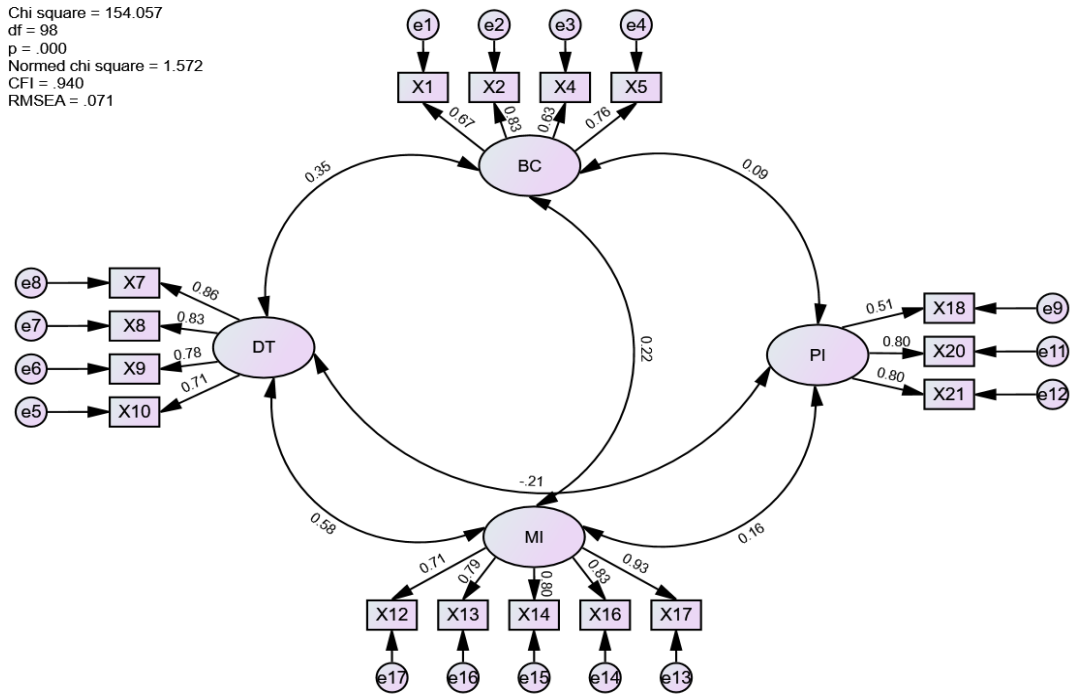
Item No	Item	Factors
X12	I do believe that the Muslim influencers I follow are convincing	Muslim Influencers (MI)
X13	I do believe that Muslim influencers' advertising is a good reference for purchasing modest fashion products	
X14	I will buy a product only if the Muslim influencer referring to it has a good reputation	
X16	I do trust brands advertised by Muslim fashion influencers I follow	
X17	I generally recommend products advertised by the Muslim influencers I follow	
X7	I usually have one or more outfits of the newest style	Design and Trends (DT)
X8	I keep my wardrobe up-to-date with the changing fashions	
X9	Fashionable and attractive styling is very important to me	
X10	To obtain fashion variations, I shop in different stores and choose different brands	
X1	I pay attention to the brand names of the clothes I buy	Brand Consciousness (BC)
X2	Sometimes I am willing to pay more money for clothing because of its brand name	
X4	I pay attention to the brand names of most of the products I buy	
X5	I buy well-known brand products even if the price is high	
X18	I am willing to pay more for modest fashion products that adhere to religious principles.	Purchase Intention (PI)
X19	I am willing to wait longer to buy modest fashion products that adhere to the religious principles.	
X20	I prefer to buy modest fashion products even when the brand is not very popular.	
X21	I intend to purchase modest fashion products in the future	

Confirmatory Factor Analysis (CFA)

In ensuring the fitness of the measurement model, Confirmatory Factor Analysis (CFA) was performed using AMOS version 29. Three fit indices were assessed, including Normed Chi-Square, Comparative Fit Index (CFI), and Root Mean Square Error Approximation (RMSEA). According to Hair et al. (2010), the recommended threshold values for these indices include a Normed Chi-Square below 5, a CFI above 0.9, and an RMSEA below 0.08. Based on the analysis, it was observed that the values of the three indices met the guidelines, with a Normed Chi-Square of 1.572, a CFI of 0.940, and an RMSEA of 0.071.

Figure 2 presents the analysis of the measurement model for the four constructs: MI, DT, BC, and PI. One item, X19 under PI, was dropped due to its low loadings while maintaining the minimum number of three items per construct. Following this, Table 5 demonstrates the convergent validity analysis of the four constructs, including standard loadings, Construct Reliability (CR), and Average Variance Extracted (AVE). All values surpassed the recommended minimum thresholds of 0.5 for standard loadings, 0.7 for CR, and 0.5 for AVE. On the other hand, Table 6 presents the discriminant validity analysis of the model, which is tested by examining the squared correlation of the construct with other constructs. The results revealed that the values of all squared correlations were below 0.5, indicating that discriminant validity was established.

Figure 2: Measurement Model



Source: Author's work

Table 5: Convergent Validity

Variable items		Std. loading	CR	AVE
Muslim Influencers			0.903	66.4%
X12	I do believe that the Muslim influencers I follow are convincing	0.71		
X13	I do believe that Muslim influencers' advertising is a good reference for purchasing modest fashion products	0.79		
X14	I will buy a product only if the Muslim influencer referring to it has a good reputation	0.80		
X16	I do trust brands advertised by Muslim fashion influencers I follow	0.83		
X17	I generally recommend products advertised by the Muslim influencers I follow	0.93		
Design & Trend			0.869	63.5%
X7	I usually have one or more outfits of the newest style	0.86		
X8	I keep my wardrobe up-to-date with the changing fashions	0.83		
X9	Fashionable and attractive styling is very important to me	0.78		
X10	To obtain fashion variations, I shop in different stores and choose different brands	0.71		
Brand Consciousness			0.810	52.8%
X1	I pay attention to the brand names of the clothes I buy	0.67		
X2	Sometimes I am willing to pay more money for clothing because of its brand name	0.83		
X4	I pay attention to the brand names of most of the products I buy	0.63		
X5	I buy well-known brand products even if the price is high	0.76		
Purchase Intention			0.716	51.3%
X18	I am willing to pay more for modest fashion products that adhere to the religious principles	0.51		
X20	I prefer to buy modest fashion products even when the brand is not very popular	0.80		
X21	I intend to purchase modest fashion products in the future	0.80		

Table 6: Discriminant Validity

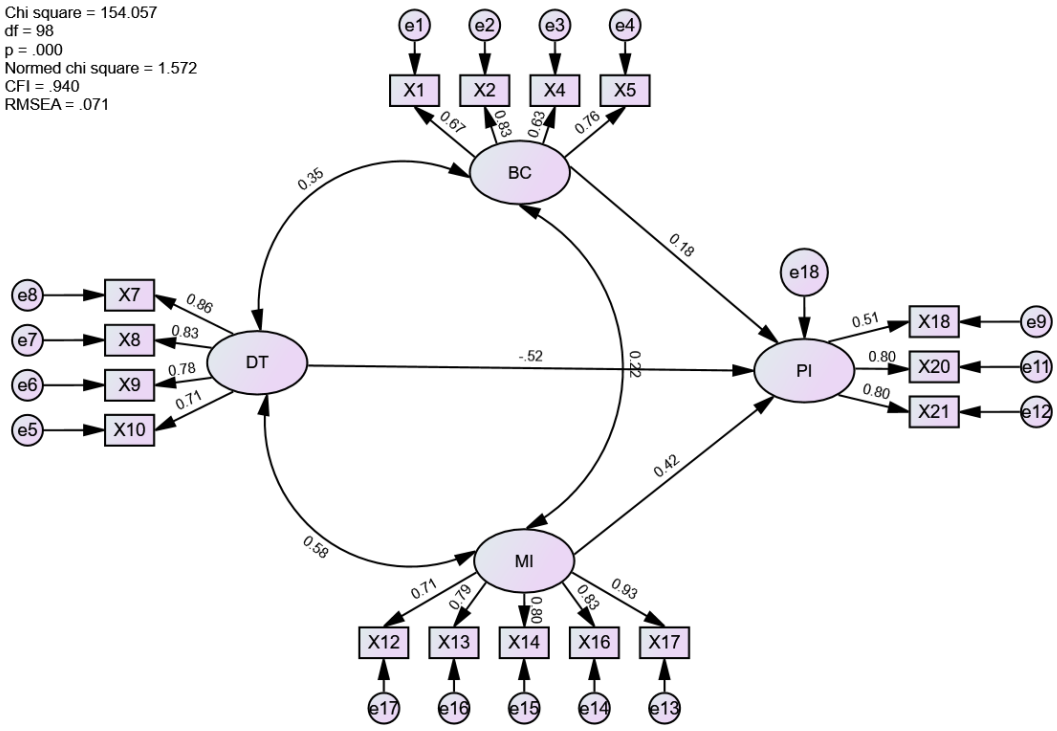
	MI	DT	BC	PI
MI	1.00	0.34	0.05	0.03
DT	0.58	1.00	0.12	0.04
BC	0.22	0.35	1.00	0.01
PI	0.16	-0.21	0.09	1.00

Structural Equation Modelling (SEM)

Figure 3 illustrates the full hypothesized model, as examined using Structural Equation Modeling (SEM) and AMOS software version 29. The fit indices of Normed Chi-Square, CFI, and RMSEA were ensured to meet the threshold values of less than 5, greater than 0.9, and less than 0.08, respectively. The full-fledged structural model then demonstrated a satisfactory goodness of fit based on the stated indices. Additionally, Table 7 presents the model's output, including the standardized estimates (coefficients) and *p*-values, as well as the results of the tested hypotheses.

It was observed that two path coefficients, namely MI → PI and DT → PI, were proven to be statistically significant, with both at $p < 0.01$. Thus, H1, which states that MI has a positive impact on the PI of Muslim women consumers for modest fashion products, and H2, which suggests that DT hurts the PI of Muslim women consumers for modest fashion products, were supported. As hypothesized, MI has a positive impact on PI with *p*-value = 0.006 ($p < 0.01$) and $\beta = 0.42$, while DT hurts PI with *p*-value = 0.003 ($p < 0.01$) and $\beta = -0.52$. However, it was reported that DT has a stronger negative influence on PI (-0.52) compared to the positive influence of MI (0.42). On the other hand, H3, which states that BC has a positive impact on Muslim women consumers' PI on modest fashion products, was rejected with *p*-value = 0.148 ($p > 0.05$) and $\beta = 0.18$, suggesting that BC has no significant relationship with Malaysian Muslim women consumers' PI.

Figure 3: Full-fledged Structural Model



Source: Author's work

Table 7: Significance of the path coefficients in the structural model

Path	Estimate	S.E.	C.R.	β	p	Sig.	Remarks
H1: MI → PI	0.198	0.072	2.760	0.42	0.006	<0.01	Supported
H2: DT → PI	0.266	0.090	2.950	-0.52	0.003	<0.01	Supported
H3: BC → PI	0.126	0.087	1.448	0.18	0.148	Not significant	Rejected

Discussion

The study, which aimed to investigate the factors influencing Muslim women consumers' PI for modest fashion wear, demonstrated that two out of three hypotheses were supported, suggesting that MI and DT significantly affect Muslim women's PI for modest fashion. Firstly, H1 stated that MI has a positive impact on the PI of Muslim women consumers for modest fashion, and the result presented a significant value of $p < 0.01$, supporting the hypothesis. This finding aligns with a previous study on the positive impact of MI on consumer behavior in a modest fashion (Arianti & Hadiprawoto, 2024).

Secondly, H2 stated that DT negatively impacts Muslim women's PI of modest fashion. The result also presented a significant value of $p < 0.01$, which supported the hypothesis that Muslim consumers continue to observe religious principles, particularly in the concepts of modesty and responsibility in clothing, as demonstrated in previous studies (Haidar, 2019; Razzaq et al., 2018). The analysis also revealed a notably strong negative influence $\beta = -0.52$, indicating that Muslim women consumers in Malaysia place greater emphasis on religious values, and that overly designed and trendy clothing may be perceived as non-Shariah compliant, ultimately discouraging PI.

As for H3, which stated that BC has a positive impact on Muslim women consumers' PI for modest fashion, the result revealed otherwise, thus rejecting the hypothesis and suggesting that Muslim women consumers in Malaysia are less concerned about the brand. The discrepancy in the result may be due to several factors. Firstly, considering that the majority of the study's sample (38.8%) spend less than RM 100 on their monthly fashion product purchases, this may indicate a lack of emphasis on brands when shopping for fashion products, as well-known fashion wear brands are usually associated with higher prices. Moreover, the study's context, which focuses on Muslim women consumers, may reflect a higher emphasis on modesty, comfort, and the ability of fashion wear to adhere to Shariah guidelines, rather than focusing on the brands' names when purchasing modest fashion products.

5. Conclusions and Recommendations

The study presents several insights, especially for modest fashion businesses targeting Muslim women consumers. Firstly, businesses are encouraged to incorporate MI in their marketing strategies, as it has been proven to positively influence the PI of Muslim women consumers of modest fashion products. The rise in social media usage among consumers has made platforms such as Instagram and TikTok highly beneficial for marketing modest fashion products. Notably, this also aligns with a past study, which reported that women who follow influencers, such as a hijab model, enjoy seeing their styles and prefer to buy the outfit combinations they offer. They also visit the stores that carry the products, while simplifying their decision-making process (Karakavak & Ozboluk, 2022).

Nevertheless, because MI is influential, it is crucial to note that DT has a stronger negative influence on the PI, which suggests that Muslim women consumers in Malaysia do not prefer extravagant designs or fast-trending fashion. Hence, businesses should be cautious in designing and producing modest fashion wear to ensure that it adheres to Shariah guidelines and fulfills the needs of Muslim women. Furthermore, apart from focusing on and investing in branding strategies, businesses should also ensure that their products embody modesty, as it has been revealed that the brand does not significantly influence Muslim women consumers in Malaysia to purchase modest fashion.

Additionally, this study offers valuable policy implications, particularly in supporting the development of the

modest fashion sector as part of Malaysia's Halal economy strategy (Agency, 2024; Ahmed, 2019). Firstly, government agencies that play significant roles in promoting Malaysian modest fashion, such as the Malaysia External Trade Development Corporation (MATRADE), could leverage influencer marketing by collaborating with Malaysian MI to promote local modest fashion brands both domestically and internationally. Notably, the negative impact of DT demonstrated in this study suggests that policymakers should encourage Shariah-compliant designs and integrate a Halal Marketing framework, rather than trend-driven innovation, which may contradict the value of modesty.

In light of the Stimulus-Organism-Response (SOR) theory, this study presents a refined application of the theory by focusing on the direct relationship between stimuli and response, without the mediating factor of the consumer's internal state process. The findings support the flexibility of the SOR framework, particularly within the Islamic marketing context. The exclusion of organisms also demonstrates the adaptability of this theory in contexts where cognitive or emotional mediators are less prominent due to strong external normative influences, such as religious values. Hence, the model of this study supports and enhances the capability of SOR theory to predict the purchasing behavior of Muslim women in modest fashion products.

While this study highlights the importance of understanding specific consumer preferences and the potential of influencer marketing in niche markets, it has several limitations. This includes a small sample size of only Muslim women consumers, which may affect the generalizability of results. Future studies could consider a larger sample size by including more diverse populations across genders and regions to enhance the findings and their applicability to different market segments. Additionally, the concept of DT was studied generally, which may be influenced by thoughts on the DT of everyday outfits. Future research can investigate the influence of this factor on the PI of Muslim women consumers, specifically during festive seasons such as Eid, which are commonly associated with newly designed and trendy clothing, to provide deeper insights for businesses targeting seasonal markets. Finally, as religious concern is believed to be an influential factor in the PI of modest fashion products, future research could investigate the moderating effect of religiosity to examine further consumer response based on their level of religious adherence.

Overall, modest fashion is particularly significant for Muslim women. Islam has established detailed guidelines for women to cover their *Aurah* as it emphasizes high respect for women and aims to protect their dignity. As Allah mentioned in The Quran Surah Al-Ahzab verse 59:

يَـٰٓأَيُّهَا ٱلنَّبِيُّ قُل لِّأَزْوَٰجِكَ وَبَنَاتِكَ وَنِسَآءِ ٱلْمُؤْمِنِينَ يُدْنِينَ عَلَيْهِنَّ مِن جَلَـٰبِيبِهِنَّ ۚ ذَٰلِكَ أَدْنَىٰٓ أَن يُعْرَفْنَ فَلَا يُؤْذَيْنَ ۗ وَكَانَ ٱللَّهُ غَفُورًا رَّحِيمًا

O Prophet! Ask your wives, daughters, and believing women to draw their cloaks over their bodies. In this way, it is more likely that they will be recognized ˹as virtuous˺ and not be harassed. And Allah is All-Forgiving, Most Merciful (33:59)

Offering modest fashion to Muslim consumers is one way in which Muslim-owned businesses can fulfill their responsibility to the *Muslim Ummah.* Producing and designing fashion that adheres to Islamic principles aligns with the *Maqasid Al-Shariah* or the objectives of Islamic rulings, which fall under *Daruriyat* (necessities) in the protection of faith and religion (Deen). Additionally, businesses can help and encourage consumers to observe the Maqasid Al-Shariah in their daily lives by promoting modest and appropriate attire. Therefore, this study has achieved its objective of investigating the factors influencing Muslim women consumers' PI for modest fashion wear and provides insights for modest fashion businesses as well as supporting the Islamic guidelines in marketing Muslim-related products, especially for Muslim women consumers.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Determinants of Breast Cancer Knowledge among Public University Students

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Abstract: Breast cancer is still a leading global health concern, with Malaysia experiencing a notable burden, accounting for approximately 34.1% of all female cancers between 2017 and 2021. The National Cancer Registry highlights the disease as a common cause of death among Malaysian women. Even though the case of breast cancer remains high, the level of breast cancer knowledge is still low, making it difficult to educate the community to effectively fight against the disease. Thus, this study aims to determine the influence of demographic factors and lifestyle factors on breast cancer knowledge and to examine the difference between gender and family history on breast cancer knowledge levels among university students. A cross-sectional survey was conducted with 261 students from the Bachelor's Degree of Health Administration (Hons.) from Universiti Teknologi Mara, Puncak Alam Campus. Results indicated that gender is an important factor in breast cancer knowledge, with females exhibiting higher knowledge levels. Moreover, physical activity and healthy dietary patterns also emerged as significant predictors of a higher level of knowledge. Future research should continue promoting early screening and prevention, raising awareness of male breast cancer to emphasize its importance alongside female breast cancer. Implementing the gamification technique is an interesting way as an educational tool to attract more community members and improve their health-related knowledge.

Keywords: *Breast cancer, Awareness, Demographic, Lifestyle, Knowledge, Family History*

1. Introduction and Background

Breast cancer is still the leading global health concern for women. In 2022, approximately 2.3 million new cases were reported, with 685,000 deaths reported 685,000. Countries with a high Human Development Index (HDI) report a lifetime risk of 1 in 12 women being diagnosed, compared to 1 in 27 in countries with a low HDI. (Andrew Tong & Hee, 2023). Even though there are many advancements in early detection and treatment initiated by authorities, the burden remains high, particularly in low-and middle-income countries where access to healthcare services is quite limited (Li & Li, 2025).

Like other countries, Malaysia also faces the health burden of approximately 34.1% of all female cancers between 2017 and 2021. The age-standardized incidence rate (ASR) for breast cancer in Malaysia was reported to be 34.1 per 100,000 population during this period. Even though the mortality rate among Malaysian women is lower than the global average, this disease still poses a significant public health challenge. The National Cancer Registry Report indicates that Malaysian women who suffer from cancer face a higher risk of death. It is good to emphasize the importance of improving awareness and knowledge, especially among younger populations, to reduce mortality and encourage early detection (Abdullah & Tan, 2022).

To continuously improve early detection and prevention, focusing on younger females, including those studying at the university, needs to be given some attention. In Malaysia, there have been many past studies determined the awareness level of breast cancer among university students. For example, a study conducted at City University Malaysia found that the level of breast cancer awareness among female students was moderate, with significant gaps in knowledge about risk factors and early detection methods (Harlina, 2024). Another one is from the International Islamic University Malaysia revealed that while students had high knowledge about breast cancer, the practice of breast self-examination was still lacking (Zhang et al., 2024). In other previous study from Saudi Arabia showed more than 55% of university female students had an acceptable level of knowledge, but there were still significant areas for improvement (Arya & Kumari, 2024). Another study in the United States emphasized the need for targeted educational interventions to improve breast cancer awareness among young women (Zainul Azlan et al., 2022).

2. Literature Review

Level of Knowledge of Breast Cancer among Youth: Young people across different regions generally have limited information and exposure to breast cancer and breast self-examination (Skreka et al., 2024). This gap is often due to a lack of participation in health education programs and limited access to early detection information. In Malaysia, studies have shown that while some university students possess moderate knowledge about breast cancer, there are still significant gaps in understanding risk factors and early detection methods. (Abdullah & Tan, 2022). It is shown through the previous study at City University Malaysia that the majority of female students were not notice of the early age that can start with breast self-examinations can start and the frequency with which they should be performed. Similar trends are seen internationally, where in Saudi Arabia, over 55% of students showed acceptable knowledge levels, though improvement is needed. In the United States, targeted interventions were recommended to improve awareness among young women (Islam et al., 2022 & Zainul Azlan et al., 2022). These results underscore the importance of educational exposure in improving awareness and knowledge among the younger generation. Some of the important focuses are early detection, the benefits of regular self-examinations, and the information on risk factors.

Demographic Factors Influencing Breast Cancer Knowledge: Demographic factors like age, gender, and family history influence breast cancer knowledge. Younger age women often have less knowledge compared to older adults, who are more likely to have encountered information through personal or familial experiences (Li & Li, 2025). A previous study in Pakistan also has the same lack of awareness and knowledge resulting in breast cancer among university students. Some results were only 25.2% identified inward pulled nipples, 25.7% recognized sores at the nipple area, and 31.7% noted abrupt changes in breast size as indicators of breast cancer. Moreover, only 20.9% of participants knew the correct age to start breast cancer examinations, and 44.4% indicated that mammography should begin after age 40 (Hussain et al., 2022). Another previous study in Syria presented the result of moderate knowledge among the female students due to their study background in medical, pharmacy, and dentistry. However, the knowledge gap still needs to be improved. (Alshafie et al., 2025). Gender differences are also notable, where females generally exhibit higher awareness and better knowledge regarding breast cancer compared to males (Zainul Azlan et al., 2022). The knowledge differences may be due to the disease that occurred mainly in women, which urged them to search for more information about the cancer. A previous study in Malaysia highlighted that both females and males scored moderate knowledge on breast cancer; however, females scored better for symptom knowledge, breast self-examination, and mammogram (Lee et al., 2022). The last factor, family history, is another significant factor in having better information and personal experiences (Li et al., 2025). The role of family history in influencing knowledge is mixed. While some studies indicate that individuals with a family history are more likely to seek information and engage in preventive behavior (Li et al., 2025 & Liu et al., 2021), others found no significant difference in knowledge levels (Mohebi et al., 2023 & Subramanian et al., 2013). Overall, these findings suggest that family history alone may not ensure greater understanding without proper educational support in this health-seeking information.

Lifestyle Factors Influencing Breast Cancer Knowledge: Being physically active and consuming a healthy diet are common lifestyle choices that contribute to a good level of breast cancer knowledge. It is supported by a previous study that healthy lifestyle choices, including regular physical activity and a balanced diet, are associated with better breast cancer knowledge (Liu et al., 2025). Exposure to active physical activity leads to improved health information access from fitness programs, gyms, and social interactions with groups that are concerned with health-related topics. Healthy dietary patterns are also linked to a greater understanding of cancer prevention strategies, including overall health literacy (Jia et al., 2022 & Mertens et al., 2023). Additionally, qualitative research has highlighted that personal and behavioural factors influence physical activity among women with metastatic breast cancer, underscoring the need for tailored education and services. Likewise, greater breast cancer knowledge has been associated with healthier eating patterns and improved overall lifestyle choices (Deeb et al., 2024 & Liu et al., 2025). These findings suggest that promoting healthy lifestyle choices can be a helpful approach in improving breast cancer knowledge among young adults; thus, hypotheses were drawn based on the previous literature reviews.

H1: Young age does not influence breast cancer knowledge
H2: Being female is a factor that influences breast cancer knowledge
H3: Having a family history of breast cancer influences a student's breast cancer knowledge

H4: Engaging in physical activity influences breast cancer knowledge
H5: Following a healthy dietary pattern influences breast cancer knowledge
H6: There is a difference in breast cancer knowledge between males and females
H7: There is a difference in breast cancer knowledge between individuals with a family history of breast cancer and those who do not.

Despite the existing research, there are still gaps in understanding the specific factors that influence breast cancer knowledge among Malaysian university students. This study aims to address these gaps by focusing on the following objectives:

- To determine the influence of demographic factors and lifestyle factors on breast cancer knowledge among public university students in Selangor.
- To examine the difference between gender and family history towards breast cancer knowledge levels among public university students in Selangor.

3. Research Methodology

This study uses a cross-sectional survey research design, and the population is the students who enrolled in the Bachelor's Degree in Health Administration (Hons.) program in Universiti Teknologi Mara, Puncak Alam campus, Selangor. The sample includes 261 students, consisting of both males and females from various semesters. This acknowledges the limitation of the findings, which may not be generalizable to students in other programs within the faculty due to the limited timeframe and available resources to conduct a broader study. Nevertheless, this study provides valuable insights within the context of health awareness.

This study used an established questionnaire from previous publications to evaluate the research objectives. The questionnaire has 18 questions. It consisted of three sections: section a (3 questions of demographics; gender, age, and family history of breast cancer), section b (10 questions of lifestyles; 5 from physical activity and 5 from dietary pattern), and section c (5 questions for breast cancer knowledge). Each section has various types of responses. For section A, it was the categorical data scale. For sections b and c, the five-point Likert scale was used between 1- strongly disagree to 5 – strongly agree. Respondents' feedback was gathered within three weeks during the semester.

All collected data were verified, modified, and analyzed using the IBM SPSS V.29.0 statistical package. The normality results in Table 1 for demographic, lifestyle, and breast cancer knowledge categories indicate that all variables fall within the acceptable range, suggesting a normal distribution. The reliability analysis shows that the breast cancer knowledge scale has a high reliability coefficient of 0.830, indicating strong consistency. The lifestyle factors scale has a moderate reliability coefficient of 0.665, reflecting acceptable but less consistent results.

Table 1: Reliability and Normal Distribution Analysis

Variables	Total Items	M	SD	CA	Skewness	Kurtosis	Distribution
DG	3	2.1379	0.28712		-.535 to .151	1.893 to .300	Normal
LS	10	3.5257	0.51118	0.665	.197 to .151	.623 to .300	Normal
BCK	5	3.105	0.79451	0.830	-.007 to .151	-.813 to .300	Normal

Note: M = mean, SD = standard deviation, CA = Cronbach Alpha, DG = demographic, LS = lifestyle, BCK = breast cancer knowledge

4. Results and Discussion

The demographic data in Table 2 indicate that 79.7% of the participants are female, while 20.3% are male. Age-wise, the majority of respondents are between 21 to 23 years old (65.5%), followed by those aged 24 to 26 (26.1%), 18 to 20 (4.6%), and 27 to 30 (3.8%). When it comes to family history, 15.3% reported having a family history of breast cancer, whereas 84.7% did not. This demographic breakdown helps in understanding the target population and tailoring the level of knowledge initiatives accordingly.

Referring to the gender gap in the university's enrolment, throughout much of the twentieth century, men obtained more bachelor's degrees than women globally. For example, in 1970, 20% of men and only 14% of women graduated from college. However, a significant shift occurred as women born in the late 1950s and early 1960s began to surpass men in college completion rates during the 1980s. While men's college completion rates stagnated, women's rates increased dramatically, from 14% in 1970 to 36% in 2010. Since 2000, women have consistently earned about 57% of all bachelor's degrees annually, with 58.5% in 2022. The ability to earn a degree completely relies on certain factors, for instance, academic skills, preparation, incentives, educational aspirations, and the ability to manage financial costs. Research indicates that educational transitions and academic performance are strong predictors of college enrollment and completion. (Buchmann et al., 2025).

In Malaysia, the trend in higher education enrollment has also seen significant growth, particularly among women. The gross enrollment ratio in Malaysia rose from 19.6% in 2000 to 42% in 2020, and it is projected to reach 70% by 2025. The gross enrollment ratio for females has increased dramatically from 10.7% in the 1950s at the University of Malaya (UM) to around 48% today, surpassing 50% in 2015. In 2022, public universities in Malaysia enrolled a total of 589,879 students, with 230,161 (39%) being male and 359,718 (61%) being female. These figures suggest that Malaysia has nearly achieved gender parity in public universities, reflecting a similar trend to the global increase in women's higher education attainment. (Elhadary & Samat, 2023).

Table 2: Respondents' Background

Variables	Description	Frequencies	Percentage
Gender	Male	53	20.3
	Female	208	79.7
Age	18 - 20	12	4.6
	21 - 23	171	65.5
	24 - 26	68	26.1
	27 - 30	10	3.8
Family History	Yes	40	15.3
	No	221	84.7

Demographic and Lifestyle Factors on Breast Cancer Knowledge Among Students

Next, this study used a regression analysis to determine the influence of demographic factors and lifestyle factors on breast cancer knowledge. The table below illustrates the coefficients and collinearity statistics:

Table 3: Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	**(Constant)**	-0.868	2.370		-0.366	0.714		
	Age	0.373	0.363	0.058	1.030	0.304	0.965	1.037
	Gender	3.690	0.601	0.374	6.136	0.000	0.813	1.230
	Family history	-0.791	0.623	-0.072	-1.270	0.205	0.945	1.058
	MEAN_PA	1.072	0.414	0.167	2.588	0.010	0.729	1.371
	MEAN_Diet	1.859	0.381	0.290	4.880	0.000	0.854	1.171
	R	0.478		**f**	15.089			
	R^2	0.228		**sig**	<.001			
	Adjusted R^2	0.213		**df**	5			
	Std. Error of the Estimate	3.52375						

The analysis results of this study provide a model summary indicating that the independent variables of demographic and lifestyle explain approximately 22.8% of the variance in breast cancer knowledge, with an adjusted R^2 of 21.3%. This indicates that although the model has moderate explanatory power, there could be other significant factors that were not included in the study but may also play an important role.

The study identified that gender, physical activity, and healthy dietary patterns significantly predict breast cancer knowledge. Female students demonstrated higher knowledge levels than males (B = 3.690, p < 0.001), supporting H2. Nevertheless, age (B = 0.373, p = 0.304) and family history (B = -0.791, p = 0.205) do not significantly impact breast cancer knowledge, indicating weak relationships with the dependent variable. Thus, H1 is accepted, and H3 fails to reject.

Regarding lifestyle factors, both physical activity (MEAN_PA) and a healthy dietary pattern (MEAN_Diet) are significant predictors of breast cancer knowledge. Physical activity has a positive coefficient (B = 1.072, p = 0.010) with a moderate relationship strength (Beta = 0.167). A healthy dietary pattern shows a stronger positive relationship (B = 1.859, p < 0.001) with a higher standardized coefficient (Beta = 0.290). Students who engage in repeated physical activity and maintain a good, balanced diet are more likely to have better knowledge about breast cancer. Thus, H4 and H5 are both accepted. This underscores the role of promoting healthy lifestyle practices as part of educational programs to improve breast cancer awareness among the students.

The collinearity statistics in the regression analysis help in determining if the independent variables have a strong correlation with one another, which could affect the reliability of the regression coefficients. The Tolerance values for all variables are above 0.7, and the Variance Inflation Factor (VIF) values are below 10, indicating no multicollinearity issues. This means that the independent variables do not excessively overlap in what they measure, ensuring that the regression results are reliable and each variable's contribution to the model is distinct.

The p-value is <0.001, indicating that the model is statistically significant, and the independent variables impact the dependent variable. The F-statistic value of 15.089, with a significance level of less than 0.001, further supports the overall significance of the model. The degree of freedom (df) for the model is 5, corresponding to the number of independent variables included in the analysis.

In conclusion, the study identifies gender, physical activity, and healthy dietary patterns as good predictors of breast cancer knowledge among public university students. These findings suggest that targeted interventions focusing on these factors could effectively enhance breast cancer awareness and may play a role in supporting early detection techniques and prevention efforts.

Role of Gender and Family History towards Breast Cancer Knowledge Among Students

Furthermore, this study adopted an independent sample t-test to determine the difference between gender and individuals with a family history of breast cancer in breast cancer knowledge among the respondents. The table below illustrates both the descriptive and t-test statistics:

Table 4: Descriptive Analysis

Variables	N	Mean	SD
Gender			
Male	53	2.6528	0.77176
Female	208	3.2202	0.75997
Family History			
Yes	40	3.0750	0.79574
No	221	3.1104	0.79597

The descriptive analysis revealed the number of participants. Regarding gender, there were 53 males and 208 females. The mean score for breast cancer knowledge among males was 2.6528, with a standard deviation of 0.77176. In contrast, the mean score for females was 3.2202, with a standard deviation of 0.75997. Additionally, the study examined whether participants had a family history of breast cancer. Among those with a family history, 40 participants had a mean score of 3.0750, with a standard deviation of 0.79574. This is slightly different from participants without a family history, who had a mean score of 3.1104 and a standard deviation of 0.79597. Based on this result, it was indicated that females scored higher in breast cancer knowledge compared to males. Moreover, individuals without a family history of breast cancer had a higher mean score than individuals with a family history.

Next, Table 5 presents the t-test analysis results between gender, family history of breast cancer, and breast cancer knowledge. For the gender variable, there was a significant difference in the knowledge level scores between males and females. Using equal variances assumed for Levene's Test, the t-test yielded a value of -4.837 while the degree of freedom (df) of 259 and two-sided p-value (0.000) indicated a statistically significant difference. Moreover, the mean score between genders is -0.56736, followed by a standard error value of 0.11730 and a 95% confidence interval ranging between 0.79835 to 0.33637 as stated. To summarize, the knowledge of breast cancer is different between males and in, specifically, females scored higher in understanding the knowledge of breast cancer. Thus, H6 is accepted.

For the family history variable, this study referred to equal variances assumed for Levene's Test, as the significance value was greater than p = 0.05. The t-test results showed no statistically significant difference in breast cancer knowledge scores between respondents with a family history of breast cancer and those without. The t-value was -0.259 with 259 degrees of freedom, and the two-sided p-value was 0.796. In terms of mean difference, these two groups had a value of -0.03541, with a standard error difference of 0.13676, and a 95% confidence interval ranging from -0.30472 to 0.23390. Therefore, the results indicate that there is no statistically significant difference in breast cancer knowledge between respondents with a family history of the disease and those without, fail to reject H7.

Females generally possess better knowledge in health-related areas, particularly those involving women's health issues. In previous studies on breast cancer knowledge, female students demonstrated a superior overall understanding of breast cancer compared to male students (Odhiambo & Hunter, 2023). A study conducted in Malaysia yielded similar results, indicating that a higher number of females were categorized at a high knowledge level (Lee et al., 2022). Another study from Greece, which conducted a systematic review analysis, corroborated these findings. The majority of the research revealed that females dominated breast cancer knowledge, while males were less likely to have a positive attitude toward the disease (Skreka et al., 2024).

Nevertheless, some contradictory results emerged from earlier studies conducted in 2000 and 2006. For example, a study in Saudi Arabia measured the level of knowledge among adolescents and found that gender—males and females—was not a significant factor in the overall cancer knowledge score, despite slight differences in the questionnaire results. This might be explained by the fact that both genders possess specific knowledge related to cancer prevention. For instance, females were generally better at learning about breast cancer prevention overall, while males might have been more knowledgeable about smoking and physical exercise for cancer prevention (Hashim, 2000). Another study using instructional videos or palpation aids to improve breast self-examination also found that gender and personal traits were not significant factors in enhancing knowledge about breast self-examination (Von Georgi et al., 2006). In summary, considering various past studies in conjunction with the current paper's results, it is evident that there is a significant variance in breast cancer knowledge between males and females, with females predominantly having a better understanding of the subject.

Additionally, this study's findings explain that having a family history of breast cancer does not necessarily correlate with the level of breast cancer knowledge. It highlighted that the group of students may have attained the same level of breast cancer knowledge and awareness, regardless of the presence of family history. One possible reason is that having a family history does not translate into in-depth knowledge, especially when the discussion involves clinical aspects, which may be difficult to understand due to complex scientific explanations. This suggests that family history itself is not a strong predictor of disease-related knowledge. This is consistent with previous results, such as a study conducted among females in Iran, which found no important variance in knowledge between students with and without a family history of breast cancer. Although the majority of respondents did not have a family history of breast cancer, their level of knowledge was considered moderate to low (Mohebi et al., 2023). In a previous Malaysian study it revealed majority of the respondents, who have the family history of breast cancer, showed poor of knowledge in risk factors (Subramanian et al., 2013) but a study in the United States, showed a contrast result that respondents with family history of breast cancer scored high level of knowledge with 88% (Khushalani et al., 2020). A previous study done among Mexican women, which is consistent with these findings, highlighted that individuals with a family history have no statistically significant with those without a family history (Bird et al., 2011). Even though individuals with a family history are a known risk factor, however majority of women who are

diagnosed with the cancer, approximately 80% with those who do not have the cancer. Only 5% to 10% of cases are considered hereditary. This highlighted the importance of comprehensive educational efforts regardless of family history (Coryell Health, 2022, National Breast Cancer Foundation, 2025 & World Health Organization, 2024).

Table 5: Independent t-test Analysis

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						P			Lower	Upper
Gender and BCKmean	Equal variances assumed	0.002	0.965	-4.837	259	0.000	-0.56736	0.11730	-0.79835	-0.33637
Family history and BCKmean		0.214	0.644	-0.259	259	0.796	-0.03541	0.13676	-0.30472	0.23390

5. Conclusion

In conclusion, this study identified key gaps in breast cancer knowledge among the public university students in Selangor, highlighting significant gender differences in awareness levels. Thus, these findings underscore the need for more inclusive breast cancer awareness strategies, particularly aimed at increasing awareness among male students. While there is no disparity found based on family history, the result emphasized that personal experience itself may not be sufficient for fostering better understanding.

Recommendations

Based on the findings, several alternatives can be proposed to improve the understanding of breast cancer. While keeping up with promoting early assessment on breast health and prevention, efforts should be made to raise awareness of male breast cancer. In 2025, it was reported by the American Cancer Society that around 2,800 men are expected to be diagnosed with breast cancer, and 510 of them will die due to the disease. Due to the lack of research being done on male breast cancer, it should be highlighted in future studies to create better awareness not only for females, but also for males and the community. (breast cancer research foundation, 2025). In addition, it can be suggested that future studies introduce game-based learning to capture the community's attention and raise awareness of breast cancer. While maintaining the channels through physical booths and social media, future studies may start to introduce the concept into learning about cancer, since it is more engaging and easily accessible for the community to explore. Game-based learning is a game concept that includes entertainment and fun ways to be applied in a reality scenario. In a healthcare setting, it has been implemented in the area of diabetes and cardiovascular disorders. (poliani et al., 2023). By addressing these limitations and implementing the recommendations, future research and public health initiatives can better address the gaps in breast cancer knowledge and promote greater awareness and early detection of the disease.

Acknowledgement: The authors would like to express our heartfelt gratitude to the Faculty of Business and Management, Universiti Teknologi Mara (UiTM), and KPJ Healthcare University for the encouragement and support in fostering research writing and publication through various initiatives aimed at research development. The authors are also sincerely thankful to the faculty members for their constructive feedback and assistance, which greatly contributed to this study. While this study did not receive any specific funding, it greatly benefited from the support and resources provided by the institutions.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Enhancing Employee Resilience Among Private Hospital Healthcare Practitioners (HCPs) in Malaysia: What Factors Matter?

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Abstract: The demanding nature of the healthcare industry created a challenging work environment for healthcare practitioners. Such challenges include emotional fatigue, long working hours, rapid decision-making under pressure, and working with critically ill patients, all of which have been exacerbated by the COVID-19 pandemic. High employee resignation rates, heavy workloads, unpredictable work hours, and regulatory and compliance pressures further complicate this challenging situation. As a result, many healthcare practitioners (HCPs) become disengaged and experience burnout. Thus, being resilient is regarded as imperative in aiding HCPs in navigating the challenging work circumstances described. The fact that HCPs must uphold high standards of care despite the challenges makes building resilience essential. This study aimed to address the factors that influence employee resilience, namely self-efficacy, perceived organizational support (POS), and perceived social support (PSS) from family, friends, and significant others among HCPs at a private hospital in Malaysia. A self-administered online survey was employed to gather data from 175 nurses and allied health professionals utilizing a non-probability purposive sampling technique. The findings of this study revealed that only SE, POS, and PSS from a significant other had a significant relationship with employee resilience among HCWs. Interestingly, the present study revealed contrary findings, indicating that PSS from family and friends did not correlate significantly with employee resilience. Several recommendations were developed for the private hospital to strengthen its talent among HCPs.

Keywords: *Employee resilience, self-efficacy, perceived organizational support (POS), perceived social support (PSS), Healthcare practitioners (HCPs)*

1. Introduction and Background

Globally, the COVID-19 pandemic has led to intense stress on health, economics, politics, and society. Undeniably, it has painfully resulted in strenuous pressure on the healthcare industry due to the surge in infections, with overall Malaysian hospital and ICU utilization rates at 62.8 percent and 63.1 percent, respectively, in the year 2022 (The Star, 2022). As a result, it has impacted healthcare systems by extending working hours, elevating stress, and shifting operations (Smallwood, Harrex, Rees, Willis & Bennet, 2022). The healthcare industry is also under pressure from the World Health Organization (WHO) to adjust to new challenges while ensuring continued access to essential health services (Ujang, Hamidi, Hamid, Awang, Zulkifli, Supadi, Mohamed & Sooryanarayana, 2023). In facing such a crisis, healthcare practitioners (HCPs) from both public and private healthcare are at the forefront, directly exposed to the physical and mental health impacts of COVID-19.

There are a few challenges faced by the HCPs in Malaysia. Firstly, issues such as burnout, anxiety, depression, suicidal thoughts, and physical health problems are heightened among HCPs due to the multiplied burden and unforeseen circumstances to surmount the challenges even in the post-pandemic era (Ortiz-Calvo, Martínez-Alés, Mediavilla, González-Gómez, Fernández-Jiménez, Bravo-Ortiz & Moreno-Küstner, 2022; Abdul Rahim & Ramdzan, 2023). In all circumstances, HCPs are obligated to maintain a professional standard of care while discharging their legal duties (Abdul Rahim & Ramdzan, 2023).

Secondly, the nature of work presented in the healthcare industry demands high tenacity and flexibility, whereby HCPs often encounter high-pressure situations in their daily responsibilities. Similarly, the HCPs at private hospitals have had to change quickly in terms of new measures and precautions for the sake of the patients at the cost of their health. Given the demands of the challenging environment, HCPs in private hospitals were required to adapt quickly to new protocols, treatments, and technologies while also facing the challenge

of maintaining the quality of patient care. Hence, it becomes imperative for HCPs not only in public but also in private hospitals to exercise resilient practices to cope with stress, rebound from failure, and uphold high levels of patient care in their daily responsibilities. Consequently, these work stressors have added more problems to employee constraints when the healthcare workforce is already stretched (Harun, Mahmood & Md. Som, 2022). This has also resulted in poor healthcare service quality and increased resignations (Lee, Kim & Chun, 2024).

Thirdly, the resignation of HCPs in both public and private healthcare is concerning, and the issue is worrisome despite the lifting of the Movement Control Order (MCO) and restrictions on international borders by the Malaysian government (Hospital Management Asia, 2023). Specifically, approximately 6,926 medical consultants, 352 nurses, and 1,651 allied health professionals have resigned from the Ministry of Health (MOH) Malaysia between 2018 and 2023 (News Straits Times, 2023; Galen Centre Organization, 2024). Additionally, the percentage of Malaysian contract doctors leaving their jobs has increased by 1,131 percent in 2022 (The Straits Times, 2023), and the number keeps increasing to date. Malaysia's Health Minister, Datuk Seri Dr Dzulkefly Ahmad, estimated that the shortage of HCWs would be nearly 60 percent by 2030, and 113,472 nurses would be needed by 2025 (News Straits Times, 2024; News Straits Times, 2023). A similar view was reported by WHO (2024), which projected a shortage of 4.5 million HCPs worldwide by 2030. Based on the statistics highlighted, the healthcare workforce shortage keeps growing, and the healthcare industry is struggling to keep its scarce skilled HCWs (Sija, 2022).

In this regard, Mendoza Bernal, Sánchez-Teruel, Robles-Bello, Sarhani-Robles, and Sarhani-Robles (2023) assert that the healthcare industry must not neglect to build resilience as a protective factor in human capital against adverse situations. Ho, Sosina, DePierro, Perez, Khan, Starkweather, Marin, Sharma, Ripp, Peccoralo, and Charney (2024) added that employee resilience protects HCPs' mental health in managing such circumstances and their challenges. Indeed, resilience in HCPs can shield them against psychological distress and foster adaptability in crises. (Simões de Almeida, Costa, Teixeira, Dores & Marques, 2023). Alternatively, Azriddin, Ahmad, Haron, Kalilah Zaghlol, and Tuan Kub (2024) demonstrated that employee resilience enhances HCPs' capacity to maintain their positions by effectively managing stress, reducing burnout, and cultivating a strong attachment to their workplace. It also enhances job satisfaction and maintains job retention among HCPs (Chidi, Adeniyi, Okolo, Babawarun & Arowoogun, 2024). This emphasizes the importance of employee resilience in the post-pandemic context to enhance workforce retention and address the healthcare shortage (Ho et al, 2024).

However, there are limited studies conducted on employee resilience in the Malaysian private healthcare industry. Hence, recognizing the factors that influence employee resilience among HCWs is essential for the private healthcare industry to develop strategies that would improve the welfare of the employees, reduce turnover, and ensure that patients can be treated well despite unparalleled demands. It is vital to recognize the pivotal role of employee resilience in ensuring optimum patient care within a highly volatile and demanding operational environment. By pinpointing factors of employee resilience, the study aims to contribute a positive stride towards facilitating the formulation of policies and structures that can foster a resilient workforce geared towards providing quality healthcare services even in challenging circumstances. Therefore, this study aimed to: (i) determine the relationship between self-efficacy and employee resilience; (ii) determine the relationship between perceived organizational support (POS) and employee resilience; and (iii) determine the relationship between perceived social support (family, friends, and significant others) and employee resilience.

2. Literature Review

Employee Resilience: Resilience has been defined as an individual's ability to cope with and recover from adverse events, according to Richardson (2002). In addition, it is described as an individual's ability to swiftly adapt to changing situations and quickly recover from potential stressors and challenges (Thomas & Suresh, 2023). The concept of resilience was later applied in workplace settings and termed "employee resilience" (Yang & Lee, 2023). Kuntz, Connell, and Naswall (2017) defined employee resilience as the behavioral capacity to continuously adapt and respond to workplace demands through the conscious use of available resources and organizational support. It also refers to an employee's ability to recover and deal with the uncertainties arising from work-related activities and disruptions (Yang & Lee, 2023; Caniëls & Baaten, 2019; Klein et al., 2003).

The early conceptualization of resilience describes it as a personal trait to rebound from adversity. However, Näswall, Malinen, Kuntz, and Hodlife (2019) and Yang and Lee (2023) shared a common notion that employee resilience is the ability to use resources for continuous adaptation and growth at work despite challenges and can be strengthened through external support. Furthermore, Kuntz et al. (2017) also extended the concept of employee resilience to encompass crisis management, proactive action, adaptive learning, and support-seeking. The significance of fostering resilience in the workplace has been emphasized by numerous scholars. Näswall et al. (2019) stated that resilience in employees equips them to adjust and deal with ever-changing work environments. Additionally, understanding how employees are struggling helps shape focused resilience interventions that mitigate the risk of burnout and emotional distress (Chidi et al., 2024). Thus, employee resilience has emerged as a key factor in the survival of employees in the industry (Yang & Lee, 2023).

Literature highlighted the criticality of employee resilience across various industries. Similarly, this study recognizes the imperative nature of resilience as a vital attribute among the workforce at the private healthcare institution. HCPs are contending with escalated job demands, heightened stress levels, and worries about their well-being and job security (Ortiz-Calvo et al., 2022). Therefore, the strategic approach to building employee resilience is crucial for preserving the workforce's well-being and safeguarding the delivery of high-quality patient care amid persistent stressors within the healthcare industry.

Self-efficacy: Self-efficacy, as conceptualized by psychologist Albert Bandura in 1977, is an individual's belief in their ability to influence outcomes and take control of their actions. According to Padmashree and Ayudajammal (2023), self-efficacy denotes one's belief in successfully executing tasks, overcoming challenges, and attaining goals within a working context. In healthcare work environments, Mendoza Bernal et al. (2023) characterized self-efficacy as an innate quality that reduces emotional impacts during challenging conditions, thereby enhancing resilience in medical professionals.

Earlier research has constantly emphasized the significance of self-efficacy in workplace settings. Alshammari and Alenezi (2023) identified self-efficacy as a source of motivation and resilience among nursing professionals. Notably, HCPs with high self-efficacy exhibit greater motivation, problem-solving abilities, and resilience in dynamic work environments. A study conducted by Mendoza Bernal et al. (2023) revealed that self-efficacy reduces the emotional effects of adverse situations and that self-efficacy has the strongest influence on employee resilience. At the same time, Baluszek et al. (2023) suggested training program initiatives to improve employees' skills and ability to oversee complex tasks. The training programs not only boost individual performance but also strengthen the total resilience of healthcare teams, which is critical for navigating disasters and ensuring the best patient care.

In the healthcare field, empirical studies indicate that self-efficacy serves as a substantial predictor of employee resilience among healthcare professionals. The study of Ghasempour, Abbasi, Basirinezhad, Dagari, and Ebrahimi (2024) indicated a significant correlation between self-efficacy and resilience among Iranian nurses. The study concluded that people with high self-efficacy tend to be more confident about their problem-solving capacity and exhibit more emotional control. An investigation was also conducted into predictors of employee resilience in HCPs during the COVID-19 pandemic (Mendoza Bernal et al., 2023). The study revealed that self-efficacy appeared to be a key component in coping with COVID-19 since it helps HCPs realize that they can manage some of the challenges they face and take precautions to stay safe from infections. A recent study conducted by Hosseininezhad, Saadat, Pourramzani, Zhaleparvar, Jafroudi, and Sheikholesmi (2024) has also demonstrated similar findings. The study provided empirical evidence to support the idea that a nurse's capacity to bounce back from stress and hardship during the COVID-19 pandemic is directly correlated with their level of self-efficacy. The study also established that self-efficacy significantly mediates the relationship between social support and resilience, suggesting that higher self-efficacy levels correlate with greater resilience. Thus, this study formulated the following hypothesis to examine the relationship between self-efficacy and employee resilience.
H1: *There is a relationship between self-efficacy and employee resilience among HCWs*

Perceived organizational support (POS): Eisenberger et al. (2020) coined the term 'perceived organizational support' (POS) in 1986. They defined POS as employee perceptions of the organization-related support and concern they receive for their contributions and well-being. The organizational support theory proposed by

Kurtessis, Eisenberger, Ford, Buffardi, Stewart, and Adis (2017) suggested that POS is defined as the employee's perception regarding the degree to which the organization cares about their well-being and appreciates their contributions. POS includes fairness of treatment (Sihag & Dhoopar, 2023), receipt of praise, and approval by the organization at the workplace (Eisenberger et al., 1986).

Undoubtedly, the crisis of the COVID-19 pandemic has created unprecedented challenges affecting almost all industries globally and employees from different work backgrounds and positions. Georgiadou et al. (2024) proclaimed that POS acts as a protective factor or buffer amidst the challenges posed by the COVID-19 pandemic. Moreover, extensive research has consistently emphasized the significance of POS in shaping employee resilience (Raj Arokiasamy & Krishnaswamy, 2021; Jin & Tang, 2021; Sihag & Dhoopar, 2023; Haider & Abid, 2017). In the context of the healthcare industry, POS is a critical factor that defines employee resilience. Prakosa et al. (2019) argued that organizations can help HCPs by addressing their emotional needs. This enhances performance-reward expectations and creates an organizational environment with job security, accessible support, and autonomy provision.

Huang et al. (2024) conducted a study to examine the relationship between POS and employee resilience among emergency nurses in tertiary hospitals in China. Their findings indicated that POS and employee resilience are positively related. This plays a huge role in employee resilience, creating a positive workplace culture that makes nurses feel secure and valued in their professional environment. Similarly, the findings of the study are consistent with Li, Jameel, Ma, Sun, Hussein, and Mubeen (2022) and Jin and Tang (2021), who both mentioned that organizational support can help HCPs maintain well-being while exhibiting resilience to the stressors and demands of their jobs. Thus, based on the reviewed literature, the subsequent hypothesis was formulated to ascertain the relationship between POS and employee resilience.
H2: *There is a relationship between perceived organizational support (POS) and employee resilience*

Perceived social support (PSS): Zimet et al. conceptualized the theory of Perceived Social Support (PSS) in 1988, along with the Multidimensional Scale of Perceived Social Support (MSPSS). PSS is defined as an individual's subjective appraisal of the assistance and resources available from their social connections, upon which they rely for value, affection, and care (Cooke, Rossmann, McCubbin, & Patterson, 1988; Sarason, Levine, & Basham, 1983, p. 127). Vadivel et al. (2022) also described PSS as the interaction and support a person requires to feel important and responsible for their actions in difficult times. The MPSS scale, developed by Zimet et al. (1988), measured PSS from three unique sources: family, friends, and significant others. Perceived family support is essential as it shapes the feelings of love, care, and respect, allowing them to provide help and assistance in times of need. Meanwhile, perceived friend support pertains to the personal evaluation of the instrumental, emotional, and informational assistance that they believe they receive from their friends. (van der Mey-Baijens, Buil, Vuijk, Bul, Branje, Meeus & van Lier, 2023). Furthermore, perceived support from a significant other refers to the instrumental and emotional support that an individual believes they receive from an important person. This includes a romantic partner or someone with whom they have a committed relationship (Halbesleben & Rotondo, 2007).

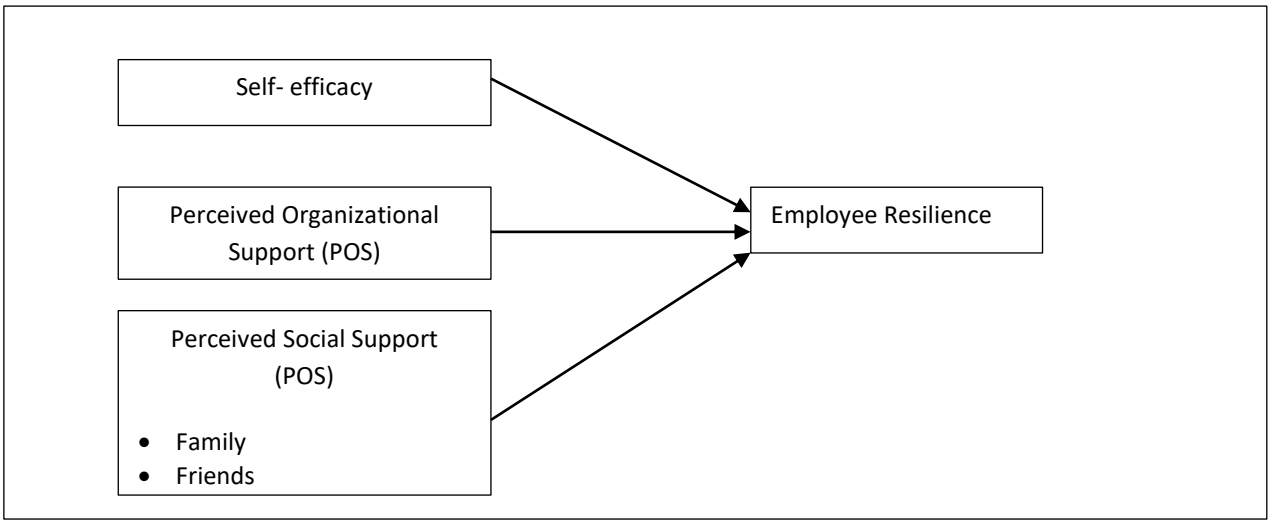
Previous studies have primarily investigated PSS as a single entity, and according to Zimet et al. (1988), providing support from three separate entities: family, friends, and a significant other. Each dimension of PSS contributes significantly to the support systems for HCPs, thereby enhancing employee resilience (Siswadi et al., 2022). Studies by Labrague (2020) and Yilmaz, Yiğitoğlu, and Yilmaz (2022) stated that HCPs' mental and psychological resilience is positively impacted by PSS. Koamesah et al. (2022) highlighted the significance of forming supportive relationships in the workplace and personal life as an essential approach. This enables HCWs to cope with emotional stressors and reinforce resilience in challenging work environments. Meanwhile, Yilmaz et al. (2022) identified that healthcare professionals perceive a high level of multidimensional social support, especially from family, friends, and significant others, as crucial for building their resilience. Likewise, Moisoglou, Katsiroumpa, Malliarou, Papathanasiou, Gallos, and Galanis (2024) suggested that social support may contribute to helping nurses practice their resilience through positive actions, self-care, and personal growth. Cao, Liu, Yan, Xiong, Wen, Chen, Zhang, Tao, Zhang, Wang, Zou, and Fu's (2024) findings indicated that enhancing PSS increases medical staff resilience in Hubei, China. The authors mentioned that strengthening PSS is important in high-stress healthcare environments, such as during public health crises, where coping and bouncing back effectively is crucial.

Nevertheless, limited prior research explored the relationship between various aspects of PSS from family, friends, and a significant other and employee resilience. A study by Procidano and Heller (1983) reported that family support is more effective at reducing distress and enhancing resilience, while support from friends is more closely linked to social skills. Note that both forms of support play distinct yet complementary roles in improving overall well-being and coping. However, Mirchandani (2021) claimed that family support could become less dominant when compared to someone's particular trait of self-efficacy. This is especially true for individuals with high self-efficacy since they avoid relying on the feedback of their families. Accordingly, support from friends has been reported to significantly enhance overall well-being, which is closely linked to social skills (Procidano & Heller, 1983). Conversely, research conducted by Wang, Tao, Bowers, Brown, and Zhang (2018) revealed that psychological and emotional support from friends does not directly influence resilience. However, it enhances self-efficacy in individuals, which in turn indirectly influences their resilience. This is primarily due to the possibility that friends may not fully comprehend the nature of the work, as their connections are often influenced by social status. Additionally, Wohn and Peng (2015) argued that the timing and frequency of communication among friends may significantly influence individual resilience. Few prior studies have revealed a significant relationship between PSS from a significant other and employee resilience. The study revealed a strong connection between spousal support and employee resilience. This suggests that the more support people receive from their spouses, the more they can be resilient since they have a safety net to deal with problems (Acibal, Kaya, Fernández-Batanero, & Çötok, 2023). Thus, by building on extensive research on the relationship between PSS and employee resilience, several hypotheses have been proposed.

H3: *There is a relationship between perceived social support and employee resilience.*
H3(a): *There is a relationship between family support and employee*
H3(b): *There is a relationship between friends' support and employee resilience*
H3(c): *There is a relationship between a significant other's support and employee resilience*

The applied research framework of this study is illustrated in Figure 1.

Figure 1: Applied Research Framework



3. Research Methodology

This study adopted a cross-sectional design and quantitative research method to examine the factors that influence employee resilience among HCPs at a private hospital in South Malaysia. The population of the study consisted of 523 nurses and allied health professionals. The sample size of 222 HCPs was determined using Krejcie and Morgan's (1970) formula. Responses from HCPs with different professional positions, specialities, departments, and ages were selected purposively for this study. This is attributed to the fact that HCPs have varying levels of resilience, and the reasons for their retention differ as well.

An online self-administered survey was utilized, where the survey was distributed to HCWs using a non-probability purposive sampling technique. An online survey was employed in this study to gather data, considering the varying shifts of HCPs. Prasad Nayak and Narayan (2019) suggested that online surveys help to facilitate easy distribution and are suitable for cross-sectional studies. The questions were uploaded to Google Forms, and the link was initially disseminated to the respective heads of each division within nursing and allied health professionals through social media networks, such as WhatsApp. Each division head subsequently disseminated the link to the Google Form among their respective division members, composed of nurses and allied health professionals.

The instruments used in this study were adopted from valid and reliable sources based on previous studies. Before the data collection, a pilot study was conducted at a sister company of the private hospital that shares similar population demographics and has comparable roles, positions, and work environments to ensure accurate results and minimize the risk of failure. Not only that, but the instruments used were sent to six professional experts possessing expertise in the fields of operations, human resources, nursing, and education to assess the questionnaire regarding its clarity, simplicity, relevance, and potential ambiguity. In this study, the English-Malay back-translation of the questionnaire was developed using the Brislin model (1970). To measure employee resilience, nine items established by Näswall et al. (2019) were utilized. The unidimensionality of the scale has been used to evaluate the capacity of HCPs to adjust to changes and challenges, as well as their ability to cope with and recover from work-related uncertainties and crises. Studies conducted by Ibrahim et al. (2019) and Chen et al. (2001) developed eight items designed to measure the HCPs' self-rated competence and confidence in performing tasks under some conditions. Then, eight items were obtained from the studies by Jin and Tang (2021) and Eisenberger et al. (1986), which aimed at measuring POS.

Meanwhile, the Multidimensional Scale of Perceived Social Support (MSPSS), developed by Zimet et al. (1988), was employed to examine the influence of PSS on employee resilience among HCPs at the private hospital. The MPSS scale was employed in this study to assess HCPs' perceptions of the social support they receive for their psychological well-being, helping them to stay resilient during tough times. For all variables, respondents were asked to indicate the extent to which the statement applies to them using the five-point Likert scale, 1 (strongly disagree) to 5 (strongly agree), except the variable under employee resilience was measured using a rating scale that ranges from 1 (almost never) to 5 (almost always). The survey was divided into two sections, covering all the variables and one section on demographic items. The demographic items in the study addressed the participants' fundamental information, encompassing demographic variables, for instance, age, gender, number of children, marital status, highest education level, tenure within the current organization, department, professional designation, and work hours. IBM SPSS Statistics version 28 was employed to analyze the data collected. Descriptive analysis, reliability analysis, and multiple regression analysis were conducted to analyze the data in achieving the objectives of the study.

4. Results

Profile of Respondents: Table 1 displays a summary of the characteristics of the total sample of HCPs who participated in the study. A total of 175 responses were obtained, which were deemed acceptable, with the response rate of 78.83 percent based on various studies conducted in the healthcare settings (Ellis, Pomare, Churruca, Carrigan, Meulenbroeks, Saba & Braithwaite, 2022). The findings revealed that the participants of the study consisted of 146 females (83.4%) and 29 males (16.6%). Additionally, 52 percent (%) of the respondents were born between 1981 and 1996, representing the Generation Y. Following this, 34.3 percent were born from 1997 to 2007, classifying them as Generation Z, while 13.7 percent (%) were born between 1965 and 1980, identifying them as Generation X. The study also found that most HCPs at the private hospital are married (62.3%), while 65 are single (37.1%), and one respondent indicated another status (0.6%). Subsequently, 79 respondents reported having no children, 52 have one or two children, 36 have three or four, and eight have five or more.

Additionally, more than half of the respondents, i.e., 93 respondents, hold a Diploma (53.1%), followed by 33 with Sijil Pelajaran Malaysia (SPM) (18.9%), and 30 respondents with a degree (17.1%). 80 respondents have worked at the private hospital for one to five years (45.7%), while an equal number have been there for six to ten years or less than one year (18.3%). Additionally, 31 respondents have worked at the hospital for eleven to

fifteen years (17.7%). Most respondents of this study earned between RM2,000 and RM4,000, making up 52.6 percent of the total. Following this, 34 respondents fall within the income range of RM4,001 to RM6,000 (19.4%), while 33 respondents earn below RM2,000. Additionally, 11 respondents have an income between RM6,001 and RM8,000 (6.3%), and five earn RM8,001 or more (2.9%). Among the 175 participants, 136 were from the nursing department (77.7%), while 39 were from the allied health department (22.3%). Furthermore, 124 of the respondents work standard office hours (70.9%), 48 are assigned to an eight-hour shift (27.4%), and three are on a twelve-hour shift (1.7%).

Table 1: Demographic Information of Healthcare Practitioners at a Private Hospital

VARIABLE	FREQUENCY	PERCENTAGE (%)
GENDER		
Male	29	16.6
Female	146	83.4
Total	175	100.0
AGE		
Year 1965-1980 (Gen X)	24	13.7
Year 1981- 1996 (Gen Y)	91	52.0
Year 1997- 2007 (Gen Z)	60	34.3
Total	175	100.0
MARITAL STATUS		
Single	65	37.1
Married	109	62.3
Others	1	0.6
Total	175	100.0
NO OF CHILDREN		
Not applicable	79	45.1
1-2 children	52	29.7
3-4 children	36	20.6
5 or more children	8	4.6
Total	175	100.0
EDUCATION LEVEL		
SPM	33	18.9
Certificate	8	4.6
Diploma	93	53.1
Degree	30	17.1
Master	10	5.7
PhD	1	0.6
Total	175	100.0
TENURE IN ORGANIZATION		
Less than 1 year	32	18.3
1-5 years	80	45.7
6-10 years	32	18.3
11-15 years	31	17.7
Total	175	100.0
INCOME RANGE		
Below RM2,000	33	18.9
RM2,000- RM4,000	92	52.6
RM4,001- RM6,000	34	19.4
RM6,001- RM8,000	11	6.3
RM8,001 and above	5	2.9
Total	175	100.0
DEPARTMENT		
Nursing	136	77.7
Allied health department	39	22.3
Total	175	100.0

WORKING TIME		
Office hour	124	70.9
8-hour shift duty	48	27.4
12-hour shift duty	3	1.7
Total	175	100.0

Descriptive Analysis: Descriptive analysis was performed to check central tendency and dispersion for each variable. The descriptive analysis displayed in Table 2 shows that the variable's mean scores ranged from 3.63 to 4.12. Perceived social support (PSS) from family scored the greatest mean value of 4.12 (SD= 0.70). Next, PSS from a significant other (M= 4.06, SD= 0.63), employee resilience (M= 3.93, SD= 0.47), and perceived organizational support (POS) (M= 3.63, SD= 0.57) were recorded. Finally, the variable with the lowest mean score in the study was self-efficacy, with a mean value of 3.40 (SD= 0.42).

Reliability Analysis: The Cronbach's alpha values for all variables, as in Table 2, were in the range of acceptable between 0.81 and 0.92, indicating good quality of all variables. The reliability of all items used in the study was above the acceptable value of 0.70, according to Sekaran and Bougie (2016). Findings from previous researchers were consistent with the results of reliability analysis (Näswall et al., 2019; Eisenberger et al., 1986; Entrata & Nicomedes, 2024; and Labrague and De Los Santos, 2020). Hence, all the variables used were reliable, and thus, credible results could be produced for this study.

Table 2: Descriptive Analysis and Reliability Analysis

Variables	N	Mean	Std. Dev.	Cronbach's Alpha, α
Employee resilience	175	3.93	0.47	0.81
Self-efficacy	175	3.40	0.42	0.87
Perceived Organizational Support	175	3.63	0.57	0.92
Perceived Social Support:				
i) Family	175	4.12	0.70	0.91
ii) Friends	175	3.84	0.61	0.83
iii) Significant other	175	4.06	0.63	0.86

Multiple Regression Analysis: The multiple regression analysis was conducted to develop a model that explains the relationship between self-efficacy, POS, PSS from family, friends, and a significant other, and employee resilience. The findings of the study revealed that the coefficient of determination (R^2) of the studied variables was equal to 0.29, as shown in Table 3. This means that 29 percent of the variance for employee resilience is accounted for by the independent variables self-efficacy, POS, and PSS obtained from families, friends, and a significant other. Specifically, only self-efficacy, POS, and PSS from a significant other were significantly related to employee resilience. The results specifically revealed that self-efficacy contributed the most significantly to employee resilience (β=.40, p< 0.01). It showed that the higher the self-efficacy of HCPs, the more likely they are to demonstrate employee resilience. Thus, Hypothesis 1 was accepted. Then, the results showed that POS significantly impacted employee resilience (β=.16, p< 0.05). This suggests that HCPs who feel they receive organizational support are likely to demonstrate employee resilience. Therefore, Hypothesis 2 was supported.

Interestingly, this study found that among the dimensions of PSS, only the support received from a significant other was significantly related to employee resilience (β=.17, p< 0.05). The findings indicated that support from family and friends had no significant impact and was not linked to employee resilience among HCPs at the private hospital. Thus, Hypothesis 3(a) and Hypothesis 3(b) were not supported, while only Hypothesis 3(c) was supported.

Table 3: Multiple Regression Analysis

Independent Variables	Dependent variable Employee Resilience (β)
Self-efficacy	0.40**
POS	0.16*
PSS (Family)	0.03
PSS (Friends)	-0.10
PSS (Significant other)	0.17*
F Value	13.56**
R^2	0.29
Adjusted R^2	0.27

**p< 0.01 level, *. p< 0.05 level

Discussion

The findings of the study revealed a few important results. Firstly, this study supported that self-efficacy has a positive relationship with employee resilience amongst the HCPs. This was in support of Bandura's (1977) self-efficacy theory, which stated that people with a belief in their capacity will be able to change events and dictate the course of their behavior. Other previous investigations also pointed out a strong correlation between self-efficacy and employee resilience (e.g., Mendoza Bernal et al., 2023; Yang and Lee, 2023; Naswall et al., 2019; Hosseininezhad et al., 2024), proving that self-efficacy helps to cope with emotional demands, reducing HCPs' stress and burnout, and requiring continuous and constant professional commitment. Maiketso, Wolvaardt and Grobler (2023) also mentioned that the HCPs who fully believe in their capacity to address tasks and embrace the content knowledge to frame concerns into triumphs are more likely to have mental toughness in critical periods. This is so because self-efficacy enables individuals in the management of their emotions, motivation, and enhanced problem-solving skills (Alshammari & Alenezi, 2023). Zamani-Alavijeh et al. (2019) suggested that people should update their knowledge, as such knowledge would otherwise dent confidence, particularly when dealing with informed patients.

Secondly, the study revealed a significant relationship between POS and employee resilience among HCPs in the private healthcare sector. The findings indicate that those who feel supported and recognized that the organization values their goals become more motivated to tackle workplace challenges. These findings align with the theory proposed by Eisenberger et al. (1986), who posit that when individuals feel appreciated by their organization and believe it cares about their well-being, they are better equipped to manage work-related stress and bolster their resilience. A study conducted by Pham et al. (2024) found that those organizational members who reported a need for and received help from the organization during the difficult period also reported higher levels of workplace resilience and well-being. A prior study by Huang et al. (2024) also pointed out that POS directly affects employee resilience through the company's policies, resources, training, and support for employees' well-being, which makes the nurses feel appreciated and protected.

Finally, this study has uncovered a partial relationship between PSS and employee resilience among HCPs. It underlines the cardinal areas of PSS relevant to enhancing employees' resilience. As conceptualized by Zimet et al. (1988), PSS includes support from three sources: friends, family, and a significant other. According to the theory, all three sources of support are essential. Previous studies suggest that every sub-construct, such as family and friends or even a partner, is important for the support system of the healthcare workforce that helps them to feel secure (Yilmaz et al., 2022), and all the sub-dimensions increase the overall employee resilience (Siswadi et al., 2022). However, this study revealed that only PSS attained from a significant other was positively linked with the HCP's resilience. PSS received from family and friends did not have any effect on employee resilience in the examined HCPs of the private hospital. The possible explanations for these findings can be explained through three possible factors. Firstly, the timing of interactions, communication frequency, and the mode of communication may determine the extent to which HCPs feel supported by family and friends (Wohn & Peng, 2015). The effectiveness of each support source can also differ based on an individual's unique stressors and situations (Zimet et al., 1988). Although family and friends can support HCPs, they may lack the specialized knowledge to address these professionals' unique job-related stressors and uncertain work conditions. As such, their capacity to completely increase the resilience of employees in the health sector

becomes constrained.

Secondly, the Bowen Family Systems Theory, developed by Murray Bowen in 1978, can also supplement the substantiation of these results. The Bowen family systems theory describes how family systems function. Elements of interest to this research include self-differentiation and emotional cutoff, both of which imprint resilient human functioning (Brown & Errington, 2024). The justification for this proposition is that self-differentiation indices can significantly help a person to stay free of the family members' responses and pressures and be autonomous to some degree. This probably explains why PSS from family may not influence the HCPs with a higher degree of differentiation because they use personal, autonomous thinking and problem solving with set goals of achieving individual and family goals. Moreover, as Bowen (1978) described, the emotional cut-off in the family system happens when individuals physically or emotionally distance themselves and grow apart from their families to pursue independent goals. This aligns with the findings of Wang et al. (2018), which suggest that family support might decrease during specific life stages following adolescence. It can also happen when individuals distance themselves from family relationships to cope with anxiety and unresolved conflicts, which undermines their ability to handle challenges and affects their resilience (Brown & Errington, 2024).

Thirdly, despite the differences, this finding was consistent with the earlier study conducted by Wang et al. (2018). The study found that PSS from friends does not directly relate to employee resilience among early-career registered nurses. Wang et al. (2018) revealed that there is little evidence to show that support from friends enhances resilience in dealing with work-related challenges because they are oblivious to the healthcare setting. Then, the timing and frequency of social support from friends also influence the resilience of HCPs (Wohn & Peng, 2015). In this context, HCPs at the private hospital typically work with different coworkers on each shift. This explains why support from friends often does not match the critical stress periods faced at work, to help them bounce back from challenges. Previous research suggested that educational programs aimed at instructing spouses in the art of sharing experiences and actively engaging them in activities that foster stronger emotional connections, ultimately leading to enhanced spousal support. Rahmadian and Ediati (2022) also proposed that programs increasing the spouses' knowledge of how they can support their patients can be helpful, as well as promoting that HCPs take vacations and participate in activities enhancing their stress coping mechanisms.

5. Managerial Implications and Recommendations

The result of this study underscores the necessity of increasing self-efficacy interventions of the HCWs at the private hospital. These findings posed practical implications that can increase self-efficacy through motivational programs that reward employee accomplishments (Núñez Cabreram, Cajachagua Castro & Huancahuire-Vega, 2023). Zamani-Alavijeh et al. (2019) suggested enhancing employee resilience among healthcare professionals through training programs, such as hands-on simulations and skill workshops, to enhance self-efficacy to increase personal growth. Training HCPs to enhance their self-efficacy can help them create fast decision-making abilities and improve confidence in managing emotions. Handling crises or making difficult decisions to be made. Additionally, programs concentrating on resilience and coping skills should be initiated to improve psychological preparedness (Gandhi, Sahu, Govindan, Nattala, Gandhi, Sudhir, & Balacahandran, 2021).

The present study also echoes prior research in the healthcare context that highlights the role of POS in building resilience among employees. A few of the ways that the private hospital can improve the HCPs' emotional well-being include creating mental health and well-being services, counselling services for the HCPs, and having stress-related resources, including Employee Assistance Program (EAP), on-site counselling, and stress relief activities. Furthermore, establishing peer support networks within the hospital can enhance emotional resilience by offering HCPs a platform to share experiences and coping strategies to support one another. Moreover, resilience training should be incorporated into the hospital's professional development programs to equip HCPs with the skills needed to handle challenging situations. These measures align with Sihag and Dhoopar (2023), who highlighted the importance of organizational support in bolstering employee resilience. Prakosa et al. (2019) suggested that organizations can meet the emotional needs of HCPs by providing autonomy, job security, performance-reward expectations, and accessible support. Sihag and Dhoopar (2023) also recommended that the organization be able to offer support through resources, training, and equitable

communication. Moreover, Gallagher, Glaser, Faller, Wasiura, Crabtree-Ide, and Case (2024) emphasize that resilience programs encompass individual-facilitated, individual-self-directed, group-facilitated, and group-self-directed approaches aimed at helping HCPs build resilience in the workplace.

Another strategic recommendation to strengthen the resilience of HCPs is to implement a Spousal Engagement Program designed to enhance PSS from their partners. PSS from a significant other can be boosted by creating opportunities for spouses to participate in wellness programs or mental health initiatives, such as stress-relief workshops or couple-focused counselling, as suggested by Acibal et al. (2023). The Spousal Engagement Program could be further enriched by introducing wellness retreats for couples. The objective is to establish an annual retreat where HCWs and their spouses can unwind and attend educational sessions together. These retreats could feature stress management workshops, resilience-building activities, and group discussions to promote engagement and mutual support.

Conclusion

This study concentrated on the factors influencing employee resilience among HCPs at the private hospital. The findings revealed that individual, social, and environmental factors, specifically self-efficacy, POS, and PSS from a significant other, impacted employee resilience. Contrary to expectations, the study highlighted that PSS from family and friends did not influence employee resilience. The result of this study provides the top management and the talent division with empirical evidence as a basis for making decisions on implementing talent strategies to strengthen employees' resilience. In addition, the management can take concrete steps to improve employee well-being, decrease burnout, and enhance productivity by understanding the factors contributing to resilience. Ultimately, it is important to invest in the study of employee resilience to maintain resilient HCPs who can deliver high-quality services in highly demanding environments. Future research could investigate how employee resilience among HCPs varies across different healthcare facilities. A comparative study between private and public healthcare organizations may offer a more comprehensive perspective on the factors influencing employee resilience. It is also suggested that future studies utilize a longitudinal approach. A longitudinal approach can offer researchers a detailed understanding of the factors influencing employee resilience during the hospital's peak demand periods and vulnerable seasons. This approach could reveal the resilience levels of HCPs and their patterns in maintaining resilience over time during high-stress healthcare environments. In addition, future research could delve deeper into the role of the organization, particularly the leader and their leadership styles, which could influence resilience in HCPs. Finally, it may be beneficial to incorporate other individual characteristics, such as emotional intelligence, as a coping strategy to examine its impact on employee resilience.

Acknowledgement: We would like to thank Arshad Ayub Graduate Business School (AAGBS), UiTM Johor, Pasir Gudang Campus, for funding the publication of this study.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

HR Practices and Employee Retention: A Study on Automotive Manufacturing Organizations in Malaysia

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Abstract: Employee retention remains a critical challenge within the automotive manufacturing sector, where the loss of skilled talent can significantly disrupt operations and competitiveness. This study investigates the impact of four key human resource (HR) practices - rewards and benefits, career development, performance management, and leadership behavior - on employee retention within a major automotive manufacturing organization in Peninsular Malaysia. Grounded in Herzberg's Two-Factor Theory, a quantitative research design was employed, and data were collected via a survey questionnaire from 650 executive-level employees across the Selangor and Melaka branches, achieving a 95 percent response rate. Statistical analysis was conducted using SPSS version 26, incorporating descriptive, reliability, and multiple regression analyses to examine the relationship between HR practices and employee retention outcomes. The findings indicate that all four HR practices significantly influence employee retention, with career development showing the strongest relationship. The findings emphasize the need for strategic alignment between HR policies and employee expectations to reduce turnover and foster long-term organizational commitment. This study offers both theoretical and practical implications by reinforcing the role of comprehensive HR practices in shaping employee behavior and organizational stability. It provides actionable insights for HR professionals and decision-makers within Malaysia's manufacturing sector to enhance workforce retention and maintain competitiveness in a dynamic labor market.

Keywords: *Employee retention, rewards & benefits, performance management, career development, leadership behavior.*

1. Introduction and Background

The automotive manufacturing industry remains one of the most influential sectors globally, significantly contributing to economic development, employment generation, and technological innovation. Moore (2024) highlights that the sector employs over four million individuals directly, with an additional million supported indirectly through interconnected industries. Automobiles serve as essential commodities that sustain various aspects of modern life and underpin industrial ecosystems. In Malaysia, the automotive industry has evolved into a cornerstone of national industrialization and economic planning. The inception of Proton in 1983 and Perodua in 1993 marked the country's entry into vehicle manufacturing, contributing to Malaysia's industrial diversification. The sector now contributes approximately four percent of Malaysia's GDP, valued at around USD 8.4 billion, and supports over 700,000 jobs (Asian Insider, 2024). With a production volume surpassing 740,000 vehicles annually, Malaysia ranks third in Southeast Asia and twenty-third globally. Despite its scale and economic importance, the industry faces growing difficulties in attracting and retaining skilled workers, a trend amplified by changing labor market dynamics and rising workforce expectations.

The retention of skilled employees has become an increasingly complex challenge across industries, but it is particularly critical in manufacturing, where operational knowledge, technical skills, and institutional memory are vital. Francis (2014) notes that high employee turnover leads to reduced morale, increased workloads, and disruptions in operations. The Malaysian automotive sector is not immune to these pressures, especially in the post-COVID era marked by what Liberty (2023) calls the "Great Resignation", where employees are actively seeking better opportunities post-pandemic. This shift has exposed gaps in traditional HR practices and

prompted organizations to reassess their retention strategies.

In response to growing attrition, organizations have implemented a range of initiatives to improve employee engagement and retention. These include enhanced compensation packages, expanded learning and development programs, mental health and wellness support, and hybrid working arrangements (Business Today, 2023). A 2023 survey by Robert Walters revealed that 60 percent of Malaysian employers struggle to retain their top talent, largely due to salary expectations driven by rising living costs. Notably, 48 percent of professionals indicated an intention to switch jobs if compensation fails to match inflation. Such findings underscore the urgency of aligning HR practices with employee expectations to remain competitive in a tight labor market.

Regardless of these efforts, the Malaysian automotive manufacturing industry remains understudied in terms of HR-related retention research. While significant literature exists in sectors like education, finance, and hospitality (Adom, 2018; Shibiti, 2019), empirical investigations into the HR-retention nexus in manufacturing remain scarce. Tanwar (2016) and Frye et al. (2020) emphasize the strategic importance of employee retention as an integral part of HR policy, particularly in industries dependent on high-skill labor. Addressing this gap is essential for Malaysian automotive manufacturers seeking to build sustainable and resilient workforces amid increasing regional and global competition.

To understand and address these challenges, a leading automotive manufacturing organization in Malaysia partnered with a global executive search and leadership advisory firm to conduct an internal employee engagement survey in 2022. The survey identified four critical areas, namely rewards and benefits, performance management, leadership behavior, and career development, as the lowest-scoring drivers of engagement, all falling below the 50 percent threshold. These areas significantly underperformed compared to the national benchmark of 80 percent set by the Best Employer Malaysia index. Exit interviews further validated these findings, revealing that a lack of career growth and dissatisfaction with compensation were primary reasons for voluntary resignations.

In 2023, the organization introduced targeted interventions to address these concerns. Reforms included revising the salary structure and benefits such as medical and maternity coverage, introducing career pathing tools, developing leadership training programs, and implementing transparent promotion and performance management guidelines. The intention was to foster a positive and transparent work culture, increase employee satisfaction, and reduce turnover. These initiatives are consistent with recommendations from Hee et al. (2018) and Ezaili Alias et al. (2018), who stress the value of strategically planned HR interventions in mitigating turnover and reinforcing organizational performance. Despite these initiatives, internal reports revealed that employee engagement levels only marginally increased from 55 percent in 2019 to 58 percent in 2022, while turnover rates rose from 8.70 percent in 2021 to 10.61 percent in 2022. This disparity suggests that the HR strategies implemented may not have fully addressed the root causes of attrition. Research by Alhmoud and Rjoub (2019) indicates that a successful retention strategy must go beyond compensation and include career development, performance appraisal clarity, and trust in leadership. Without addressing the motivational and psychological needs of employees, technical HR changes may yield limited impact.

Given the ongoing turnover and suboptimal engagement scores, this study seeks to examine the relationship between specific HR practices and employee retention in this organizational context. Anchored in Herzberg's Two-Factor Theory, which distinguishes between hygiene factors and motivators, the study seeks to evaluate whether interventions in the four identified dimensions have significantly influenced retention outcomes. The research focuses on executive-level employees who were the initial recipients of the new HR practices and uses quantitative analysis to generate empirical findings. Thus, this study aims to examine the impact of (1) rewards and benefits, (2) career development opportunities, (3) performance management systems, and (4) leadership behavior on employee retention within this specific automotive manufacturing organization.

This study offers two key contributions. First, it fills a significant knowledge gap in HR literature by contextualizing retention challenges within Malaysia's automotive manufacturing industry. Second, it provides actionable insights for practitioners seeking to implement evidence-based HR strategies that align with both organizational goals and employee needs. By identifying which HR practices most effectively drive retention,

the study aims to support sustainable workforce development in a critical national industry.

2. Literature Review

Employee retention: Employee retention remains a critical concern for organizations striving to maintain a competitive advantage in a globalized and dynamic labor market. Retention refers to an organization's ability to retain its workforce over time, including both permanent and voluntary employees (Mahadi, Woo, Baskaran, & Yaakop, 2020). High retention levels are essential not only for achieving organizational objectives but also for fostering long-term employee development and organizational growth (Rakhra, 2018). With increased globalization and rapidly shifting market demands, companies are facing unprecedented challenges in retaining top talent. The intensifying competition has necessitated the development of effective retention strategies that align with evolving workforce expectations and strategic business objectives (Azmat & Rentschler, 2017; Nelson, 2014). A variety of factors influence an employee's decision to remain in an organization, such as job satisfaction, financial and non-financial rewards, employee engagement, organizational commitment, and the availability of work-life balance (Bhatnagar & Thakur, 2017; Shah, Fakhr, Hussain, & Shah, 2020).

Understanding the underlying causes of employee turnover is fundamental to developing sound retention strategies. Turnover includes both voluntary departures and involuntary exits, and addressing its root causes involves exploring factors such as job dissatisfaction, limited career growth, and inadequate compensation (Laing, 2019). Studies have emphasized that remuneration and benefits play a central role in deterring turnover. For instance, Onochie (2020) found that enhanced compensation packages significantly increase retention among public sector employees. Similarly, Arachchillage (2017) argued that retention depends on the quality of the employee-organization relationship, which is strengthened through sustained organizational investment in human capital.

In the manufacturing sector, where operational efficiency and continuity are vital, retaining skilled employees presents a unique challenge. The sector faces frequent turnover due to factors like the low level of job satisfaction, poor work-life balance, and insufficient growth opportunities. Scholars such as Bhatnagar and Thakur (2017) and Shah et al. (2020) identified that employee engagement, organizational commitment, and attractive compensation packages are crucial in promoting retention. Moreover, effective retention strategies are often rooted in organizational cultures, specifically leadership that prioritizes employee welfare, motivation, and participation (Mathimaran & Kumar, 2017).

Empirical evidence also supports the importance of other retention drivers, including opportunities for job promotion, recognition, learning, and skill development. Aguenza and Som (2018), Bibi, Ahmad, and Majid (2018), Lyman, Yerby, and Rogers (2020), Perreira, Berta, and Gorman (2018), and Pichler, Varma, Budhwar, and Biswas (2021) collectively highlighted compensation, performance rewards, and a supportive organizational environment as significant predictors of employee retention. Establishing a culture that values employee contribution, facilitates professional growth, and improves satisfaction is imperative for the long-term sustainability of organizations, particularly in the manufacturing industry.

Herzberg's Two Factor Theory: Herzberg's Two-Factor Theory, also referred to as the motivation-hygiene theory, remains a foundational framework in understanding employee motivation and job satisfaction. Originally developed by Herzberg, Mausner, and Snyderman (1959) and later elaborated by Herzberg (1974), the theory distinguishes between two categories of job-related factors: motivators and hygiene factors. Motivators are intrinsic and contribute to positive job satisfaction. These include factors such as recognition, achievement, opportunities for career advancement, and the inherent nature of the work itself. Conversely, hygiene factors are extrinsic elements such as salary, working conditions, organizational policies, and interpersonal relationships. While these do not inherently lead to satisfaction, their absence can result in dissatisfaction (Herzberg, 1974; Lacey, Kenneth-Hansel & Manolis, 2015).

Herzberg (1974) emphasized that the presence of motivators enhances employee performance, engagement, and retention, whereas the absence of adequate hygiene factors may increase dissatisfaction and turnover rates. This dual-factor model implies that organizations must address both intrinsic and extrinsic needs to

cultivate a motivated and stable workforce. Importantly, it also highlights the psychological dimensions of work as being as crucial as physiological or material conditions.

Relationship Between Rewards and Benefits and Employee Retention: In contemporary organizational settings, rewards and benefits have emerged as critical drivers of employee motivation, engagement, and retention. Organizational leaders and scholars have increasingly focused on understanding how both monetary and non-monetary rewards influence workforce behavior and performance (Ullah, 2018). A well-designed reward system contributes significantly to fostering a motivated workforce, aligning individual goals with organizational objectives.

Empirical evidence indicates a positive correlation between the level of rewards provided and employee engagement and organizational commitment. For instance, Anita (2014) found that fair and consistent reward practices enhance employee satisfaction and lead to greater discretionary effort. Similarly, Erturk (2014) emphasized the importance of equitable rewards in sustaining employee commitment, suggesting that perceived fairness in compensation is closely tied to organizational trust and loyalty. Further studies have explored the multidimensional impact of reward systems. Mone et al. (2018) underscored that performance-based rewards, when aligned with organizational goals, serve as strong motivators for individual and team performance. Aggarwal, Datta, and Bhargava (2007) argued that integrated reward frameworks, which include financial incentives, career development opportunities, and recognition programs, play a pivotal role in fostering employee retention. In line with this, Minbaeva (2008) highlighted the role of non-financial rewards, such as professional growth and meaningful work, in cultivating high-performing employees. Moreover, Sardar et al. (2011) found that supportive supervision and developmental rewards significantly contribute to retention and reduce turnover intentions. In addition, effective compensation practices such as performance bonuses, merit pay, and comprehensive benefit packages can influence employees' decisions to remain with an organization (Kryscynski et al., 2021). Ardiansyah et al. (2020) emphasize that when organizations strategically design their reward and benefits structures, they can significantly reduce employee turnover. Based on these insights, the following hypothesis is proposed:
Hypothesis 1: *There is a significant relationship between rewards and benefits and employee retention*.

Relationship Between Performance Management and Employee Retention: Employee performance refers to the extent to which an individual achieves organizational goals and contributes to overall productivity (Larsen, Gunawan, & Sumali, 2018). Effective performance management is a critical component of organizational success, particularly in aligning employee output with strategic objectives. One of the foundational elements of performance management is effective communication between superiors and subordinates. Clear communication and strong interpersonal relationships facilitate regular feedback, clarify expectations, and foster the continuous development of employee competencies (Engelbrecht, Johnson, & Hooper, 2017; Kim, 2014).

Performance improvement strategies are essential for business leaders seeking to maintain a competitive edge (Khan, 2013; Wang, Waldman, & Zhang, 2014). These strategies often include structured feedback mechanisms, coaching, and tailored development plans, which collectively contribute to enhanced individual and organizational outcomes. In addition, the working environment plays a pivotal role in shaping employee performance. Wachira et al. (2020) emphasize that a supportive and conducive work environment significantly enhances employee engagement, motivation, and output.

A key component of performance management is the performance appraisal system. This system provides a structured process for evaluating employee performance over a specific period, offering opportunities for feedback, development, and reward (Singh et al., 2010). A well-structured performance appraisal framework aligns employee roles and responsibilities with clearly defined objectives and promotes transparency and fairness. According to Hom (1995), fairness and objectivity in evaluation processes are fundamental for fostering trust and acceptance among employees, which, in turn, enhances the credibility and effectiveness of the performance management system.

Research indicates that transparent and equitable performance appraisal systems are associated with lower turnover rates (Gulzar et al., 2017). A well-implemented performance management system helps organizations

retain high-performing employees by recognizing their contributions and supporting career growth. In the Malaysian context, Kessler et al. (2014) and Lee et al. (2015) found that performance evaluations perceived as fair positively influence retention. Similarly, Chandrakantan et al. (2019) observed that performance management practices significantly influenced employees' intentions to stay, particularly in Malaysia's semiconductor industry. These findings underscore the role of performance evaluation processes in building employee trust and organizational commitment:

Hypothesis 2: *There is a significant relationship between performance management initiatives and employee retention.*

Relationship Between Career Development and Employee Retention: Career development has become a pivotal aspect of human resource strategy, aligning both individual aspirations and organizational goals. Employees are increasingly expected to engage in continuous skills enhancement and take advantage of professional development opportunities provided by their organizations to adapt to evolving stakeholder expectations (Jackson & Tomlinson, 2020). Career-oriented individuals actively seek employment avenues that offer potential for growth, reflecting a broader trend toward self-directed career management and personal responsibility for career progression (Jackson & Tomlinson, 2020). The availability of career development opportunities within an organization significantly influences employee motivation and engagement. According to Wachira et al. (2020), such opportunities not only foster professional advancement but also enhance the perceived autonomy within the employment relationship. When employees perceive genuine prospects for development, they are more likely to remain committed and perform at higher levels.

However, not all employees experience continual upward mobility. Yang et al. (2019) introduced the concept of a career plateau, defined as the stage at which the likelihood of further hierarchical promotion is minimal. Career plateaus can lead to stagnation, decreased job satisfaction, and turnover intentions, highlighting the need for diversified career development strategies beyond mere promotions.

Thus, career development is another critical factor influencing employee retention. Employees tend to remain with organizations that offer opportunities for professional growth and skill enhancement. Ali et al. (2019) assert that career development initiatives help employees envision long-term trajectories within the organization, which in turn increases loyalty and reduces turnover. Dalayga et al. (2021) emphasize the role of succession planning in preparing future leaders and fostering employee retention. Furthermore, Fahim (2018) found that strategic human resource practices, particularly training and development, were positively associated with employee retention at the National Bank of Egypt. A structured career development system not only supports individual advancement but also aligns with organizational talent management strategies (Gulzar et al., 2017). Given the reviewed literature, the following hypothesis is proposed:

Hypothesis H3: *There is a significant relationship between career development opportunities and employee retention.*

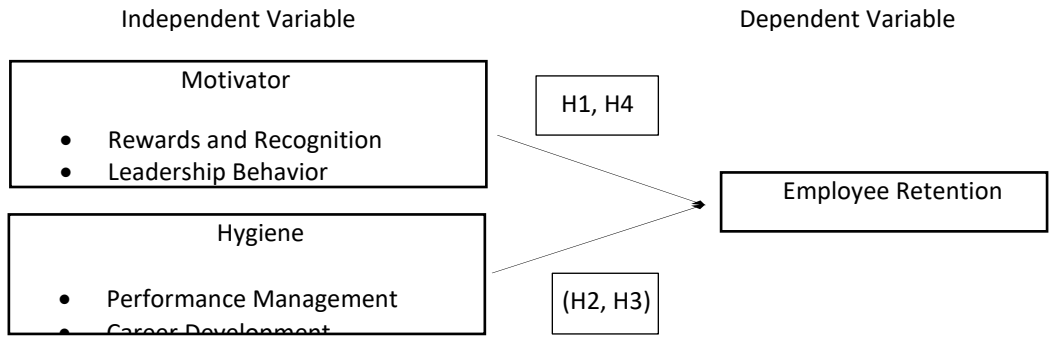
Relationship Between Leadership Behavior and Employee Retention: Effective leadership behavior plays a crucial role in enhancing employee engagement, satisfaction, and retention. Research has shown that authentic leadership positively influences employees by fostering trust and commitment (Nichols & Erakovich, 2013). Leaders who are transparent, ethical, and genuine inspire higher job performance and organizational loyalty among subordinates. Mone et al. (2018) emphasized that leadership that actively supports employee engagement not only enhances morale but also significantly reduces turnover and the financial burden associated with employee attrition. Trust and supportive leadership have also been linked to improved work-life balance and overall job satisfaction. Saha (2016) argued that leadership behaviors that emphasize employee well-being lead to greater organizational commitment. Furthermore, strategic leadership that nurtures a culture of excellence by aligning organizational values and competencies is effective in enhancing institutional performance (Tolici, 2021).

Various leadership theories and styles, including transformational, transactional, and situational leadership, have distinct impacts on employee engagement. According to McGowan (2022), transformational leadership, in particular, is associated with increased motivation, innovation, and stronger leader-employee relationships. In contrast, transactional and situational leadership may be effective in specific contexts that require structure and adaptability. Attentive and respectful leadership is essential for employee retention. Pusparini and Aryasa

(2021) highlighted that when leaders demonstrate consideration and foster motivation, employees are more likely to remain loyal and productive. Key leadership behaviors such as supporting, developing, recognizing, consulting, and empowering enhance employee morale and foster a positive work environment (Gordon & Taber, 2022). Leaders who demonstrate empathy, provide constructive feedback, and facilitate growth contribute to stronger organizational attachment among employees (Yukl et al., 2019). Recognition of employee contributions and supportive leadership are particularly effective in promoting retention. Nichols (2020) argues that leadership actions and managerial support are critical determinants of employee loyalty. When leaders exhibit behaviors that prioritize employee well-being and development, organizations are more likely to retain skilled talent. Based on these insights, the following hypothesis is proposed:
Hypothesis H4: *There is a significant relationship between leadership behavior and employee retention.*

Figure 1 shows the research framework of the study. The framework is based on Herzberg's Two-Factor Theory (1959), which distinguishes between motivator and hygiene factors influencing employee attitudes. In this study, rewards and recognition, along with leadership behavior, are categorized as motivator factors, while performance management and career development are classified as hygiene factors. The framework guides the investigation into how both intrinsic (motivators) and extrinsic (hygiene) human resource practices contribute to the retention of employees in the organizational context.

Figure 1: Research Framework



3. Research Methodology

This study adopts a quantitative, cross-sectional, correlational research design to examine the relationship between selected HR practices, namely rewards and benefits, performance management, career development, and leadership behavior, and employee retention in a Malaysian automotive manufacturing organization. Data collection was conducted using survey questionnaires distributed among executive-level and senior management employees. Data was collected through an online survey using Google Forms, distributed via email. The data collection period lasted two weeks, with follow-up reminders to ensure a high response rate. Departmental administrators assisted in facilitating participation. Overall, the data collection process was systematically implemented to ensure data quality and completeness (Hassan, 2025).

A correlational study approach was chosen for its ability to statistically describe associations between variables without manipulating the environment. This is aligned with Creswell and Creswell (2018), who endorse such designs for identifying patterns and associations in organizational research. The cross-sectional nature of the study implies that data were collected at a single point in time, providing a snapshot of the existing situation (Sekaran & Bougie, 2009).

This study focused solely on executive and senior management employees across two automotive manufacturing plants in Selangor and Melaka because the HR practices, such as rewards and benefits, performance management, career development, and leadership behavior, are primarily applicable to this group and have not yet been fully extended to non-executive or production staff. Executive employees are more directly involved in and affected by these strategic HR policies, making their feedback more relevant and reliable. In addition, limiting the scope to this segment ensures alignment with the study's objectives and avoids

inconsistencies that could arise from varying job roles and benefit structures. A stratified random sampling method was employed to ensure that all major organizational divisions were proportionally represented. The target population included 684 executive-level employees, and the final sample consisted of 650 valid responses, yielding a response rate of 95 percent. Sample size determination was guided by the Krejcie and Morgan (1970) table, which suggested a minimum of 384 responses for a population of this size.

The questionnaire was divided into four sections, based on theoretical frameworks and validated measurement scales. Section A assessed independent variables: rewards and benefits, performance management, career development, and leadership behavior. Rewards and benefits were measured using a 5-item scale adapted from Mbugua et al. (2015), while performance management was assessed using a 7-item scale adapted from the same source. Career development was measured using a 7-item scale adapted from Delery and Doty (1996), and leadership behavior was measured using an 8-item scale adapted from Beveran et al (2017). Section B measured the dependent variable, employee retention, using a 6-item scale adapted from Foong et al. (2015). Section C was dedicated to collecting demographic information, including work location, gender, position level, years of experience, and generational cohort. All items are rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

A pilot study was conducted with 20 respondents who were not part of the main sample to assess the instrument's reliability. Cronbach's alpha coefficients for all constructs ranged between 0.74 and 0.90, exceeding the 0.70 threshold for acceptable reliability (Zikmund et al., 2010), indicating strong internal consistency across all scales used. The data collected from 650 respondents was then analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 26, to draw insights and conclusions from the study. Next, the data analysis process began with the use of descriptive statistics, such as percentages, means, and frequencies, to determine the demographic characteristics of the respondents. Subsequently, multiple regression analysis was conducted to examine the relationships between human resource practices and employee retention.

4. Results

The demographic profile of the respondents provides important context for understanding the findings of this study on employee retention in a Malaysian automotive manufacturing organization. Out of 650 respondents, the majority of the respondents were in Melaka (60%), with the remaining 40% based in Selangor. The sample was predominantly male, comprising 403 (62%) of the respondents, while females made up the remaining 38 percent. In terms of job positions, a significant portion of respondents held executive-level positions (72%), followed by mid-level management (22%) and senior management (5%). Concerning work experience, the largest group of respondents had between 5 to 10 years of experience, accounting for 199 respondents (31%), followed by those with over 10 to 15 years (17%), and less than one year's experience (12%). Notably, only a small fraction had between 2 – 5 years of experience (8%). The generational breakdown indicated that most respondents belonged to Generation Y (1981–1995), accounting for 405 (62%) of the total sample. This was followed by Generation X (1965–1980) at 26 percent, Generation Z (1996–2015) at 11 percent, and Baby Boomers (1946–1964) making up only 0.2 percent. These demographics suggest a relatively young and experienced workforce with a strong representation from Generation Y, which is often characterized by a desire for career development and meaningful work engagement.

Reliability analysis was conducted to assess the internal consistency of the measurement instruments used in the study. Cronbach's alpha was employed as the statistical index to evaluate the reliability of each construct. According to Zikmund et al. (2010), a Cronbach's alpha value of 0.70 or above indicates acceptable reliability, with values between 0.80 and 0.95 suggesting very good reliability. In this study, rewards and benefits demonstrated acceptable reliability ($\alpha = .74$), while performance management ($\alpha = .91$), career development ($\alpha = .82$), leadership behavior ($\alpha = .92$), and employee retention ($\alpha = .80$) recorded Cronbach's alpha values exceeding the 0.80 benchmark, thereby confirming the very good reliability of the questionnaire items. This implies that the items used to measure each construct were internally consistent and produced stable results, thus providing confidence in the accuracy and dependability of the data collected.

Table 1: Reliabilities (Cronbach Alpha) of the measures: (n=650)

Factor	Original Items	Reliability Cronbach Alpha (n=650)
Rewards & Benefits	5	.74
Performance Management	6	.91
Career Development	7	.82
Leadership behavior	8	.92
Employee Retention	6	.80

The descriptive analysis provided in Table 2 demonstrates the distinct characteristics of each variable. These descriptive results provide preliminary insights into employees' perceptions of key human resource practices and their intention to remain with the organization. Rewards and benefits received a mean score of 3.11, indicating a relatively moderate perception among employees. The moderate mean score may suggest that the current compensation system does not adequately meet employees' expectations, potentially affecting their motivation and commitment. Performance management recorded a mean score of 3.45, suggesting that while performance evaluation systems are somewhat effective, there may still be concerns about their fairness, consistency, or developmental orientation. As for career development, the lowest mean score of 3.01 highlights limited perceived opportunities for growth and advancement. Leadership behavior received the highest mean score among the human resources practices (M = 3.74), indicating a relatively positive perception of leadership within the organization. And finally, employee retention had a high mean score of 4.23, suggesting a generally strong intention among employees to remain with the company.

Table 2: Descriptive Statistics of All Study Variables (n=650)

Variables	Mean
Rewards & Benefits	3.11
Performance Management	3.45
Career Development	3.01
Leadership behavior	3.74
Employee Retention	4.23

Table 3 summarises the results of a multiple regression analysis on the relationship between human resource practices (rewards and benefits, career development, performance management, and leadership behavior) and employee retention. The R-squared value of .49 suggests that 49. A percentage of the variance in the dependent variable can be explained by the combined influence of rewards and benefits, performance management, career development, and leadership behavior. Specifically, career development had the strongest influence (β = .34, $p < .001$), suggesting that employees who perceive greater opportunities for growth and advancement are more likely to remain with the organization. Leadership behavior (β = .19, $p < .001$) and performance management (β = .15, $p < .001$) also showed a significant positive effect on employee retention. Meanwhile, rewards and benefits, though the least influential, still had a modest yet significant impact (β = .13, $p < .001$), suggesting that compensation remains a relevant factor in employee retention, an observation that aligned with Herzberg's (1966) two-factor theory.

Table 3: Regression Analysis

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
	B	*Std. Error*	*Beta*		
Rewards and benefits	.12	.03	.13	3.89	.000
Performance Management	.13	.03	.15	3.50	.000
Career Development	.20	.02	.34	7.58	.000
Leadership Behavior	.11	.02	.19	4.88	.000
F-value			155.412		
Sig.			000*		
Adjusted R^2			.48		

R^2	.49

5. Discussion and Conclusion

The study examined the relationship of four selected HR practices, namely rewards and benefits, performance management, career development, and leadership behavior, towards employee retention in an automotive manufacturing organization in Malaysia. The results of the findings have indicated that all four human resource practices showed a positive relationship with employee retention. Thus, hypotheses H1, H2, H3 and H4 were accepted.

Based on this study, career development was found to be the most influential factor affecting employee retention, a finding consistent with prior research emphasizing its role in fostering organizational commitment (Meyer & Allen, 1997; Kyndt et al., 2009). Career development encompasses the provision of opportunities for individuals to progress both personally and professionally (Sharafi et al., 2018). In the context of this automotive manufacturing company, career development initiatives focus not only on upward mobility through promotions but also on lateral movements across roles or departments. This holistic approach enables employees to broaden their skill sets and explore diverse career trajectories. A key component of this process involves two-way communication between employees and their supervisors to discuss potential career opportunities and future directions within the organization. Internal job postings and career conversations are actively encouraged to help identify suitable pathways for advancement. Additionally, employees are granted access to comprehensive learning and development resources, including training programs and courses, which support their career planning and readiness for future roles. These practices align with the findings of Khazei (2019), who emphasizes that career development entails structured occupational strategies such as skills training, capability building, mentoring, and measurable outcomes that facilitate professional advancement. Furthermore, the availability of a career path guidebook for executive-level employees ensures that career progression requirements are transparent and accessible. This guidebook outlines relevant certifications, training programs, and learning opportunities that employees can pursue to qualify for higher-level positions, thereby empowering them to take ownership of their career development.

Leadership behavior emerged as the second most influential factor after career development, highlighting the importance of effective, supportive leadership in creating a work environment that promotes employee loyalty (Bass & Riggio, 2006). As noted by Sakinc and Ergun (2024), leadership effectiveness is critical in both individual and organizational contexts, as it fosters organizational commitment, reinforces shared values that guide employee behavior, and provides motivational support. These elements collectively enhance long-term organizational performance and sustainability. In the context of this automotive manufacturing company, leadership practices align with these findings; leaders are observed to communicate a clear set of values and a positive organizational vision. Additionally, they provide encouragement and motivation, which not only strengthens employee engagement but also contributes significantly to retention. These practices demonstrate that supportive and visionary leadership fosters a work environment in which employees feel valued, inspired, and more likely to remain with the organization.

Performance management also showed a statistically significant relationship with employee retention. The use of transparent and objective performance appraisal systems helped clarify promotion pathways and expectations, thus increasing employees' engagement and motivation. This outcome is consistent with findings by Kerisnasamy (2024) and Malik et al. (2018), who argued that effective performance management not only improves performance but also enhances retention. According to Sepahvand and Kodashahri (2020), enhancing effective performance appraisal processes is essential for retaining top talent, as there is a strong positive relationship between performance appraisals and employee retention. In the context of this study, the implementation of a structured performance management guideline plays a pivotal role in promoting transparency and fairness in appraisal practices. Such guidelines help employees develop a clear understanding of promotion criteria, which are directly linked to their performance outcomes. By aligning performance expectations with advancement opportunities, the organization fosters a results-driven culture where employees are motivated to perform and remain committed. Additionally, other performance management practices such as regular feedback, goal setting, and developmental reviews further contribute to

strengthening employee retention by reinforcing clarity, recognition, and career progression within the organization.

This study has determined that rewards and benefits were also significantly related to employee retention. The results of this study align with prior research by Ahmad and Kamarudin (2022) and Kerisnasamy (2024), which found that rewards and compensation significantly influence retention outcomes. Similarly, Olaimat and Awwad (2017) reported that offering competitive pay is one of the most effective strategies for maintaining employee loyalty, confirming a positive and significant correlation between compensation practices and employee retention. Rewards and benefits play an important role, particularly through the provision of enhanced medical benefits and revisions to the salary structure. In this automotive manufacturing company, recent improvements to healthcare coverage and salary adjustments have contributed to greater employee satisfaction and retention. Fair and competitive compensation fosters a sense of appreciation and motivation among employees, strengthening their commitment to the organization. This finding is consistent with established theoretical frameworks that highlight the positive relationship between rewards and benefits and employee retention. Employees are more likely to remain with an organization when they perceive that they are compensated fairly and supported through comprehensive benefit programs.

Conclusion

This study has confirmed that career development, leadership behavior, performance management, and rewards and benefits are all significantly associated with employee retention. Among these, career development demonstrated the strongest influence, followed by leadership behavior, performance management, and rewards and benefits. The findings have practical implications for HR practitioners and organizational leaders in the Malaysian automotive manufacturing sector. Targeted interventions in career development, performance management, leadership behavior, and rewards and benefits can significantly enhance employee retention. Organizations in the automotive manufacturing sector should invest in robust career development programs, enhance leadership training, and ensure transparent performance management systems. Moreover, maintaining competitive compensation packages will support efforts to retain skilled talent in an increasingly competitive labor market.

While this study focused on the automotive manufacturing industry, the underlying principles of effective HR practices are transferable across industries. In sectors such as healthcare, finance, education, and technology, where skilled labor is critical, structured career pathways, competent leadership, transparent performance appraisal systems, and attractive compensation packages are equally essential in fostering employee commitment and reducing turnover (Bersin, 2015). For instance, in the fast-evolving tech industry, where talent mobility is high, applying similar strategies could help firms cultivate loyalty and reduce attrition (Cappelli, 2019). Similarly, in the healthcare sector, robust leadership and career development programs can support employee morale and continuity of care (Shanafelt et al., 2015).

This study has two main limitations. First, it focused solely on executive to senior management levels, excluding non-executive employees. Second, the study examined only four out of twelve drivers from the internal employee engagement survey. These were selected because they scored lowest in employee satisfaction, and other potentially significant factors were not included due to time constraints. Thus, future studies should expand the scope to include non-executive employees and examine additional variables such as job satisfaction, organizational culture, and communication. Broader studies across different departments and roles may uncover further insights into the multidimensional nature of employee retention.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Insuring Where the Heart Is: Key Drivers Influencing Houseowner and Householder Insurance Adoption in Puncak Alam, Selangor

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Abstract: The increasing frequency of climate-related disasters such as floods, fires, and extreme weather events in Malaysia has amplified the urgency for adequate home protection. However, underinsurance remains a critical issue, with less than half of Malaysian households holding fire or home insurance policies. This leaves millions, especially in high-risk areas such as Puncak Alam, Selangor, exposed to financial vulnerability. This study investigates the key drivers influencing homeowners' intentions to purchase homeowner and household insurance, focusing on awareness, perceived adequacy of product coverage, and household income. Guided by Protection Motivation Theory and principles of consumer behavior, the study employed a quantitative research design. A structured survey was distributed to 100 property owners using convenience sampling. Descriptive and Pearson correlation analyses were conducted to examine the relationship between the independent variables and purchase intention. Findings indicate that awareness, product coverage, and income are all significantly and positively associated with purchasing insurance. Respondents with a better understanding of policy coverage and greater financial capacity were more likely to consider insurance as a critical part of their financial planning. However, response variation indicates continued gaps in product understanding and cost accessibility, particularly for extended coverage. The study recommends that insurers develop clearer communication strategies and educational outreach to address these gaps. Policymakers are also urged to consider initiatives such as subsidies or mandatory minimum coverage to improve insurance accessibility for vulnerable groups. Ultimately, property insurance must be recognized as an essential pillar of personal resilience and national disaster preparedness.

Keywords: *Houseowner and Householder insurance, Awareness, Product Coverage, Income.*

1. Introduction and Background

In Malaysia, as the country faces a concerning increase in property-related incidents, an important question arises: Are homeowners adequately equipped to protect their most precious asset - their home? Fires, floods, and industrial mishaps are now frequent occurrences; they have turned into ongoing dangers that jeopardize lives and livelihoods significantly. In this atmosphere of unpredictability, homeowner and household insurance policies are not just optional but vital resources for financial stability.

Among these hazards, fire remains particularly devastating. The Fire and Rescue Department of Malaysia (BOMBA) recorded 34,389 fire emergencies in 2023, leading to estimated economic losses of RM2.6 billion. Selangor alone accounted for 7,350 fire incidents, a notable increase from 6,294 in 2022 (Malay Mail, 2024a, 2024b). More recently, a catastrophic gas pipeline explosion in Putra Heights, Selangor, in April 2025 injured over 150 people, damaged 237 homes and 399 vehicles, and displaced 538 residents. The blast carved a crater measuring over 20 meters wide and sent flames up to 30 meters into the sky, demonstrating the scale of vulnerability faced by residential communities (The Star, 2025a).

Despite the frequency of such incidents, property insurance uptake remains critically low. The General Insurance Association of Malaysia (PIAM) reported that only 3.87 million out of 9.1 million households in 2024 were insured, with the national take-up rate for fire and home insurance policies stagnating at approximately 43 percent over the past two years (The Star, 2025b).

This widespread underinsurance places millions of Malaysian homeowners at risk of catastrophic financial loss and undermines national disaster resilience. Research has identified several key factors that contribute to this low adoption rate. These include limited awareness of insurance benefits, poor understanding of product coverage, and affordability constraints, particularly among lower-income groups.

Given the rising incidence of climate-related and man-made disasters, it is imperative to examine how awareness, perceived adequacy of product coverage, and household income influence homeowners' intentions to purchase houseowner and householder insurance. This study focuses on Puncak Alam, Selangor, a rapidly developing semi-urban locality that has become increasingly vulnerable to environmental and structural risks such as flash floods and fire incidents, as evidenced by recent events and local reports (New Straits Times, 2024a; New Straits Times, 2024b). By investigating these behavioural and socioeconomic determinants, the research aims to inform more effective public education campaigns, product design, and policy interventions that can close the protection gap and enhance the financial resilience of Malaysian homeowners.

2. Literature Review

Protection Motivation Theory (PMT): Rogers (1975) first introduced the Protection Motivation Theory (PMT) to explain how people respond to fear-based messages, particularly those concerning health-related issues. Later, Maddux and Rogers (1983) further developed the idea, creating a more comprehensive framework for understanding how people respond to threats or dangers of any kind through persuasive communication. Based on two important cognitive processes, which are threat appraisal and coping evaluation, PMT recommends that people adopt protective actions. While coping evaluation takes into account the efficacy of the suggested reaction, one's confidence in executing it, and the perceived cost of taking action, threat appraisal evaluates the threat's seriousness and one's susceptibility to it.

In the context of insurance, Protection Motivation Theory (PMT) helps clarify why people choose to take protective actions, such as acquiring houseowner and householder insurance. These types of insurance act as financial buffers against threats like theft, fire, or natural disasters. While PMT has been extensively utilized in research on health behaviours, as shown in studies by Ndifon et al. (2020), and in studies related to disaster preparedness, including those by Veeravalli et al. (2022) and Hudson et al. (2020), its use in understanding insurance behaviours is still relatively sparse.

This study aims to fill that gap by employing PMT to investigate the motivational and psychological aspects that affect the choice to purchase houseowner and householder insurance. The research will concentrate on residents of Puncak Alam in Selangor, a semi-urban area that is increasingly facing environmental and structural hazards. In doing so, the study enhances the understanding of how individuals recognize threats and assess their capacity to manage risks when contemplating protective financial instruments such as insurance.

Drivers Influencing Houseowner and Householder Insurance Adoption: In Malaysia, the intention to buy homeowner and householder insurance continues to be significantly low, even though there is a rise in the frequency of severe natural and structural hazards like floods, fires, and industrial accidents. As risks associated with properties become more common, it is essential to comprehend the factors that drive homeowners' intentions to adopt insurance to enhance financial readiness and mitigate risks at the household level. This literature review explores three primary factors that influence the decision-making process related to the acquisition of such insurance: awareness, perceived sufficiency of product coverage, and household income.

Awareness is widely acknowledged as a key factor influencing insurance-related actions. Asnadi and Azmi (2025) discovered that merely 25% of homeowners affected by floods in Malaysia had obtained extended coverage for natural disasters, indicating a significant lack of knowledge regarding available protections and their significance. This lack of awareness poses a serious challenge in areas with a high risk, where making informed decisions is crucial. Jahya et al. (2023) further emphasized that awareness of insurance is closely linked to income levels, prior experiences of loss, and fundamental insurance literacy, which are elements that together influence the willingness to participate in financial protection strategies.

Perceived adequacy and clarity of product coverage also have a significant impact on purchasing intentions. According to the 2024 report by Perbadanan Insurans Deposit Malaysia (PIDM), millennials living in urban areas tend to prioritize affordability, perceived usefulness, and the credibility of institutions when considering insurance options. However, complex policy language and a lack of transparency often impede engagement. Consumers are more likely to postpone or skip purchases when products seem unclear or do not align with their requirements. Consequently, simplifying policy frameworks and effectively communicating benefits are essential for enhancing perceived value and promoting adoption.

Household income serves as a socioeconomic factor that significantly influences both the ability and willingness to invest in insurance. The PIDM (2024) study indicated that individuals with monthly incomes below RM2,500 are more likely to downgrade or forgo their policies due to financial constraints. In contrast, higher-income households are more inclined to maintain their insurance coverage. Additionally, income indirectly affects intentions through its influence on awareness and access to financial resources (Jahya et al., 2023). These insights highlight the need for the introduction of income-sensitive policy options or subsidy programs to enhance insurance inclusiveness.

Risk perception is widely acknowledged as a crucial factor influencing the demand for housing insurance. Homeowners who believe their properties are at a higher risk from threats like floods, earthquakes, or theft tend to be more motivated to obtain insurance coverage (Botzen & van den Bergh, 2012). Nevertheless, risk perceptions do not always correspond to actual risk levels. Cognitive biases, such as optimism bias or the inclination to downplay low-probability yet high-impact events, frequently cause homeowners to underestimate potential losses, which can result in insufficient insurance or no coverage at all, especially in areas prone to disasters (Kunreuther & Pauly, 2004).

Economic capability significantly influences insurance demand as well. Households with higher incomes typically have a greater ability to pay for premiums, making them more likely to view insurance as a financially practical and beneficial method of risk management (Browne & Hoyt, 2000). Conversely, households with lower incomes may prioritize immediate needs over insurance, even though they are more susceptible to financial difficulties from property damage. Research by Ganderton et al. (2000) indicates that even in high-risk areas, affordability issues can result in low insurance uptake among economically disadvantaged groups.

In summary, current research consistently highlights the significance of awareness, understanding of products, and income as key elements affecting homeowners' decisions to buy insurance policies in Malaysia. To improve insurance uptake, it is crucial to tackle information gaps, simplify product messaging, and provide financially accessible options. As Malaysia faces increasing environmental challenges and socio-economic inequalities, these strategies are vital for building resilient and secure communities.

Awareness: In Malaysia, the rising occurrence of property-related disasters such as fires, floods, and industrial incidents has not led to an increase in the number of homeowners and householders obtaining insurance, which remains surprisingly low. A major obstacle to addressing this issue is the insufficient public knowledge about the availability, significance, and advantages of insurance policies tailored for homeowners. In this scenario, awareness extends beyond mere familiarity; it involves recognizing individual risk exposure, comprehending policy details, and valuing the financial protection that insurance offers.

Research has repeatedly underscored the importance of awareness in shaping individuals' intentions to purchase insurance. For instance, Haji Wahab and Mohd Tajuddin (2020) identified that while basic knowledge had a limited effect, awareness of health risks notably impacted people's likelihood of buying medical takaful. This difference illustrates that awareness includes both cognitive understanding and emotional reactions to perceived dangers, which are essential factors influencing consumer choices.

Likewise, Asnadi and Azmi (2025) surveyed communities affected by floods and found that more than 50 percent of participants lacked home insurance, with only 25 percent having specific coverage for floods. The primary reason given was a lack of awareness, even among those who had directly experienced environmental hazards. This indicates that simply experiencing risks does not automatically trigger awareness; it requires deliberate educational efforts to foster understanding.

Employing an integrated approach based on Protection Motivation Theory and the Theory of Planned Behavior, Azizam et al. (2024) demonstrated that constructs related to awareness, such as attitudes and subjective norms, positively impacted the intention to buy insurance. Their results highlight that awareness serves as both a personal and social factor influencing behavioral intentions.

Qualitative research conducted by Arshad et al. (2024) found that awareness also functions as a mediating element in how individuals understand insurance information. Interviews with academics revealed that personal experiences, financial literacy, cultural beliefs, and peer influence shape insurance decisions, with awareness playing a crucial role in integrating these factors.

Zainal et al. (2024) emphasized that increased public awareness results in more positive perceptions of insurers and increased consumer trust, which subsequently enhances the likelihood of purchasing insurance. This supports the importance of awareness-raising campaigns, not only for promoting insurance literacy but also for bolstering market confidence.

Together, these studies suggest that awareness is a crucial factor in determining insurance adoption behavior. It informs, motivates, and transforms consumer perceptions, making it a central focus for policymakers and insurers seeking to address Malaysia's protection gap. Consequently, the following hypothesis is proposed:
H1: Awareness significantly and positively influences the intention of homeowners to purchase homeowner and householder insurance policies.

Perceived Adequacy of Product Coverage: The extent and transparency of insurance product coverage play a crucial role in influencing consumer choices, especially when considering protection against residential hazards. Product coverage encompasses the range of incidents and losses an insurance policy covers, including fire, theft, flooding, and structural damage. A policy that is seen as thorough and pertinent to the consumer's situation is more likely to be regarded as valuable and essential, thereby enhancing the probability of purchase.

A study conducted by Lim et al. (2020) on life insurance policies indicated that consumers who viewed the coverage as sufficient and extensive exhibited a higher intention to buy. This aligns with the research by Beng Keat et al. (2020), which explored insurance behaviours among university students and found that familiarity with the advantages and characteristics of insurance products was strongly positively linked to the intention to purchase. These observations emphasize that knowledgeable consumers are more likely to view policies as advantageous and respond proactively.

While Haji Wahab and Mohd Tajuddin (2020) mainly concentrated on health awareness, they noted that an understanding of specific policy features significantly affected decisions related to insurance. They argued that simply having product knowledge is inadequate without a related awareness of personal risks and contextual vulnerabilities. This suggests that comprehension of the product must be combined with perceived relevance to effectively drive behavior.

Azizam et al. (2024) underlined the importance of perceived efficacy, pointing out that when consumers believe an insurance policy can successfully alleviate financial losses, their inclination to purchase is heightened. This sense of effectiveness reinforces the notion that having comprehensive and efficient product coverage is key to building consumer trust and encouraging adoption.

In a recent investigation, Asnadi and Azmi (2025) examined the insurance behavior of homeowners affected by floods in Malaysia. Their results indicated that the low rates of adoption were primarily due to a lack of understanding of the insurance coverage options available. A significant number of participants were not aware of extended policy features, underscoring the need for clear and accessible information about products, particularly in high-risk regions.

The existing literature uniformly indicates that the perceived sufficiency of insurance coverage significantly influences the intention to purchase homeowner and householder policies. When consumers believe that the coverage is adequate to mitigate relevant risks, they are more inclined to invest in such protection. Thus, insurance companies should prioritize increasing transparency, simplifying product descriptions, and

enhancing public awareness regarding coverage options to encourage a more informed and broader adoption. In light of these findings, the following hypothesis is proposed:
H2: Perceived adequacy of insurance product coverage significantly and positively influences the intention to purchase houseowner and householder insurance policies among homeowners.

Household Income: Household income is a crucial determinant of both the capacity and willingness of consumers to buy insurance. Financial resources have a direct impact on an individual's ability to pay premiums, and this economic capacity often influences whether insurance is viewed as an essential protection or an optional expenditure.

Typically, individuals belonging to higher income levels are more inclined to take up insurance products due to their enhanced ability to manage costs and their focus on long-term risk mitigation. In contrast, those with lower incomes often encounter affordability issues, which restrict their access to insurance and lead to underinsurance among at-risk populations.

Research consistently underscores income as a key factor in predicting insurance enrolment. Ramli et al. (2024) discovered a strong correlation between household income and life insurance ownership in Malaysia, revealing that those with higher incomes were more inclined to maintain active policies. Likewise, Mohd Bakri et al. (2018) explored insurance behaviours among the B40 demographic and identified affordability as a significant hurdle, especially for lower-income households that found it difficult to allocate funds for insurance amid other financial obligations.

The impact of income is not limited to older or more established individuals. A study by Azizam et al. (2024) revealed that even among college students, income had a notable effect on their intentions to buy health insurance, indicating that financial capability is a vital consideration irrespective of age or employment situation. Additionally, Haji Wahab and Mohd Tajuddin (2020) affirmed that income levels influenced access to medical takaful among public sector workers, highlighting that the adoption of insurance frequently depends on financial practicality.

In environments characterized by high risk, the effects of income limitations become significantly heightened. Asnadi and Azmi (2025), in their investigation of communities vulnerable to flooding in Malaysia, discovered that insufficient income was a primary factor preventing many homeowners from obtaining insurance coverage, even though they were conscious of their risk to environmental threats. These results highlight the ongoing influence of financial resources on risk-related choices, especially in regions where insurance could greatly alleviate financial losses.

In essence, the existing literature indicates that income serves not merely as a facilitator but as a crucial determinant of insurance purchasing behavior. Individuals with higher incomes possess both the means to pay premiums and a greater tendency to view insurance as a valuable investment towards their financial security. To enhance insurance uptake among low- and middle-income populations, it is essential to implement targeted approaches such as adjustable payment options, subsidized insurance plans, or community-organized insurance initiatives. Building on these insights, the following hypothesis is put forth:
H3: Household income positively influences homeowners' intention to purchase homeowner and householder insurance policies.

3. Research Methodology

This study utilized a convenience sampling method to gather data from homeowners in Puncak Alam, Selangor. The main aim was to explore the key factors that affect the decision to purchase homeowner and householder insurance policies. Convenience sampling was considered suitable due to its effectiveness and the ease of reaching respondents within a specific geographic region. This non-probability technique is commonly employed in consumer behavior studies concerning insurance when the intention is to derive initial insights rather than to achieve broad population generalizability.
A total of 100 valid responses were collected through a self-administered questionnaire, which was disseminated via both physical and digital means. The survey included 20 items evaluated on a five-point Likert

scale, ranging from "strongly disagree" (1) to "strongly agree" (5). These items were crafted to assess four primary constructs: awareness, perceived product coverage, household income, and the intention to purchase homeowner and householder insurance. All items were adapted and refined from existing literature focused on insurance adoption and consumer decision-making within Malaysia.

Descriptive statistical methods were employed to analyze the data, leading to the identification of central trends and recurring patterns among the respondents. This analysis provided an initial understanding of the most influential factors affecting insurance adoption behaviours among homeowners.

In addition, the study examined how these factors correlate with consumer preferences for extended insurance coverage options, such as protection against natural and man-made hazards like floods, landslides, and explosions. These findings are particularly pertinent given the rising environmental risks and pressures from urban development. The results offer valuable insights for insurers and policymakers looking to enhance insurance literacy, create products that respond to consumer needs, and increase the uptake of property insurance coverage.

It is essential to recognize certain limitations associated with the selected sampling method. Since convenience sampling is a non-probability approach, it may introduce selection bias and diminish the sample's representativeness. Consequently, the findings should be viewed cautiously, as they might not accurately represent the opinions or behaviors of the wider population of Malaysian property owners. Although a sample size of 100 respondents is typically adequate for fundamental descriptive and exploratory analysis (Hair et al., 2019), it may lack the robustness required for more sophisticated statistical methods or for making broader generalizations. The sample size was determined based on practical factors, such as time and resource limitations, consistent with the exploratory nature of the study. In future research, utilizing a larger and more diverse sample would enhance the reliability and relevance of the results.

4. Results

The main aim of this research is to examine the important factors, particularly awareness, product availability, and income, that affect property owners' willingness to acquire homeowner and householder insurance policies.

Profile of Respondents: Table 1 provides an overview of the demographic characteristics of the participants involved in the study.

Table 1: Demographic Profile

Variable	Frequency	Percentage
GENDER		
Males	56	56.0%
Females	44	44.0%
Total	**100**	**100%**
AGE		
18-28	53	53.0%
29-39	25	25.0%
40-50	15	15.0%
51 and above	7	7.0%
Total	**100**	**100%**
EDUCATION		
Sijil Pelajaran Malaysia (SPM)	14	14.0%
Diploma	22	22.0%
Degree	55	55.0%
Master / PhD	9	9%
Total	**100**	**100%**

MONTHLY INCOME		
RM1,000 and below	10	10.0%
RM1,001 - RM2,000	21	21.0%
RM2,001 - RM3,000	29	29.0%
RM3,001 – RM4,000	19	19.0%
RM4,000 and above	21	21.0%
Total	**100**	**100%**

Reliability Analysis: Reliability analysis was conducted to assess the internal consistency of the survey items used to measure the key constructs in this study (awareness, perceived product coverage, household income, and purchase intention). This analysis ensures that the items within each construct consistently reflect the same underlying concept. Cronbach's alpha coefficients were calculated for each variable to evaluate reliability, with values above 0.70 generally indicating acceptable reliability. The results of the reliability analysis are presented in Table 2 below.

Table 2: Reliability Analysis

Variable	No of Item	Cronbach Alpha
Intention	5	7.30
Awareness	5	7.58
Product Coverage	5	7.49
Income	5	7.38

Reliability Statistics: The reliability statistics provide an overview of the internal consistency for each construct measured in this study. High reliability coefficients indicate that the items within each scale consistently measure the same underlying concept. Table 3 presents the Cronbach's alpha values for all variables examined.

Table 3: Reliability Statistics

Cronbach Alpha	No of Item
0.855	20

Descriptive Statistics: Descriptive analysis was employed to summarize the data, highlighting the key drivers affecting their intention to purchase Houseowner and Householder Insurance. The results detailing these factors are presented in Tables 4, 5, 6, 7, and 8 below.

Table 4: Descriptive Statistics

Item	Mean	Std. Dev.
Intention	3.82	0.644
Awareness	3.72	0.743
Product Coverage	3.81	0.713
Income	3.84	0.686

Table 5: Mean Score and Standard Deviation for Intentions to Purchase Houseowner and Householder Insurance

Item	Mean	Std. Dev.
I intend to purchase Houseowner and Householder insurance in the future.	4.16	0.849
I believe my current homeowner and Householder insurance coverage is sufficient to protect my property.	3.77	0.851
I am willing to purchase Houseowner and Householder insurance even if it is not legally mandated.	3.65	0.936
I ensure that I fully understand the terms and coverage of the policy before making a purchase decision.	3.82	1.018
I support the idea of the government making homeowner and household insurance compulsory, provided the premium remains affordable and minimal.	3.72	0.975

Table 5 displays the mean and standard deviation scores for items evaluating respondents' attitudes and intentions regarding Houseowner and Householder insurance. The item "*I intend to purchase Houseowner and Householder insurance in the future*" achieved the highest average score (M = 4.16, SD = 0.849), signifying a robust inclination among property owners to acquire such coverage. The statement *"I ensure that I fully understand the terms and coverage of the policy before making a purchase decision"* was next with a relatively high average (M = 3.82, SD = 1.018), reflecting a careful approach and a satisfactory level of awareness regarding policies. The item *"I believe my current Houseowner and Householder insurance coverage is sufficient to protect my property"* recorded a moderate average of 3.77 (SD = 0.851), indicating a reasonable level of contentment with current insurance policies. Meanwhile, the statement *"I support the idea of the government making homeowner and household insurance compulsory, provided the premium remains affordable and minimal"* attained an average score of 3.72 (SD = 0.975), demonstrating conditional support for regulation, dependent on cost-effectiveness. Finally, the statement *"I am willing to purchase Houseowner and Householder insurance even if it is not legally mandated*" garnered the lowest average (M = 3.65, SD = 0.936), suggesting that voluntary participation might be less pronounced without regulatory mandates or incentives.

In summary, the findings reflect a generally positive attitude toward insurance adoption, with awareness and perceived adequacy of coverage emerging as important factors. These insights are particularly relevant for increasing insurance penetration in high-risk areas such as Puncak Alam, Selangor.

Table 6: Mean Score and Standard Deviation for Awareness

Item	Mean	Std. Dev.
Houseowner and Householder insurance policies increase public awareness by helping protect against financial losses in the event of unforeseen circumstances.	3.93	1.007
I have not received sufficient explanations from insurers regarding the benefits and uses of Houseowner and Householder insurance policies.	3.50	1.029
It is important for insurers to provide clear briefings to raise public awareness about Houseowner and Householder insurance policies.	3.91	1.083
Individuals with greater responsibilities are more likely to be encouraged to purchase Houseowner and Householder insurance policies.	3.88	1.047
I am not fully aware of the different types of coverage options offered by insurers in the market.	3.41	1.045

Table 6 presents the mean and standard deviation scores for five items assessing respondents' awareness levels regarding Houseowner and Householder insurance. The overall results suggest that respondents generally possess a sound understanding of the role awareness plays in influencing insurance adoption decisions. The highest-rated item was *"Houseowner and Householder insurance policies increase public awareness by helping protect against financial losses in the event of unforeseen circumstances"* (M = 3.93, SD = 1.007), indicating that most respondents recognize the financial protection these policies offer. Similarly, strong agreement was observed for the statement *"Clear briefings from insurers are important to raise awareness"* (M = 3.91, SD = 1.083), underscoring the importance of effective communication by insurance providers. The statement *"Individuals with greater responsibilities are more likely to be encouraged to purchase insurance"* received a mean score of 3.88 (SD = 1.047), suggesting that personal obligations such as dependents or property ownership increase motivation to seek insurance coverage. However, the data also highlight some awareness gaps. The statements *"I have not received sufficient explanations from insurers"* (M = 3.50, SD = 1.029) and *"I am not fully aware of the coverage options available"* (M = 3.41, SD = 1.045) reveal that many respondents feel underinformed about policy details and options.

In conclusion, while general awareness of the benefits of Houseowner and Householder insurance is relatively strong, the findings suggest a need for improved public education and clearer communication from insurers. Targeted awareness initiatives and more transparent information delivery could significantly enhance understanding and foster greater insurance adoption.

Table 7: Mean Score and Standard Deviation for Perceived Adequacy of Product Coverage

Item	Mean	Std. Dev.
The basic coverage of Houseowner and Householder insurance policies typically includes protection against fire, lightning, and explosion.	3.95	1.028
Adding extended coverage to my Houseowner and Householder insurance policy will require me to pay an additional premium.	3.66	1.036
I understand that Houseowner and Householder insurance coverage is not intended for profit but for protection against loss.	3.69	0.950
The primary purpose of insurance product coverage is to provide immediate financial support in times of loss or damage.	3.93	1.007
Houseowner and Householder insurance coverage helps me recover financially if unexpected losses occur.	3.83	1.025

Table 7 presents the mean and standard deviation for five items measuring respondents' understanding of perceived adequacy of product coverage, one of the key independent variables in this study. The highest-rated item was *"The basic coverage of Houseowner and Householder insurance policies typically includes protection against fire, lightning, and explosion"* (M = 3.95, SD = 1.028), suggesting that most respondents are aware of the fundamental components typically included in standard insurance policies. A similarly high mean was recorded for *"The primary purpose of insurance product coverage is to provide immediate financial support in times of loss or damage"* (M = 3.93, SD = 1.007), indicating a strong understanding among respondents that the core function of insurance is to offer financial relief during emergencies. The statement *"Houseowner and Householder insurance coverage helps me recover financially if unexpected losses occur"* also received a relatively high score (M = 3.83, SD = 1.025), showing that respondents generally perceive insurance as a financial recovery tool. In contrast, slightly lower agreement was observed for *"I understand that Houseowner and Householder insurance coverage is not intended for profit but for protection against loss"* (M = 3.69, SD = 0.950) and *"Adding extended coverage to my Houseowner and Householder insurance policy will require me to pay an additional premium"* (M = 3.66, SD = 1.036). These findings suggest some confusion among respondents about the non-profit nature of insurance and the cost implications of policy enhancements.

In summary, while respondents demonstrate a solid grasp of the basic functions and coverage of Houseowner and Householder insurance, there remains a need for greater clarity regarding extended coverage and the financial principles underlying insurance policies. Improved communication from insurers can help address these knowledge gaps and support more informed consumer decisions.

Table 8: Mean Score and Standard Deviation for Household Income

Item	Mean	Std. Dev.
I am willing to allocate part of my finances to purchase Houseowner and Householder insurance policies.	3.88	0.913
I consider homeowner and Householder insurance policies as part of my financial commitments.	3.97	0.881
I assess my financial ability before deciding to purchase Houseowner and Householder insurance policies.	3.75	1.038
I regularly track my long-term financial goals.	3.83	1.064
I am likely to purchase Houseowner and Householder insurance policies when I have available funds.	3.77	1.003

Table 8 presents the mean and standard deviation for five items measuring respondents' financial considerations (household income) related to purchasing Houseowner and Householder insurance. The highest mean was recorded for the statement *"I consider Houseowner and Householder insurance policies as part of my financial commitments"* (M = 3.97, SD = 0.881), indicating that many respondents treat insurance as an essential component of their household budgeting. Similarly, *"I am willing to allocate part of my finances to purchase Houseowner and Householder insurance policies"* received a high mean score (M = 3.88, SD = 0.913), reflecting a general willingness among respondents to invest financially in protection. The statements *"I regularly track my long-term financial goals"* (M = 3.83, SD = 1.064) and *"I am likely to purchase Houseowner*

and Householder insurance policies when I have available funds" (M = 3.77, SD = 1.003) also showed positive responses, suggesting that many participants engage in financial planning and are open to purchasing insurance when circumstances allow. Meanwhile, the item *"I assess my financial ability before deciding to purchase Houseowner and Householder insurance policies"* had a slightly lower mean score (M = 3.75, SD = 1.038). While still moderately high, this suggests some variability in how consistently respondents evaluate their financial capacity before making insurance decisions.

In summary, the findings indicate that most respondents demonstrate financial awareness and a willingness to invest in insurance. However, their buying patterns continue to be affected by income levels and individual budgeting priorities, underscoring the significance of affordability and adaptable payment options in promoting wider acceptance of insurance.

Correlation Analysis: This analysis was performed to examine the strength and direction of the connections between the independent variables (awareness, perceived sufficiency of product coverage, and household income) and the dependent variable, which is the intention to buy Houseowner and Householder insurance. By analyzing these relationships, the research seeks to identify whether changes in the independent variables align with corresponding shifts in respondents' purchasing intentions. The findings from the correlation analysis are displayed in Tables 9, 10, and 11.

Table 9: The Relationship Between Intention to Purchase Houseowner and Householder Insurance and Awareness

		Intention to Purchase Houseowner and Householder Insurance	Awareness
Intention to Purchase Houseowner and Householder Insurance	Pearson Correlation	1	.527**
	Sig. (2-tailed)		.000
	N	100	100
Awareness	Pearson Correlation	.527**	1
	Sig. (2-tailed)	.000	
	N	100	100

Table 9 displays the Pearson correlation coefficient illustrating the relationship between awareness and the intention to buy Houseowner and Householder insurance, which is r = 0.527 with a p-value of 0.000. This indicates a moderate, positive, and statistically significant correlation. The findings imply that individuals with greater awareness of insurance and its advantages are more inclined to indicate an intention to purchase it. This result underscores the essential role of public education and awareness programs in promoting insurance uptake, especially in regions susceptible to property-related risks.

Table 10: The Relationship Between Intention to Purchase Houseowner and Householder Insurance and Perceived Adequacy of Product Coverage

		Intention to Purchase Houseowner and Householder Insurance	Product Coverage
Intention to Purchase Houseowner and Householder Insurance	Pearson Correlation	1	.570**
	Sig. (2-tailed)		.000
	N	100	100
Product Coverage	Pearson Correlation	.570**	1
	Sig. (2-tailed)	.000	
	N	100	100

Table 10 displays the Pearson correlation coefficient, which shows a value of r = 0.570 between the perceived

adequacy of product coverage and the intention to purchase Houseowner and Householder insurance, with a significance level of p = 0.000. This result indicates a moderate, positive, and statistically significant relationship between the two variables. The results imply that when consumers have a clearer understanding of the extent and adequacy of their insurance coverage, their likelihood of purchasing the policy increases. This highlights the importance for insurers to offer clear, detailed, and transparent information regarding policy features to enhance consumer confidence and foster higher adoption rates.

Table 11: The Relationship Between Intention to Purchase Houseowner and Householder Insurance and Income

		Intention to Purchase Houseowner and Householder Insurance	Income
Intention to Purchase Houseowner and Householder Insurance	Pearson Correlation	1	.574**
	Sig. (2-tailed)		.000
	N	100	100
Income	Pearson Correlation	.574**	1
	Sig. (2-tailed)	.000	
	N	100	100

Table 11 presents the Pearson correlation coefficient linking income with the intention to buy Houseowner and Householder insurance, showing r = 0.574 and a p-value of 0.000. This signifies a moderate, positive, and statistically significant correlation between income and the intention to purchase. This implies that individuals with greater income levels are more likely to express a desire to obtain these insurance policies. This result emphasizes the vital role of financial means in influencing insurance purchasing choices and highlights affordability as an essential element in encouraging increased insurance adoption among homeowners.

5. Discussion and Recommendations

H1: Awareness significantly and positively influences the intention of homeowners to purchase homeowner and householder insurance policies.

The study's findings support the notion that awareness is vital in influencing homeowners' intentions to acquire homeowner and householder insurance policies. The descriptive analysis showed a comparatively high average score for awareness-related items (M = 3.93, SD = 1.007), suggesting that most participants acknowledge the protective benefits of these insurance products. Additionally, the Pearson correlation analysis indicated a moderate positive correlation between awareness and purchase intention ($r = 0.527$, $p < 0.01$), validating the proposed connection.

These results are consistent with earlier studies highlighting that individuals who have a solid understanding of insurance policies, including their coverage and advantages, are more inclined to demonstrate positive purchasing behavior (Asnadi & Azmi, 2025; Jahya et al., 2023). The correlation findings not only affirm the significance of this connection but also imply that enhanced knowledge and comprehension can lead to increased consumer intention and action.

However, in spite of the overall high awareness, the notable standard deviations indicate varying levels of understanding among participants. This inconsistency underscores the gaps in detailed knowledge concerning specific coverage options and the complete value proposition of the policies. Such variations may arise from insufficient communication by insurers, limited access to information, or differing degrees of financial literacy within the community.

Importantly, this implies that merely increasing general awareness is not enough. Insurance companies and policymakers must concentrate on providing clearer, more comprehensive, and targeted information designed for various population segments. Initiatives should aim at simplifying policy language, highlighting essential

coverage benefits, and dispelling common misconceptions. Furthermore, interactive educational initiatives, community outreach efforts, and digital platforms can improve engagement and understanding.

By improving the quality and accessibility of information, these strategies can bridge existing knowledge gaps, build consumer confidence, and ultimately increase the adoption rates of houseowner and householder insurance policies, especially in risk-prone areas. This approach will not only protect homeowners financially but also strengthen the resilience of communities against unforeseen property risks.

H2: Perceived adequacy of insurance product coverage significantly and positively influences the intention to purchase houseowner and householder insurance policies among homeowners.

H2 is supported because a statistically significant and positive relationship has been found between homeowner perceptions of the adequacy level of insurance product coverage and their purchase intention of homeowner and householder insurance policies. Results of the descriptive analysis indicated consistently high mean scores for coverage-related items. The highest was being aware of some basic elements such as fire, lightning, and explosion coverage ($M = 3.95$, $SD = 1.028$). Respondents also generally agreed on the usefulness of these policies to provide financial protection and to support recovery from unforeseen losses.

More importantly, correlation analysis confirmed that the perceived level of coverage was moderately strongly and statistically significantly positively correlated with purchase intention ($r = 0.570$, $p < 0.001$). This means that if homeowners feel the coverage is something they can use, they are more likely to consider purchasing such policies. This result is consistent with previous research, which found that value and utility of the product significantly influence consumer decision making (Kavitha et al., 2012). The quality of the product as a dimension has been considered an antecedent to purchase intention, and product-specific insurance quality has been a subject of study for a long time (Harnam and Madhurima, 2011). Despite the differences in the type of insurance, like life insurance (for education, retirement), for which insurance is taken (Kumar, 2011), a desirable product fulfilling the customer's expectations is indeed an important determinant for buying behavior.

Despite the generally favorable trends, the moderate standard deviations for many individual items indicate that respondents did not universally understand insurance information. Although most will acknowledge the benefits of having coverage, they may not fully understand policy terms, exclusions, and optional extended coverage features. This narrow awareness may represent an obstacle to the acceptance of houseowner and householder insurance on a broader basis.

Therefore, it is recommended that insurers enhance efforts to provide clearer, more transparent information about policy details, including the benefits and costs associated with extended coverage options. Educational initiatives and simplified communication strategies could help bridge these knowledge gaps, fostering greater confidence and encouraging more informed purchasing decisions among homeowners.

H3: Household income positively influences homeowners' intention to purchase homeowner and householder insurance policies.

The findings confirm H3 by showing that household income creates a positive relationship between homeowners' plans to acquire homeowner and householder insurance. The mean score shows that respondents agree moderately to strongly about the role of financial capacity in insurance decision-making. The standard deviation shows that respondents have different financial conditions and viewpoints because their income levels differ across the sample.

The correlation analysis shows a strong positive link between household income and insurance policy purchase intentions ($r = 0.574$, $p < 0.001$). Homeowners who earn higher incomes tend to consider and purchase homeowner and householder insurance. Research by Chantarat et al. (2015), Outreville (2014), and Beck & Webb (2003) supports this finding because income level plays a crucial role in determining insurance adoption decisions. The study by Chantarat et al. (2015) demonstrates that affordability problems prevent lower-income households from purchasing insurance, especially in developing economic settings. Outreville (2014) confirms

that income stands as a leading socioeconomic factor that influences life and non-life insurance demand worldwide. The research by Beck and Webb (2003) shows that life insurance consumption depends on income levels across 68 countries, thus confirming financial capability in insurance choices. Additionally, Giné et al. (2008) demonstrate that low-income people avoid buying insurance because they cannot afford it and lack product knowledge, which reduces their willingness to purchase even when they face high risks.

Based on these findings, it is suggested that insurers and policymakers should consider policies that target affordability problems more widely to increase insurance coverage. Potential actions include the implementation of tiered Insurance based on the level of premium affordability, the introduction of government subsidies or incentives for low-income homeowners and improving consumer education strategies to explain the long-term benefits and affordability of insurance. The niche insurance strategies that map to the diverse incomes present more opportunities to improve access and to stimulate a protection-oriented culture, leading to a reduction in homeowners' vulnerability to shock events.

In general, addressing income-related barriers is crucial to enhancing the penetration of houseowner and householder insurance in Malaysia, especially in those similar to Puncak Alam, where disaster risks are increasing. Further investigation is needed to examine interventions and policies specifically designed to address the affordability gap and to facilitate more equal access to insurance.

Conclusion

This study offers important insights into what influences homeowners in Puncak Alam, Selangor, to buy homeowner and householder insurance. It shows that awareness, understanding of insurance coverage, and household income all play key roles in their decision to purchase insurance. Many homeowners recognize the value of insurance, but there are still gaps in knowledge about policy details and challenges with affordability that limit wider adoption.

The positive connections between these factors and the intention to buy insurance suggest that improving education about insurance benefits and coverage, along with making insurance more affordable, can help more homeowners protect their properties. The influence of income also highlights the need for insurance options that are accessible to people from all income levels. By addressing these issues, insurers and policymakers can work together to create a stronger and more protected community. This study adds valuable knowledge to the field and offers practical ideas to improve insurance access and support in Malaysia.

Acknowledgement: The authors wish to express their sincere gratitude to the Faculty of Business and Management, Universiti Teknologi MARA, Puncak Alam, Selangor, for their invaluable support. They also extend their appreciation to all individuals who directly and indirectly contributed to the success of this study.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

OSH Integration in Malaysian Supply Chains: A Stakeholder Engagement and Social Exchange Analysis for Enhanced Resilience

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Abstract: In pharmaceutical companies in Malaysia, employee retention is a huge responsibility for Human Resources Management. In today's global economic landscape, many companies are moving towards globalization, and employees are more inclined to change organizations in search of better opportunities and growth. This has become a major concern, and retaining employees has been one of the competitive strategies because employees leaving the organization carry with them their skills and knowledge. The main focus of this study is to understand the factors that influence employee retention at pharmaceutical companies in Malaysia. The research objectives were to examine whether reward, career advancement, and manager engagement have a significant influence on employee retention in pharmaceutical companies in Malaysia. This is a correlation study focusing on the relationship between rewards, career advancement, manager engagement, and employee retention in pharmaceutical companies. This research was conducted in a natural setting in a non-contrived manner using non-probability convenience sampling. A questionnaire was distributed to 400 employees working for pharmaceutical companies in Malaysia, regardless of position. The validity and reliability of the questionnaire were checked, and responses were collected and analyzed via SPSS software. The analysis and research findings showed that rewards, career advancement, and manager engagement positively influenced the retention of employees in pharmaceutical companies in Malaysia. All independent variables show a significant beta coefficient, with a p-value of 0.00 for rewards and career advancement and a p-value of 0.001 for the manager's engagement. The result supported the hypotheses and was accepted.

Keywords: *occupational safety and health, OSH, social sustainability, supply chain management, Malaysia, stakeholder theory, social exchange theory*

1. Introduction and Background

Malaysia has made notable advancements in sustainability, yet the full incorporation of Occupational Safety and Health into broader social responsibility strategies remains underdeveloped (Amirrudin et al., 2024). This study explores the integration of OSH into the social sustainability framework within Malaysian supply chains, highlighting the importance of prioritizing worker well-being for sustainable and resilient supply chain performance (Amirrudin et al., 2024). This is consistent with broader global trends recognizing the interconnectedness of business operations and their impact on stakeholders (Cheng et al., 2015). Furthermore, the increasing complexity and interconnectedness of global supply chains have amplified the need for resilience—the capacity to withstand and recover from disruptions (Pereira & Silva, 2015). Social sustainability, encompassing fair labor practices, worker well-being, and community development (Mani et al., 2016), has become a critical dimension of overall sustainability, particularly within supply chain contexts (Huq & Stevenson, 2018). This conceptual paper explores the integration of OSH, defined as the science of anticipating, recognizing, evaluating, and controlling hazards arising in or from the workplace that could impair the health and well-being of workers (Ustailieva et al., 2012), into the social sustainability framework within Malaysian supply chains, using a stakeholder-social exchange perspective. This perspective recognizes the importance of collaboration and communication within the supply chain (Awheda et al., 2014; Mohammad et al., 2014).

This paper posits that prioritizing worker well-being, as reflected in robust OSH practices, is essential for achieving both social sustainability and resilient supply chain performance. Drawing upon stakeholder theory, which emphasizes the interconnectedness of organizations and their stakeholders, and social exchange theory, which focuses on the reciprocal exchange of resources and obligations, we develop a conceptual framework for

understanding the complex interplay of actors and interests within Malaysian supply chains. This stakeholder-social exchange lens allows us to analyze how investments in OSH can generate positive outcomes for various stakeholders, including employees, suppliers, customers, and communities, ultimately contributing to a more sustainable and resilient supply chain ecosystem (Hsu et al., 2021). Furthermore, this perspective sheds light on the potential conflicts and trade-offs that may arise in the pursuit of both social sustainability and resilience, providing insights for navigating these complexities (Shahbaz et al., 2020).

This conceptual paper explores the integration of Occupational Safety and Health into social sustainability frameworks within Malaysian supply chains. This paper extends the authors' earlier conceptual work on the integration of Occupational Safety and Health into social sustainability frameworks in Malaysian supply chains. While the previous study focused on the ethical, legal, and policy rationale for prioritizing OSH within supply chain sustainability, the current paper advances this agenda by incorporating stakeholder theory and social exchange theory to propose a structured conceptual framework. This theoretical lens allows for a deeper understanding of the mechanisms through which OSH can be embedded into sustainable supply chain practices, particularly through stakeholder collaboration and reciprocity. In doing so, this article addresses the empirical and practical gaps identified in the earlier study and contributes a set of actionable variables to guide future research and organizational implementation.

While existing literature acknowledges the importance of OSH in supply chains, this research aims to address a gap by specifically examining how the integration of stakeholder engagement and social exchange theory can enhance OSH practices and resilience within the unique context of Malaysian supply chains. This conceptual paper will address the following key questions: How can OSH be effectively integrated into social sustainability frameworks within Malaysian supply chains? What are the key stakeholder perspectives on OSH and its role in supply chain resilience? How can social exchange mechanisms be leveraged to promote OSH and enhance supply chain resilience? By addressing these questions, we aim to contribute to both academic discourse and practical guidance for organizations seeking to build more sustainable and resilient supply chains in Malaysia. This analysis will draw upon existing literature on sustainability, supply chain management, and OSH, integrating stakeholder and social exchange theories to develop a comprehensive understanding of the complex dynamics at play. This includes considering the current practices and challenges related to OSH in Malaysia (Mohd et al., 2020).

This research recognizes that Occupational Safety and Health is not merely a matter of compliance or risk management; it's a fundamental pillar of social sustainability (Amirrudin et al., 2024). When workers are safe and healthy, they are more productive, engaged, and able to contribute to their communities (Ivaşcu et al., 2019). A supply chain that prioritizes OSH is, therefore, a more ethical, resilient, and sustainable supply chain. This perspective aligns with the broader sustainable development goals, particularly those related to decent work, economic growth, and reduced inequalities.

However, achieving this integration requires a shift in mindset. Traditionally, OSH has been viewed as a separate function, often disconnected from broader sustainability initiatives. This research argues that a more holistic approach is needed, one that recognizes the interconnectedness of OSH, stakeholder relationships, and social responsibility. By leveraging the principles of stakeholder engagement and social exchange, we can create a more collaborative and supportive environment where all actors in the supply chain are incentivized to prioritize OSH.

Ultimately, this research seeks to demonstrate that investing in OSH through stakeholder engagement and social exchange is not just a cost, but a strategic investment in the long-term sustainability and resilience of Malaysian supply chains. By fostering a culture of safety and well-being, organizations can enhance their reputation, improve their bottom line, and contribute to a more just and equitable society.

2. Interconnections between social sustainability, supply chain resilience and OSH

OSH directly contributes to social sustainability by prioritizing the health, safety, and well-being of workers (Mani et al., 2016; Ustailieva et al., 2012). Robust OSH practices minimize workplace hazards, reducing the risk of injuries, illnesses, and fatalities ("A Smarter National Surveillance System for Occupational Safety and Health

in the 21st Century," 2018). This, in turn, leads to a healthier and more productive workforce, contributing to improved social outcomes within the supply chain and related communities (Amirrudin et al., 2024). When workers feel safe and valued, their morale and job satisfaction increase, fostering a positive work environment and promoting social cohesion within the organization. Furthermore, strong OSH practices can enhance a company's reputation and attract and retain skilled workers, creating a more stable and sustainable workforce (Schulte, 2006). This positive social impact extends beyond the workplace, benefiting families and communities by reducing the social and economic burdens associated with workplace accidents and illnesses (Khalil & Salih, 2022). A healthy and productive workforce contributes to the overall economic well-being of a community, fostering social stability and development (Ustailieva, 2014).

Improved worker well-being, fostered by robust OSH practices, translates into enhanced social outcomes by creating a ripple effect throughout the supply chain (Harter et al., 2003; Węziak-Białowolska et al., 2019). When workers are healthy and safe, they are more likely to be productive and engaged (Miller, 2016), contributing to higher quality products and services (Mani et al., 2017). This, in turn, can enhance customer satisfaction and brand loyalty (Harter et al., 2003), strengthening the overall competitiveness of the supply chain (Hsu et al., 2021). Moreover, a commitment to worker well-being can improve a company's reputation and attract socially conscious consumers, further enhancing its market position. By prioritizing worker well-being, companies demonstrate their commitment to ethical and responsible business practices (Huq & Stevenson, 2018), fostering trust and positive relationships with stakeholders across the supply chain (Jain et al., 2018). This creates a more collaborative and sustainable supply chain ecosystem, benefiting all involved parties.

Social sustainability is intrinsically linked to supply chain resilience (Pereira & Silva, 2015; Zavala-Alcívar et al., 2020). A socially sustainable supply chain, characterized by fair labor practices, worker well-being, and community engagement, is inherently more resilient to disruptions (Mani et al., 2016). When workers are treated fairly and their well-being is prioritized, they are more likely to be loyal, committed, and motivated to contribute to the success of the organization (Zangara et al., 2024). This strong social foundation creates a more stable and adaptable workforce, capable of navigating challenges and recovering quickly from disruptions. Furthermore, a socially responsible supply chain is more likely to attract and retain skilled workers (Schulte, 2006), reducing the risk of labor shortages and operational disruptions (Shahbaz et al., 2020). By investing in social sustainability, companies build strong social capital within their supply chain (Zangara et al., 2024), fostering trust, collaboration, and mutual support among stakeholders (Awheda et al., 2014). This strong social fabric enhances the supply chain's ability to withstand and recover from disruptions (Zavala-Alcívar et al., 2020), ensuring its long-term viability and competitiveness (Cheng et al., 2015). A socially sustainable supply chain is not only ethically sound but also strategically advantageous, contributing to greater resilience and long-term success.

Existing research has highlighted the potential benefits of integrating OSH into social sustainability, including improved worker well-being, enhanced brand reputation, and greater supply chain resilience (Amirrudin et al., 2024). This is particularly relevant in the Malaysian context, where the growing importance of sustainability has led to increased attention on social responsibility and worker welfare. However, the practical implementation of such integration remains a challenge, often hindered by institutional barriers, misalignment of stakeholder interests, and a lack of consistent application of OSH practices across supply chain tiers (Huq & Stevenson, 2018).

3. Stakeholder Perspectives and Social Exchange Mechanisms

To address this challenge, a stakeholder-social exchange perspective offers valuable insights. Stakeholder theory emphasizes the need to consider the diverse interests and influences of various actors, including employees, suppliers, customers, and local communities, within the supply chain ecosystem. By understanding the perspectives and motivations of these stakeholders, organizations can develop more effective strategies for integrating OSH into their social sustainability frameworks, fostering greater collaboration and shared responsibility.

A stakeholder perspective is crucial for understanding the complex dynamics of social sustainability and supply chain resilience, particularly concerning OSH integration (Huq & Stevenson, 2018). This theory emphasizes the

importance of considering the interests and influences of all stakeholders affected by a company's operations, including employees, suppliers, customers, local communities, and government agencies (Ustailieva et al., 2012). Each stakeholder group has unique perspectives on OSH and its role in supply chain resilience (Mani et al., 2017). For instance, employees are directly impacted by OSH practices, and their well-being is paramount (Harter et al., 2003; Miller, 2016). They are directly impacted by workplace hazards and benefit most from safe and healthy working conditions. Their perspectives often emphasize fair wages, reasonable working hours, access to healthcare, and opportunities for skill development. They seek a voice in decisions impacting their safety and well-being, advocating for strong enforcement of regulations and transparent communication about workplace risks. Amirrudin et al. (2024) highlight the particular need for increased awareness and training among low-skilled workers in Malaysia, reflecting their potential vulnerability within supply chains.

Suppliers may face pressure to comply with OSH standards, potentially impacting their costs and operations (Mani et al., 2017). Their main concerns often revolve around the feasibility and financial implications of implementing more rigorous OSH practices, as well as the potential impact on their competitiveness. Smaller suppliers, in particular, may lack the resources and expertise to implement robust OSH systems independently and benefit from collaborative initiatives and knowledge sharing within the supply chain. Awaysheh & Klassen (2010) explore the impact of supply chain structure on supplier adoption of socially responsible practices, including OSH.

Customers, on the other hand, are increasingly concerned about ethical sourcing and worker welfare, influencing their purchasing decisions (Beske & Seuring, 2014). Their perspectives focus on product safety, ethical sourcing, and fair labor practices. They may be willing to pay a premium for products from companies with demonstrably strong OSH performance, driving market demand for socially responsible supply chains. Initiatives that enhance transparency and traceability, enabling consumers to make informed purchasing decisions, can play a key role in strengthening OSH integration. Amirrudin et al. (2024) suggest that increased information transparency about OSH performance, potentially through apps that allow consumers to evaluate factors related to health and safety, might sway purchasing behaviors and encourage improvements. Local communities may experience positive or negative externalities from supply chain activities, including impacts on public health and safety.

Government agencies play a regulatory role, setting and enforcing OSH standards ("A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century", 2018; Schulte, 2006; Meixell & Luoma, 2015; Amirrudin et al., 2024; Koplin et al., 2006; Huq & Stevenson, 2018). Their perspectives emphasize compliance with laws and regulations, as well as the need for effective monitoring and enforcement mechanisms to ensure consistent application of OSH practices across the supply chain. Collaboration between government agencies and other stakeholders can contribute to more effective enforcement and facilitate the development of context-specific solutions. Md. Deros et. al (2014) highlight the importance of the Department of Occupational Safety and Health and the regulatory framework for OSH in Malaysia, emphasizing the crucial role of government agencies in this domain. Understanding these diverse perspectives is crucial for developing effective strategies for OSH integration and building more socially sustainable and resilient supply chains. A collaborative approach that considers the needs and interests of all stakeholders can create a more equitable and mutually beneficial outcome.

Social exchange theory provides a valuable lens for analyzing the interactions between stakeholders in the context of OSH and supply chain resilience (Griffith et al., 2005). This theory posits that relationships are based on reciprocal exchanges of resources, both tangible (e.g., financial incentives, information) and intangible (e.g., trust, reputation) (Cook & Rice, 1995). In the context of OSH, social exchange mechanisms can be leveraged to promote the adoption and implementation of robust OSH practices throughout the supply chain (Davis-Sramek et al., 2020). For example, companies can offer incentives to suppliers who demonstrate strong OSH performance, creating a positive feedback loop that encourages continuous improvement (Chowdhury et al., 2019). Collaborative partnerships between companies and local communities can facilitate the sharing of information and resources, enhancing OSH outcomes for all involved (Cole et al., 2002). Building trust and open communication channels among stakeholders is essential for effective social exchange, enabling the identification and resolution of OSH challenges collaboratively (Najjar et al., 2020).

In the realm of OSH, social exchange dynamics are evident in the relationships between employers and employees, between companies and their suppliers, and between organizations and regulatory bodies. Employers invest in OSH programs, expecting increased productivity, reduced absenteeism, and enhanced employee morale in return (Amirrudin et al., 2024). Employees, in turn, contribute their labor and expertise, expecting safe and healthy working conditions. Companies may provide training, resources, and support to their suppliers in exchange for compliance with OSH standards, expecting a more resilient supply chain and enhanced reputation. Regulatory bodies enforce OSH regulations, expecting companies to comply and contribute to a safer working environment for all.

SET emphasizes the importance of reciprocity in maintaining stable relationships. When one stakeholder invests in OSH improvements, they expect a reciprocal benefit from other stakeholders. This reciprocal exchange fosters trust, which is essential for collaborative efforts to enhance supply chain resilience. Scholten & Schilder (2015) highlight the importance of collaboration in supply chain resilience, suggesting the inherent role of social exchange and reciprocity in these collaborative efforts. When stakeholders perceive a lack of reciprocity or fairness in the exchange process, trust erodes, hindering collaboration and impeding progress on OSH integration. By examining the dynamics of social exchange in the context of OSH and supply chain resilience, it is possible to identify opportunities for strengthening stakeholder relationships and promoting more effective OSH practices.

Power imbalances within supply chains can significantly influence the exchange process. Lead firms often wield considerable power over their suppliers, dictating terms and conditions. This power dynamic can affect the willingness of suppliers to invest in OSH, especially if they fear it will increase costs without commensurate rewards. Amirrudin et al. (2024) touch upon the issue of stakeholder power within supply chains, highlighting the need for equitable exchanges. To overcome these challenges, it is essential to promote transparency and fairness in the exchange process, ensuring that suppliers are adequately compensated for their OSH investments.

SET recognizes the importance of social capital, which encompasses the networks, norms, and trust that facilitate cooperation and coordination within a group or community. Strong social capital within a supply chain can foster collaborative efforts to improve OSH, leading to greater supply chain resilience. Johnson et al. (2013) directly address the role of social capital in facilitating supply chain resilience, underscoring its importance in this context. Investing in social capital by building strong relationships with suppliers and fostering a culture of trust can create a more supportive environment for OSH improvements. Moreover, capacity building and empowerment are essential for fostering a culture of continuous improvement in supply chain OSH. This involves providing suppliers with the necessary training, resources, and technical assistance to enhance their occupational safety and health management systems (Amirrudin et al., 2024).

By understanding the principles of SET, organizations can develop more effective strategies for promoting OSH within their supply chains. This includes establishing clear expectations for reciprocal exchanges, fostering trust through transparent communication and fair practices, addressing power imbalances, and building social capital. Azadegan & Dooley (2020) discuss different levels of collaboration in supply chain resilience, providing a framework for understanding how social exchange can operate at various scales within the supply chain. Applying SET to analyze stakeholder interactions provides valuable insights into the motivations, incentives, and challenges associated with OSH integration and supply chain resilience. This framework can inform the design of interventions that effectively leverage social exchange mechanisms to promote positive change and build more sustainable and resilient supply chains.

Integrating stakeholder and social exchange theories provides a comprehensive framework for understanding the complex interplay of actors and interests within supply chains (Najjar et al., 2020; Cook & Rice, 1995). This integrated perspective allows for a more nuanced analysis of how investments in OSH can generate positive outcomes for various stakeholders, ultimately contributing to a more sustainable and resilient supply chain ecosystem (Barakat et al., 2023; Zavala-Alcívar et al., 2020). Furthermore, this perspective sheds light on the potential conflicts and trade-offs that may arise in the pursuit of both social sustainability and resilience, providing insights for navigating these complexities (Abbasi, 2017). By considering the perspectives of all stakeholders and leveraging social exchange mechanisms, organizations can create a more collaborative and

mutually beneficial approach to OSH integration, enhancing both social sustainability and supply chain resilience (Thong & Wong, 2018; Amirrudin et al., 2024). This approach is particularly relevant in the Malaysian context, where the diverse stakeholder landscape and the growing emphasis on sustainability require a comprehensive and inclusive approach to OSH management (Sobry et al., 2022; Amirrudin et al., 2024).

4. Conceptual Framework: OSH Integration Through Stakeholder–Social Exchange Mechanisms

Based on the synthesis of stakeholder theory and social exchange theory, this paper proposes a conceptual framework for integrating Occupational Safety and Health (OSH) into social sustainability strategies to build supply chain resilience. The framework (Figure 1) visualizes the key actors, relational mechanisms, and expected outcomes across the supply chain. It emphasizes stakeholder salience, trust, reciprocity, and incentive mechanisms as central variables that shape OSH adoption. Tables 1 and 2 provide detailed descriptions of the independent and mediating variables derived from both theories, while key outcomes reflect improvements in OSH performance, social sustainability, and organizational resilience.

Figure 1: OSH Integration Through Stakeholder – Social Exchange Mechanisms



Table 1: Stakeholder Theory Variables

Variable	Description
Stakeholder Salience	The degree to which a stakeholder's claims are prioritized (based on power, legitimacy, urgency).
Stakeholder Engagement	The depth and frequency of communication and collaboration with stakeholders (e.g., workers, suppliers, government).
Stakeholder Pressure	The extent to which stakeholders demand improved OSH and social sustainability practices.
Stakeholder Alignment	The level of agreement and shared values among stakeholders regarding OSH priorities.
Institutional Support	Government policies and industry standards support stakeholder OSH efforts.

Table 2: Social Exchange Theory (SET) Variables

Variable	Description
Perceived Reciprocity	The extent to which parties feel their contributions (e.g., investing in OSH) are fairly rewarded.
Trust	The confidence among supply chain actors that others will uphold OSH and ethical standards.
Relational Capital	The strength of social ties and mutual respect among partners can moderate OSH adoption.
Incentive Mechanisms	Financial or reputational rewards for suppliers or partners who comply with OSH standards.
Power Imbalance	The degree of asymmetry between lead firms and suppliers may influence OSH investment decisions.
Information Sharing	The frequency and quality of communication on OSH practices and expectations.

Occupational Safety and Health and Social Sustainability Integration: A Malaysian Supply Chain Perspective

The integration of occupational safety and health into social sustainability frameworks is an emerging area of interest, with significant implications for supply chain resilience. In the Malaysian context, the growing emphasis on sustainability and corporate social responsibility has brought increased attention to the importance of worker well-being and ethical practices throughout the supply chain. Effectively integrating Occupational Safety and Health into social sustainability frameworks within Malaysian supply chains requires a multifaceted approach. It must consider the diverse stakeholder landscape, existing regulatory frameworks, and the unique socio-cultural context of Malaysia. Stakeholder engagement and collaborative efforts are crucial for driving meaningful change in this domain.

Some key considerations for enhancing social sustainability and supply chain resilience through OSH integration in Malaysia include:

a. Strengthening Regulatory Frameworks and Enforcement: Malaysia has existing OSH regulations, but enforcement and consistent application across all tiers of the supply chain, especially within smaller suppliers and remote areas, remain a challenge (Amirrudin et al., 2024). Strengthening regulatory oversight, increasing penalties for non-compliance, and promoting transparency through mandatory OSH reporting are crucial. These actions can incentivize companies to prioritize worker safety, fostering a level playing field where responsible OSH practices are not a competitive disadvantage but a shared responsibility. Amirrudin et al. (2024) both emphasize the need for stronger regulatory frameworks and enforcement. Further research could investigate the effectiveness of different enforcement mechanisms and the impact of increased penalties on OSH compliance rates.

b. Fostering Stakeholder Collaboration: A stakeholder-centric approach is essential (Amirrudin et al., 2024). Engaging employees, suppliers, customers, local communities, and government agencies in dialogue and collaborative initiatives can ensure that OSH considerations are integrated into all aspects of supply chain operations. Thong & Wong (2018) highlight the importance of considering stakeholder perspectives in achieving sustainable supply chain performance in Malaysia. This collaborative approach not only fosters a more comprehensive understanding of OSH challenges and opportunities but also facilitates the development of context-specific solutions, leveraging diverse perspectives and expertise. Future research could explore effective stakeholder engagement strategies and assess their impact on OSH outcomes.

c. Leveraging Social Exchange Mechanisms: Social exchange theory suggests that reciprocal exchanges of resources, both tangible and intangible, can motivate stakeholders to adopt robust OSH practices (Amirrudin et al., 2024). Companies can offer incentives to suppliers who demonstrate strong OSH performance, creating a positive feedback loop that encourages continuous improvement. Collaborative partnerships between companies and local communities can further facilitate the sharing of information and resources, amplifying positive OSH outcomes. Research could investigate the effectiveness of different incentive mechanisms and explore how social exchange principles can be applied to different stakeholder relationships.

d. Integrating OSH into Broader Sustainability Strategies: OSH should not be treated as a standalone issue, but rather integrated into broader social sustainability frameworks and corporate social responsibility initiatives (Amirrudin et al., 2024). This holistic approach can ensure that OSH considerations are aligned with overall business goals and values, creating a more sustainable and resilient supply chain ecosystem. Amirrudin et al. (2024) discuss the integration of OSH into the UN's Sustainable Development Goals, further highlighting the importance of this integrated approach. This integration reinforces the message that worker well-being is not merely a compliance issue but a core value that contributes to long-term business success. Further research could investigate how OSH integration impacts overall sustainability performance and explore best practices for aligning OSH with broader CSR goals. Foo et al. (2018) present a study on Green Supply Chain Management practices and their impact on sustainability performance, suggesting that similar frameworks could be adapted for OSH integration.

e. Addressing the Specific Challenges of the Malaysian Context: Malaysia's unique context presents specific hurdles to OSH integration. One prominent challenge is the prevalence of informal labor, particularly in sectors like construction and agriculture. These workers often lack legal protections and access to OSH training, making them vulnerable to exploitation and unsafe working conditions. Amirrudin et al. (2024) discuss the difficulty of ensuring consistent regulatory compliance across all tiers of the supply chain, especially among smaller suppliers and in remote areas. Furthermore, complex supply chain structures, with multiple tiers of suppliers and subcontractors, can obscure accountability and make it difficult to track OSH performance throughout the entire chain. Mohammad et al. (2014) highlight the challenges posed by fragmented and adversarial relationships within the IBS construction supply chain. Varied levels of OSH awareness among businesses, particularly small and medium-sized enterprises, pose another challenge. Resource constraints and a lack of understanding regarding the importance of OSH can hinder the implementation of effective safety programs. Mohd et al. (2020) indicate varying procedures and approaches to OSH among construction stakeholders, suggesting a need for greater standardization and coordination. Tailored solutions are needed to address these challenges effectively. Thong & Wong (2018) discuss the use of structural equation modelling to analyze the relationship between sustainable practices and performance in Malaysian supply chains, suggesting a data-driven approach to understanding these complexities. Mani et al. (2017) emphasize the importance of considering the specific societal evolution and context of emerging economies like Malaysia when addressing social issues in supply chains.

f. Promoting Continuous Improvement: OSH integration is not a one-time fix but an ongoing process that requires continuous improvement. Regularly monitoring OSH performance through data collection and analysis is essential. Amirrudin et al. (2024) underscore the importance of continuous improvement and suggest mechanisms such as frequent monitoring, independent audits, and transparent reporting. Independent audits provide an objective assessment of OSH practices and identify areas where improvements are needed. Implementing feedback mechanisms, such as worker surveys and safety committees, allows for continuous learning and adaptation based on real-world experiences and emerging challenges. Amirrudin et al. (2024) emphasize the need for flexibility to adapt strategies based on new challenges and opportunities. Sivan et al. (2024) recommend fostering a safety-conscious culture and continuous improvement through enhanced supply chain integration and education. By embracing a data-driven approach to continuous improvement, businesses can ensure that their OSH programs remain effective and relevant in the long term. Rasit et al. (2019) discuss the importance of continuous improvement in environmental practices within Malaysian SMEs, suggesting a similar approach could be adopted for OSH. Amirrudin et al. (2024) provide examples of tools and methods for monitoring and enhancing OSH in supply chains. Awaysheh & Klassen (2010) explore the integration of social issues in supply chain management and provide a framework for measuring suppliers' socially responsible practices.

By adopting these strategies, Malaysian businesses can effectively integrate OSH into their social sustainability frameworks, creating a safer, more equitable, and resilient supply chain ecosystem. Further research, particularly empirical studies within the Malaysian context, is needed to refine these approaches and address the specific challenges and opportunities presented by this dynamic environment.

5. Conclusion

In conclusion, integrating Occupational Safety and Health into social sustainability frameworks within Malaysian supply chains is not merely a matter of compliance but a strategic imperative for building resilient and ethical business practices. By adopting a stakeholder-social exchange perspective, businesses can foster collaborative relationships and create a positive feedback loop that promotes continuous improvement in OSH outcomes. The unique challenges presented by the Malaysian context, such as the prevalence of informal labor and complex supply chain structures, necessitate tailored solutions and a commitment to addressing the specific needs of workers and communities (Amirrudin et al., 2024). Furthermore, by aligning OSH initiatives with broader sustainability goals and corporate social responsibility efforts, companies can ensure that worker well-being is recognized as a core value that contributes to long-term business success. Ultimately, creating a safer, more equitable, and resilient supply chain ecosystem requires a multi-faceted approach that includes robust regulatory frameworks, consistent enforcement, and a culture of safety and well-being that benefits all stakeholders (Sivan et al., 2024). Further research, particularly empirical studies within the Malaysian context, is needed to refine these approaches and address the specific challenges and opportunities presented by this dynamic environment (Amirrudin et al., 2024).

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Green Supply Chain Management Adoption's Internal and External Barriers in Malaysia Construction Industry: A Case Study

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Abstract: The construction industry has significantly strengthened Malaysia's economy; however, its swift growth has also influenced the environment and could potentially impact the population. The Malaysian government has committed to promoting the adoption of sustainable practices among construction companies nationwide. Although Green Supply Chain Management (GSCM) has been introduced over the past decade, the majority of construction companies in Malaysia still have not adopted GSCM practices within the construction industry. This qualitative study aimed to pinpoint the internal and external obstacles to the implementation of GSCM. Focusing on the Malaysian construction industry, the research employed a qualitative methodology. Purposive sampling was used to select twelve managerial-level participants from various stakeholders, including clients, contractors, government officers, and consultants. Semi-structured face-to-face interviews served as the primary method for data collection, and the gathered information was meticulously analyzed using a thematic analysis approach. The findings of this study revealed four internal obstacles that organisations face: operational disruption, lack of awareness, lack of knowledge and expertise, and high initial costs. On the other hand, the study revealed five external challenges: insufficient coordination, low market demand, regulatory and policy barriers, and a lack of government incentives. The comprehensive findings and discussions presented in this study are expected to contribute positively to ongoing efforts in implementing GSCM within the Malaysian construction sector, providing valuable insights for policymakers and industry practitioners.

Keywords: *Construction Industry, Green Supply Chain Management, Qualitative, Case Study, Malaysia*

1. Introduction and Background

The social and economic development of the country is significantly influenced by the construction sector (Ramiah, 2019). Considering that the construction sector is an essential part of any economy (Masyhur et. al, 2024; Waqar et. al, 2024), it is essential to the advancement of a country and should not be undervalued (Rashid et. al, 2024). Malaysia's construction industry has contributed between 4.5% and 5% of the country's GDP in recent years. This percentage demonstrates the sector's significant contribution to Malaysia's economic expansion, which has been driven by investments in residential construction and infrastructure. After the pandemic caused disruptions, private sector investments resumed, and the industry saw a resurgence in 2023. (MIDF Research, 2024).

Increased air and water pollution, deforestation, and biodiversity loss are the results of growing urbanization and industrialization (Sikder et. al, 2022; Voumik & Sultana,2022). Furthermore, extreme weather events and rising global temperatures are unmistakable signs of how human activity is affecting the environment. Approximately 50% of landfill waste, 40% of global energy consumption, and 50% of climate change are caused by the construction industry (Saxena, 2025; Ting, Zandi & Shahzad, 2025). Additionally, the construction sector contributes to the degradation of natural habitats and pollution of the air, water, and noise. According to the World Economic Forum (WEF) report, many nations may be able to significantly reduce their emission rates and achieve energy savings of more than 30% thanks to the construction industry's capabilities (Sandanayake, 2022).

The Malaysian construction industry has taken a number of steps to create opportunities for environmentally friendly building methods. The New Economic Policy (NEP) initiated sustainable development in the 1970s, and the five-year Malaysia Plan included certain sustainable elements (Awwad, 2021). Founded in 2007 and formally constituted in 2009, the Malaysia Green Building Confederation (MGBC) is dedicated to governing sustainable development in Malaysia (Green Building Council of Malaysia, 2023).

As businesses look to reduce their environmental impact and operate sustainably, green supply chain management, or GSCM, has grown in importance (Feng, Lai & Zhu, 2022; Zhu et al., 2011). Green supply chain management, or GSCM, is essential in Malaysia for promoting sustainability and influencing business practices.

Many businesses have adopted green supply chains to address various environmental issues, such as pollution reduction and energy conservation. These tactics include creating networks of suppliers to obtain environmentally superior products and creating conventional techniques for waste reduction and operational efficiency (Kumar & Chandrakar, 2021; 2012).

GSCM in the construction sector means using ecologically friendly methods across the supply chain, from getting raw materials to building, moving things around, and getting rid of waste (Fu, Liu, & Shan, 2023; Wong, Wah, & Wong, 2023). The goal is to keep the project on track and of high quality while having as little of an effect on the environment as possible. This means utilizing products that are good for the environment, cutting down on energy use and pollution, properly disposing of waste, and choosing suppliers who respect environmental rules. GSCM also promotes "lifecycle thinking," which is taking environmental factors into account from the design stage all the way through to the building's operations (Soufi et. al, 2023). It helps construction companies follow the rules, get green certifications, and work toward national goals for sustainability.

The organization examined in this analysis has established a robust reputation as a key player in Malaysia's construction and infrastructure sectors. The organization has consistently demonstrated its capability in executing projects punctually and adhering to the highest quality benchmarks, particularly focusing on infrastructure development, construction initiatives, and public amenities. The company, as a CIDB G7 contractor, holds the pinnacle of certification within the construction industry.

This G7 classification granted by the Construction Industry Development Board (CIDB) Malaysia permits contractors to bid on projects of limitless value, signifying substantial financial capability, technical proficiency, and a demonstrated history of performance. G7 contractors are authorized to execute projects over RM10 million, with no maximum limit on contract amount. This allows for the execution of comprehensive and significant projects that greatly enhance the nation's progress.

Although the construction sector plays a vital role in Malaysia's economic growth and strives for sustainable practices, the implementation of Green Supply Chain Management (GSCM) is still quite restricted. Despite the introduction of initiatives like Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST), the Green Building Index (GBI), and the Construction Industry Transformation Program (CITP) aimed at promoting green construction, the sector still encounters considerable challenges.

Organizations face challenges related to the elevated expenses of sustainable materials, a lack of awareness, and a deficiency in knowledge regarding environmentally friendly practices (Soufi et. al, 2023; Wong, Wah & Wong, 2023). Weak policy enforcement, minimal government incentives, and fragmented collaboration among stakeholders externally hinder the effective implementation of GSCM (Oyefusi, Enegbuma, & Brown, 2025; Ahmed et. al, 2023). The presence of these obstacles plays a significant role in the ongoing environmental deterioration within the industry, characterized by elevated carbon emissions, substantial energy use, and increased waste production.

Given the organization’s prominent role in delivering large-scale construction and infrastructure projects in Malaysia, it serves as a representative case for examining the broader industry’s readiness to adopt sustainable practices. Investigating both internal and external barriers to Green Supply Chain Management (GSCM) within this organization provides valuable insight into the practical challenges faced by major players in the sector. By identifying and understanding these barriers, the study aims to highlight actionable strategies that can facilitate more effective integration of GSCM in Malaysia’s construction industry, particularly among top-tier contractors, where change can create wider systemic impact.

2. Literature Review

While the concept of Green Supply Chain Management (GSCM) has gained increasing attention globally, there remains a notable paucity of empirical studies examining its adoption within the Malaysian construction industry, particularly in the post-pandemic context. Most existing research (Kazemi et al., 2023; Chen, Feng, & de Soto, 2022; Shekarian et. al, 2022; Lima et al., 2021) in the field has primarily focused on general sustainable construction practices, environmental performance metrics, and green building technologies, with limited emphasis on the comprehensive integration of GSCM principles.

Green Supply Chain Management Adoption

Few studies (Khayyat et. al, 2024; Kazemi, 2023; Feng, Lai & Zhu, 2022; Hebaz & Oulfarsi, 2021; Badi & Murtagh, 2019) have systematically explored the internal and external barriers that hinder GSCM adoption, such as organizational readiness, cost constraints, regulatory support, and stakeholder collaboration. However, most existing studies are either focused on developed economies or examine GSCM adoption at an industry-wide level, with limited attention given to in-depth analysis at the organizational level within developing countries like Malaysia.

This gap is especially critical given the heightened urgency for sustainable development in the aftermath of COVID-19, which has disrupted supply chains and amplified environmental concerns. As a result, there is a pressing need for research that investigates the specific challenges and drivers influencing GSCM implementation in Malaysia's construction sector to inform more effective policy and industry responses.

Green Supply Chain Management (GSCM) is referring as the incorporation of environmental consideration into supply chain management thru both upstream and downstream activities, comprises of product design, material acquisition, production, logistic, and end-of-life management (Feng, Lai & Zhu, 2022; Zhu et al., 2011; Badi & Murtagh, 2019; Shipeng, 2011). This methodology guarantees diminished waste, optimized resource utilization, and a lowered carbon footprint by evaluating environmental effects at each phase. Successful green construction initiatives necessitate coordination among stakeholders to implement sustainable practices from design up to end-of-life management (Badi & Murtagh, 2019).

Organizations implement GSCM strategies to reduce the ecological impact of their activities, acknowledging that sustainable practices are crucial at all phases of the production and supply chain (Balasubramanian & Shukla, 2017; Rostamzadeh et al., 2015). This methodology is essential, as environmental effects may arise at any stage of the production process (Badi & Murtagh, 2019).

According to previous research, GSCM techniques in the construction sector can be classified as green design, procurement, transportation, construction, and management of end of life (Debnath et. Al, 2023; Badi & Murtagh, 2019; Balasubramanian & Shukla, 2017). Additional classifications encompass green procurement, awareness of the environment, conservation of energy and water, and encouragement of sustainable practices (Ali et al., 2019). Green design encompasses strategies for reducing the environmental impacts of a service or product across its entire lifecycle (Debnath et. Al, 2023; Rostamzadeh et al., 2015).

The implementation of Green Supply Chain Management (GSCM) practices in the construction industry has been a subject of increasing interest all over the world. This could be attributed to a wider recognition of the environmental impacts that are associated with construction activities, as well as the potential for GSCM to mitigate these impacts. An examination of research from a variety of nations illustrates not only the global reach of GSCM techniques but also the specific problems and opportunities that are found in many locations, including Malaysia.

According to The UAE Sustainability Report 2023, as of Q3 2023, the average occupancy rate of LEED-certified assets was 95.9%, up from 85.1% in Q3 2022. Compared to the previous year, the occupancy rate of non-LEED-certified developments increased to 89.5% during this time. LEED-certified properties have consistently outperformed non-LEED-certified properties in terms of rental prices, partly because of the increased demand but also because of the superior quality of these properties.

The adoption of GSCM practices in developing countries has significant challenges, such as the high costs of sustainable products, inadequate awareness, and limited governmental incentives (Debnath et. Al, 2023; Badi & Murtagh, 2019; Balasubramanian & Shukla, 2017; Pinto & Allui, 2016). Nevertheless, opportunities exist, including potential cost reductions through resource efficiency, improved brand recognition, and compliance with international standards (Hoang and Jones, 2012). Studies by Ojo et al. (2014) and Mathiyazhagan et al. (2013) highlight the imperative for improved regulatory frameworks and stakeholder collaboration to tackle these issues.

Despite the geographical and economic differences among countries, the global trend indicates a growing acknowledgment of the importance of integrating environmental considerations into supply chain management in the construction industry. This convergence suggests a promising future for GSCM practices worldwide, albeit one that requires overcoming significant barriers, particularly in emerging economies like Malaysia.

The transition from conventional Supply Chain Management (SCM) to Green Supply Chain Management (GSCM) in the construction sector marks an important step towards embracing sustainability and responsibility for environmental concepts. This transition marks a departure from conventional practices, underlining the construction sector's growing commitment to reducing its ecological footprint and addressing the urgent need for sustainable development.

Barriers to Adopting GSCM

Various studies have explored internal and external barriers to adopting Green Supply Chain Management across different industries—such as manufacturing and logistics—highlighting challenges like high implementation costs, lack of expertise, and regulatory constraints, yet there remains a need for further investigation within underrepresented sectors, particularly the construction industry. Internal barriers are obstacles that arise within the organization and depend on the management's decisions. External barriers are the obstacles originating from the outside of the organization that may require collaboration with external stakeholders to surmount (Debnath et. Al, 2023; Badi & Murtagh, 2019; De Sousa Jabbour, 2015)

Internal Barriers

The substantial implementation cost. For every stakeholder, additional expenses related to using green practices create major difficulties. It was also considered in the research of the application of green practices in the building sector and other sectors (Debnath et. Al, 2023; Badi & Murtagh, 2019; Cao and Zhang, 2011). According to Debnath et al (2023), the high cost of GSCM implementation and its processes, which include product design, material sourcing and selection, production, delivery to end-users, and post-consumer recycling which serve as obstacles that deter organizations from adopting GSCM. Debnath et. al (2023) and Abbasi & Nilsson (2012) added that the challenge of balancing the reduction of environmental impact with the increasing financial cost associated with the organizations' activities.

Insufficient Knowledge and Awareness. Previous research on green construction methods shows that insufficient information and awareness of using green practices and their advantages constitute a major obstacle that prevents the organization from implementing these practices (Wibowo, Handayani, & Mustikasari, 2018; Sourani & Sohail, 2011; Cao and Zhang, 2011). According to Badi & Murtagh (2019), insufficient research on the indoor air quality of environmentally friendly constructions could be the reason for insufficient awareness. The lack of knowledge in understanding the successful implementation of GSCM makes it challenging to engage with the unknown becomes challenging and complex (Balasubramanian, 2012). Ojo et al. (2014) mentioned that insufficient knowledge and expertise as the primary obstacles to GSCM implementation in the Nigerian construction industry and emphasized the necessity for awareness and outreach initiatives for all respective stakeholders in the construction industry.

Lack of Top Management Support: Wibowo, Handayani & Mustikasari (2018) and Balasubramanian (2012) noted that the absence of senior management commitment to engage GSCM is a significant impediment, given its substantial driving power and the capacity to enforce compliance. Alongside its obligations to promote and empower people, enhance their involvement, and bolster devotion, this can be accomplished through employee motivation, training, and retraining, and effective communication across all organizational levels.

Lack of Resources: Technical barriers such as scarcity of eco-friendly construction materials, insufficient technical expertise, as well as shortages of skilled workers, significantly hinder the effective implementation of the sustainable construction principles (Balasubramanian, 2012; Enshassi & Mayer, 2005). In addition, the initial investment required for green techniques is costly as well (Luthra et. al, 2016).

External Barriers

Shortage of Green Suppliers: Organizations use green resources offered by suppliers to execute green initiatives. Organizations struggle to implement green practices in their supply chain when the materials are inaccessible through a standardized supply and delivery network. Partnership with suppliers who offer delivery guarantees, flexible payment terms, and fair costs is predicted to boost green practices according to (Shi et al, 2013).

Government Regulation and Support: The government can function as either driver as well as barrier as government is responsible for developing environmental regulations for construction industry and if regulations are absent, companies will not be obliged to engage in green practices, just as are lacking government support system remains the most prevailing barrier to GSCM practices in construction firms (Balasubramanian, 2012; Elbarkouky, & Abdelazeem, 2013). Another researcher, Sheu and Chen (2012), suggested that while governments play an important role in boosting GSCM adoption, the lack of proactive measures such as tax breaks or green subsidies can hinder progress. Feng, Lai & Zhu (2022) added that the importance of successful government engagement in creating environmental regulations and encouraging cross-industry collaboration to support GSCM.

Lack of Public Awareness: Many stakeholders and consumers are not aware of the benefits of sustainable construction practices for the environment, which limits the pressure of the markets on the organizations to adopt GSCM. It is difficult for organizations to justify the higher costs associated with practices due to a lack of awareness, as demand for environmentally friendly construction still remains low (according to Amade et al., 2020; UJContent, 2022).

Additionally, Dubey et al. (2015) stated that the associated organization will be required to implement GSCM due to the pressure from stakeholders in the supply chain, particularly when those involved in the supply chain are their upstream stakeholders, who are ultimately responsible for paying for their service and product. It is clear from the previous statement how the upstream stakeholder has a greater degree of impact on determining the adoption of GSCM for the entire supply chain system. This occurrence becomes even more important when the developer demands that all downstream stakeholders adhere to environmentally friendly practices in order to make sure that their building is acknowledged as a green building, thereby attracting prospective clients who are concerned about environmental issues. Nevertheless, the effectiveness of GSCM will be determined by the openness of downstream stakeholders to work together and work with upstream parties (Balasubramanian, 2020).

The available literature provides valuable insights but tends to offer generic findings and broad solutions regarding the adoption of Green Supply Chain Management (GSCM), often lacking specificity when applied to particular industries such as construction. This study aims to investigate and provide a focused explanation of the internal and external barriers that hinder GSCM adoption, including organizational limitations, cost challenges, regulatory gaps, and stakeholder resistance. By identifying these influencing barriers, the study seeks to offer a broader understanding to enhance the adoption of green practices. The outcomes are expected to contribute both to the academic understanding of GSCM implementation and practical improvements within supply chain strategies, particularly in the context of the construction industry.

3. Research Methodology

This study utilizes a qualitative methodology, which is suitable for acquiring an understanding of their point of view of stakeholders involved in GSCM in Malaysia. Qualitative research facilitates a comprehensive understanding of stakeholders' relationships and the other particular issues they face. This approach is selected for its usefulness in research that needs the examination of complicated and diverse issues, such as the implementation of sustainable adoption in extremely dispersed as in the construction industry.

Semi-structured Interviews

Semi-structured interviews were conducted with industry players, encompassing government officers, contractors, and consultants who are involved in the industry. The interviews are important in obtaining firsthand information and knowledge from pivotal stakeholders involved in the construction industry, whereas document research will facilitate the mapping of policies, reports, as well as industry standards. In previous research, Ahmed et al. (2020) have quoted those qualitative methods, such as interviews and document analysis, yield comprehensive insights into the barriers and drivers of GSCM implementation.

Purposive sampling was utilized in choosing individuals who are engaged in the construction industry. This approach assures that the data obtained originated from stakeholders processing important information and perspectives. The sample consisted of:

- Project Managers, Technical Managers, and Project Engineers are integral to the daily operations and decision-making processes concerning project execution, particularly in the implementation of sustainable practices (Darko et al., 2017).
- Technical and Contract Managers: These individuals offer strategic oversight and are accountable for assuring adherence to governmental legislation and business policy concerning sustainability (Lam et al., 2019).
- Government Officials Specializing in Construction Research and Development: Their participation will yield insights into the regulatory environment, governmental initiatives, and policies that advocate for GSCM in the construction sector (Hoang & Jones, 2022).

Semi-structured interviews were performed with industry stakeholders, including government officials, contractors, and consultants engaged in the sector. This method provides flexibility in questions while ensuring that fundamental enquiries are consistently addressed in each session. The enquiries focused on stakeholders' experiences with GSCM, their views on governmental actions, the roles of different stakeholders, and the internal and external obstacles they face in implementing GSCM. The principal criterion for selecting an individual for participation is their capacity to represent stakeholder groups within the Malaysian construction sector.

The interview guide included open-ended questions aimed at examining several facets of GSCM, such as:

"Have there been any governmental initiatives to support GSCM in our construction?" In what manner?
“What regulations and policies exist to encourage sustainable construction practices in Malaysia?“
“What are the internal and external barriers to the adoption of Green Supply Chain Management in the Malaysian construction industry?”

Interviews were conducted in person or over the phone, depending on the participants' preferences and availability. Each interview lasted approximately 30 minutes and was recorded with participants' consent to ensure accuracy in data collection. The semi-structured format enabled the researcher to explore in-depth the experiences, attitudes, and strategies of construction professionals regarding GSCM adoption (Rubin & Rubin, 2012). A unique code was assigned to each of the respondents to ensure the individuals and organizations remain anonymous during this study, and this was agreed upon when conducting each of the interviews.

The chosen participants must possess the necessary knowledge and qualifications to represent the specific stakeholder group (Costello & Osborne, 2005; Patton, 2002; Miles & Huberman, 1994). This aimed to guarantee that respondents could assist with tackling the research topics (Gubrium et al. 2012).

Below was the brief profile of respondents involved in this study (Refer to Table 1).

Table 1: **List of Research Participants**

Code	Level	Department	Stakeholder Category
R#1	Executive	Instrument & Control	Client
R#2	Executive	QAQC & Project Planning	Contractor
R#3	General Manager	Operation	Contractor
R#4	Executive	Contract	Contractor
R#5	Executive	Occupational Health & Safety, Environmental	Client
R#6	Senior Executive	Contract	Contractor
R#7	Executive	QAQC	Client
R#8	Senior Manager	Project Management	Contractor
R#9	Senior Executive	Occupational Health & Safety, Environmental	Consultant
R#10	Director	Technical and Project Management	Contractor
R#11	Director	Project Management, Contract & Commercial	Contractor
R#12	Senior Executive	CREAM CIDB	Government Officer

This study encompasses several stakeholder groups; hence, the analysis concentrated on each group's viewpoint regarding the general landscape of GSCM in the construction industry. The data collected from each stakeholder group was aggregated and analyzed collectively, then arranged by the emergent themes. Twelve interviews were conducted, and all interview files were transcribed using the TurboScibe.ai software.

The data obtained from the interviews underwent thematic analysis, following Braun and Clarke's (2023) six-phase approach: (1) familiarization with the data, (2) generation of initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. A total of 25 initial codes were generated during the coding process. These were then grouped and refined through multiple rounds of analysis, resulting in 12 preliminary themes. After further consolidation and validation, 8 final themes were identified, which formed the basis for interpreting the findings (Refer to Table 2).

The data obtained from the interviews undergo thematic analysis, a technique employed to find, categorize, and present patterns or themes within qualitative data.

Table 2: Derivation of Themes and Codes

CATEGORY	THEMES	CODES
Internal Barriers	Cost Constraints	Cost constraints for the initial cost High cost
	Lack of Awareness	Awareness level GSCM adoption is new to industry players
	Lack of Education and Training	Lack of knowledge & expertise Training & skills development
	Operational Stage	Challenges in operations Department/unit approval and endorsement
External Barriers	Limited Availability of Green Material	Limited availability and few suppliers Price of green materials Limited resources Selection of sustainable material Commitment
	Lack of Coordination	Fragmented supply chain Bureaucracy and red tape
	Limited Market Demand	Acceptance and perception of the client

	Location
	No proper monitoring & standards
	Not many industry players are interested.
	Regulatory & policy barrier
Lack of Government Support and Engagement	Regulatory & policy gap
	Lack of incentive from the government
	Lack of push factor between industry & government
	Inconsistent in environmental regulation
	Lack of knowledge and understanding

The interview was performed with representatives of stakeholder groups in the Malaysian construction sector to gather extensive qualitative data for this research. The data obtained from the interviews provides basic insight into their perspectives on internal and external hurdles to GSCM adoption.

4. Results

This section captures findings on numerous internal and external constraints that influence the implementation of GSCM techniques within the construction sector, as well as strategies for overcoming these challenges from the perspective of the research participants.

Internal Barriers

The study identified financial constraints as an internal barrier to the implementation of Green Supply Chain Management (GSCM). Participants indicated that the **initial costs** of green materials and technologies associated with sustainable practices exceed those of conventional alternatives, leading many contractors to opt for traditional, less expensive materials instead of adopting innovative technologies. R#2, R#3, and R#4, all from the Contractor group, in tandem, stated that constrained financial resources may hinder organizations' capacity to invest in green technologies.

Another response pertained to the technology introduced by the government, known as the Industrial Building System (IBS), echoed by participant R#7. From the perspective of the Client group, he stated that *"Construction costs are higher than conventional systems due to components being manufactured in the factory."* All this feedback pertained to the costs incurred by the organization.

The second internal barrier pointed out is a **lack of awareness** among industry participants. Feedback suggests that the adoption of GSCM is still developing, and inadequate efforts have been undertaken to encourage and improve understanding of its advantages and methodologies.

"The GSCM adoption is new to Industry Player. Not enough awareness and promotion.". R#3

Moreover, there exists resistance to change, as numerous stakeholders favour conventional techniques over sustainable alternatives, hence limiting the extensive implementation of Green Supply Chain Management (GSCM). R#11 stated that *"Key challenges include lack of awareness, resistance to traditional practices, and high capital costs for sustainable materials and technologies."* Another participant, R#9 (Consultant Group) highlighted that "*One barrier of the GSCM adoption in the construction industry is market demand for green buildings remains comparatively low due to a lack of awareness and prioritize the cost saving over sustainability*," which constrains the motivation for developers to invest in GSCM unless pressured by clients or regulatory authorities.

In addition to the internal barrier, three participants shared the same point of view about the **lack of knowledge and expertise** among industry participants as a substantial internal barrier. The most recent adoption of GSCM has resulted in inadequate promotion and awareness, prompting resistance to transition from conventional methods. A shortage of experts in GSCM contributes to the ineffective transfer of knowledge to the sector, hence impeding the advancement of GSCM processes.

Based on participant feedback, one of the barriers to implementing in the Malaysian construction industry is

the **operational disruption** caused by introducing green practices. It was shared by one of the participants, R#11. He added that:

"... introducing green practices may cause disruptions to the company's existing workflows and operations. To adjust to new systems may reduce efficiency in the short term, which can create internal resistance from management and workers concerned with meeting deadlines or maintaining profitability".

Additionally, almost all participants from the Client and Contractor groups suggested that the incompatibility of existing technology used with green materials or sustainability-focused methods may also cause technical hurdles, which are unfavourable to the companies to invest in a new system."

Table 3 below represents a summary of the internal barriers to GSCM implementation.

Table 3: Summary of Internal Barriers

Internal Barriers	Description
High Initial Costs	The adoption of green materials and technologies is hindered by their higher costs compared to conventional alternatives. Furthermore, investment is further impeded by inadequate financial resources.
Lack of Awareness and Promotion	Inadequate propagation and awareness of the advantages and methodologies of GSCM. The demand for green buildings is minimal, as stakeholders prefer conventional practices due to cost concerns.
Shortage of Knowledge and Expertise	The industry's capacity to comprehend and implement sustainable practices is restricted by a dearth of GSCM experts, which leads to ineffective knowledge transmission.
Operational Disruptions	The efficiency of extant workflows may be reduced by green practices, which may disrupt them. Technical obstacles are also generated by the incompatibility of current technologies with sustainable methods.

External Barriers

Participants identified problems concerning **the accessibility of sustainable resources and market demand**. A participant, R#3 (Contractor Group), stated that "*the accessibility of local green materials remains constrained, necessitating reliance on imported products by many companies, thereby elevating costs.*" Another participant from the same group, R#11, added that:

"The government is only implementing heavy taxes for importing materials, but the equivalent ***material is not available locally.*** *For example, the government recently implemented the Anti-dumping tax (20-30%) for some materials, such as stainless-steel steel, but Malaysia did not produce the same material! How would the construction companies take the initiative in implementing GSCM?"*

All participants from the Contractor group shared that a **lack of coordination** due to a fragmented supply chain could be one of the external barriers that hinder GSCM implementation in the construction industry. This is clearly stated by R#8:

"It's hard to implement green business practices successfully because small, medium, and large businesses fail to cooperate. This makes it tougher for people to work together and agree on environmental goals, which makes it harder to implement GSCM throughout the supply chain."

Limited market demand due to not fully understanding the benefits of GSCM, shared by one of the participants. R#12, representing the Government Officer group, claimed that limited market demands due to a lack of awareness and prioritizing cost saving over sustainability, causing low market demand to invest in green practices. His view is also shared by another participant (R#9) noted, *"Not many industry players are interested in adopting green practices."*

Participants highlighted that **regulations and policies could prevent** the adoption of sustainable practices. *"Inconsistent or stringent regulations regarding environmental standards could hinder the progress of emphasizing GSCM in the construction industry,"* noted one participant (R#1). While R#5 representing the Client group quoted that *"No strict laws enforcing the sustainable requirements in every construction project".* He reiterated that this is one of the main reasons why green initiatives are taking more time to catch on. Similarly, R#3 brought out the regulatory and policy gap, which also creates uncertainty that may prevent the implementation of GSCM.

Further feedback also suggested that while some of the suppliers in Malaysia are shifting to eco-friendly and greener products to improve their Environmental Sustainability and Governance (ESG) performance, the **lack of incentives from the government** has left the industry with low motivation. One participant. R#7 quoted that:

"… the lack of regulatory standards, punitive measures, or effective incentives limits the widespread adoption".

Participants also expressed worry about the lack of 'push factors' from the government as well as the industry, which also resulted in a low level of GSCM adoption. Another participant, R#3, agreed and stated that *"inconsistency in environmental regulations and practices can create confusion, and it prevents consistent GSCM practices in the Malaysian construction industry."* Table 4 below represents a summary of the external barriers to GSCM implementation.

Table 4: Summary of External Barriers

External Barriers	Description
Accessibility of Sustainable Resources	Reliance on expensive imported products is further restricted by tariffs, such as the Anti-dumping tax on stainless steel, due to the limited availability of local green materials.
Lack of Coordination	The absence of coordination and cooperation among small, medium, and large businesses complicates the implementation of GSCM throughout the entire supply chain.
Limited Market Demand	A lack of awareness and a tendency for cost-savings over sustainability are the primary factors contributing to the low demand for sustainable practices, which in turn diminishes interest in green practices.
Regulatory and Policy Challenges	The construction industry's adoption of GSCM is impeded by a lack of strict enforcement and inconsistent or stringent regulations, which create uncertainty.
Lack of Government Incentives	The motivation of companies to adopt eco-friendly materials and green practices is restricted by the absence of effective government incentives, standards, and punitive measures.

Discussion

From the study, researchers found that there were several barriers that affect the implication of GSCM adoption in the Malaysian construction industry and which can be categorized into internal and external barriers. Those barriers have been proven by authors in their previous research.

Internal Barriers

Initial Cost of Green Materials and Technologies

Any additional expenses related to green practices may create major difficulties. The issue of high initial cost has always been the issue of green practices adoption (Hoang & Jones, 2022; Wibowo, Handayani & Mustikasari, 2018; Lindermann et al., 2012). To adopt environmentally friendly practices within the organization, it makes sense to acquire new machinery and equipment. Hence, it requires several training courses before the usage of new machinery and equipment, where all the new training may cover respective employees within the organization to embrace and understand the concepts, procedures, and challenges of GSCM before commencing the practice. The financial burden on the organization will certainly increase the cost of training and the time that has been spent on the training.

According to Sandanayake (2022) and Baumers et al. (2016), the cost of new machinery and equipment will be influenced by their productivity, as a decline in productivity will decrease the organization's profit. This led to increased operation costs for an organization that are beyond the reach of the majority of small and medium-sized companies, which generate only just enough revenue to remain in the industry.

Lack of Awareness Among Industry Participants

From this study, participants' common feedback about GSCM adoption was a lack of awareness among industry participants. Balasubramanian (2012) quoted that a lack of knowledge in understanding the success of GSCM adoption makes it difficult to engage with the unknown becomes complex and challenging. These study findings also support the study conducted by Wong, Wah & Wong (2023). Insufficient information and awareness regarding the benefits of green practices can hinder the organization's adoption of this practice, as mentioned by previous studies (Wibowo, Handayani & Mustikasari, 2018; Sourani & Sohail, 2011).

This finding is also supported by Debnath et. al (2023) and Shurrab et al. (2019), which GSCM will be intensified by the organization's lack of knowledge and experience in green practices, as they are unsure of the steps necessary to be considered environmentally friendly or how to initiate green practices. In addition, people who are unaware of the existence of green practices when their level of knowledge is low which results in the organization's incompetence in the green practices area. Similarly to Gu et al. (2023) and Hoang & Jones (2022), this will maintain the traditional approach to the construction industry, preventing the development of innovation, breakthroughs, or quantum leaps that would enable the industry to achieve a more sustainable future.

Lack of Knowledge and Expertise

Currently, Malaysia is deficient in green professionals who can oversee and facilitate the implementation of green practices in the construction industry. However, the government has tried to train more professionals by conducting MyCrest and GBI through CIDB. Low awareness of green practices among construction industry stakeholders will result from a lack of collaboration and cooperation in the adoption of green practices. This is due to the reduced number of green professionals as highlighted by Wong, Wah & Wong (2023). Additionally, the organization will be obstructed from adopting green practices due to the difficulty in locating available green expertise, as they are unable to initiate the process without the advice of a professional or consultant. Ultimately, this will hinder the advancement of the green trend in the Malaysian construction industry. (CIDB HQ; Green Building Index; Law Partnership)

Operational Disruption

Based on the study findings, the participants believe that implementing GSCM in existing practice may cause operational disturbance. This is due to the difficulty in sourcing supplies and balancing costs. This is in line with previous studies such as Charef, Morel, and Rakhshan (2021) and Mojumder & Singh (2021). Traditional vendors who do not satisfy green standards may cause delays and budgetary pressure, potentially bleeding the procurement process. As a result, incorporating these new practices necessitates collaboration across all project stages, which may increase complexity, as stated by Mubarik et al. (2023). The selection of the correct partners was a substantial disruption to the operation because of the endeavor to align with the green requirement as one of the factors for partner selection. Reshaping the supply chain network may generate additional uncertainty at the operational level, requiring the business to navigate a new regulatory context (Hoang & Jones, 2022; Wu & Barnes, 2016).

Finally, delays are common because of integrating GSCM with the project's existing timeline. The complexity of the green supply chain, particularly the procurement and logistics of resources, always causes delays in project delivery. Furthermore, traditional construction enterprises may fight all these changes due to long-standing habits Khayyat, Balfaqih, Balfaqih, & Ismail, 2024; Agyekum-Mensah and Knight, 2017).

External Barriers

Lack of Incentives from the Government

The government plays a crucial role in ensuring the success of GSCM adoption in the construction industry. Participants in this study shared their perspectives on Malaysian government incentives or programs to encourage more green activities. Previous studies (Zaman, Ali, & Khan, 2024; Govindan et al., 2014) cited a lack

of government incentives as one of the challenges to GSCM deployment. The point was that, while some businesses are prepared to invest in sustainability, the financial burden that they confront, particularly small and medium-sized businesses, might be overwhelming, especially without government backing. This may explain why most businesses favor traditional methods, which are less expensive in the short term but detrimental to the environment (Govindan et al., 2014; Eltayeb et al., 2011).

Studies conducted by Hoang & Jones (2022) and Laari et al. (2018) found that a relationship between government and industry players, as well as government policies, is required to ensure successful GSCM adoption. Larger organizations may have greater resources and are more likely to pursue green initiatives, whereas small businesses are frequently left behind due to a lack of financial incentives and government assistance. Many businesses were unwilling to prioritize green efforts over more immediate financial concerns due to an unclear structure or government assistance.

Lack of Coordination Among Players

Lack of coordination among multiple players in the construction sector could hinder the adoption of GSCM, where good communication, clarity of role, and better integration of GSCM are critical in determining the successful implementation of GSCM, and it was supported by a few researchers.

Xin (2024) and Shi et al. (2013) used the example of the Chinese construction sector, where the absence of clear roles and communication channels between diverse participants, such as suppliers and contractors, made it difficult to effectively execute green procurement. This difficulty arose because of unfamiliarity with green procedures and technology, which caused all relevant parties to work at cross purposes.

Another researcher, Govindan et al. (2014), made a similar point, stating that a lack of communication among contractors, planners, and designers can lead to inefficiencies. The requirement for clear communication and integrated strategies makes it challenging to align all stakeholders who share the same aims, which are to achieve green objectives, particularly during the green design and procurement process. Misalignment may also result in project delays and cost increases over the intended budget. Similarly, implementing GSCM may disrupt traditional supply chains, particularly logistics and procurement, where the interaction between contractors and subcontractors is already complex. Delays and risks to satisfying environmental standards may arise if a clear and effective communication channel is not established (Cahyadi et. al, 2023; Mubarik et al., 2023).

Accessibility of Sustainable Resources (Shortage of Green Supplies)

From the participants' point of view, they agreed that the scarcity of green products in our market may serve as one of the external barriers that difficult for their organization to use sustainable resources. Ahmed et al. (2020) quoted that the availability of green materials in the construction industry itself acts as a barrier to GSCM adoption. In the construction industry, there exists a restricted range of products that fulfill environmental standards (Balasubramanian, 2020). This finding supports the previous studies (Shi et al., 2013), where partnership with suppliers who offer delivery, fair costs, and flexible payment terms may boost green practices.

According to Balasubramanian (2020), in the absence of suppliers of green products and materials, potential practitioners will be reluctant to engage in green commerce because obtaining the necessary materials and services will be more difficult and expensive, which will eventually lower the building's quality.

Moreover, according to Mubarik et al. (2023) and Shi et al. (2013), a construction stakeholder finds it difficult to decide whether to work with an existing supplier who does not offer green technology in their services and goods or look for a new supplier who does. This is because there are a lot of unknowns with new suppliers, which makes practitioners hesitant to select one over the other. However, this problem may be readily resolved, and green practices will become standard procedure in the construction sector if an increasing number of suppliers offer green technology in their services and goods.

Limited Market Demand (Lack of Public Awareness)

Awareness about the benefits of sustainable construction practices for the environment among stakeholders

and consumers may limit the pressure of the market demand in the adoption of GSCM in organizations. Organizations have difficulty justifying the increased expenses related to environmentally friendly construction techniques due to a lack of awareness, as the demand for such construction remains low (Amade, 2020; UJContent, 2022).

It is important for an organization to take this factor into account, as the demands of customers in their end products and services influence the upstream stakeholders. In the present day, consumers have begun to express concern regarding environmental issues and are optimistic that they can contribute to the green aspects through their capacity (Badi & Murtagh, 2019). Therefore, they will refrain from selecting products and services that are not environmentally favorable and will favor organizations that incorporate green concepts into their operations, production, and provision. To draw in these potential customers, the organization must adopt green practices, such as GSCM, to enhance customer satisfaction. This will ultimately end up in customers selecting the organization and achieving a higher profit in their final year of operation (Balasubramian, 2020).

Regulatory and Policy Enforcement (Lack of Regulation and Support)

From the study, among all external barriers, most participants agreed that without regulatory and policy enforcement, the adoption of sustainable practices. It matched with previous studies (Ahmed, Sayed, Asran, & Nosier, 2023; Balasubramanian, 2012; Elbarkouky & Abdelazeem, 2013) where companies will not be obliged to engage in green practices if there is are lack of government support in terms of regulation enforcement. Mubarik et al. (2023) and Khidir et al (2009) also supported that institutional support for the principles of environmental management is limited. It is supported by Hsu et al. (2013), where the implementation of governmental legislation regarding sustainable practices will make certain that a large number of organizations adhere to and meet the minimum standards established by the authorities. Furthermore, there are not enough governmental initiatives concerning legislation and regulation related to environmental practices, as mentioned by Debnath et al. (2023) and Mathiyazhagan et al. (2013).

For example, in Malaysia construction industry CIDB regulates construction projects, and they function to oversee, direct, and evaluate the construction activities on site. CIDB regulates construction companies, construction projects, and activities in Malaysia. Companies that fail to comply with the minimal requirements will face penalties, including fines, work stop orders until the issues are resolved, and the inability to renew their company's construction license, known as *Sijil Perakuan Pendaftaran Kontraktor (SPK).* In order to mitigate these issues, the majority of construction companies choose to fulfill the requirements, including adherence to the environmental standards for materials and technologies established by the government (Hoang & Jones, 2022**;** Shi et al., 2013).

5. Managerial Implications and Recommendations

This study only provides a baseline understanding of GSCM adoption in the Malaysian Construction Industry. The results and conclusions of this study may offer guidance and opportunity for further research in the subsequent areas:

- Although researchers have identified external and internal barriers faced by various stakeholders in adopting and achieving GSCM in the construction industry, further studies can be initiated to investigate factors that are crucial to the successful implementation of GSCM.
- An additional study using a quantitative survey that involves more participants from various stakeholders can be carried out for future studies to obtain more information on their views in regards to GSCM adoption.

Conclusion

This study enhances the comprehension of various barriers, internal and external, that might hinder the successful adoption of green supply chain management in Malaysia, specifically in the context of the construction industry. The study identifies four internal barriers that organizations encounter: operational disruption, lack of awareness, lack of knowledge and expertise, and high initial costs. Conversely, the investigation identified five external obstacles: inadequate coordination, inadequate market demand, regulatory and policy obstacles, and inadequate government incentives.

In general, the results of this study make a valuable addition to the existing information about the current adoption of green supply chain management from the various stakeholder perspectives and are anticipated to be beneficial to our initiative to implement GSCM in the Malaysian construction industry.

This study holds significant importance as it has the potential to make substantial contributions to both the sustainability objectives of the construction sector and the academic field of supply chain management. Moreover, it plays a crucial role in promoting innovation, aiding Malaysia in achieving its long-term environmental goals, and providing a competitive edge for industry participants.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

5s Quality Management Practices with Sejahtera Ulul Albab of Micro, Small and Medium Enterprises in Malaysia

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Abstract: This study investigates the strategic embedding of 5S quality management practices within the *Sejahtera Ulul Albab* paradigm among Malaysian Micro, Small, and Medium Enterprises (MSMEs). Drawing on semi-structured interviews with 12 MSME managers across the food, halal services, and manufacturing sectors, the research reveals that while 5S—Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)—enhances operational discipline and lean outcomes, its integration with Islamic philosophical anchors such as *niyyah* (intention), *amanah* (trust), and *taqwa* (God-consciousness) repositions quality management as a spiritually driven endeavor. The findings demonstrate that ethical leadership, communal purpose, and spiritual accountability significantly amplify the effectiveness, consistency, and sustainability of 5S implementation. The study proposes a conceptual framework that reconceptualizes 5S as a multidimensional resource that fosters both strategic advantage and divine accountability within the *Tawhidic* worldview. This integrative approach advances theory by bridging operational efficiency with Islamic epistemology and offers practical guidance for value-driven business practices. However, the study is limited to a qualitative exploration within selected sectors. Thus, future research may adopt a mixed-methods design or cross-regional comparison to validate and extend the proposed framework's applicability and scalability.

Keywords: *5S, Sejahtera Ulul Albab, SMEs, Tawhidic paradigm, Islamic Strategic Management, Spirituality, Malaysia*

1. Introduction and Background

Micro, Small and Medium Enterprises (MMEs) represent a vital engine of economic growth, innovation, and inclusive development in emerging economies, particularly in Malaysia. According to SME Corporation Malaysia (2023), in 2023, Malaysian Micro, Small, and Medium Enterprises (MSMEs) demonstrated notable resilience, continuing to contribute significantly across key macroeconomic indicators despite a moderation in growth momentum. In terms of GDP, MSMEs recorded a contribution of RM613.1 billion, representing 39.1% of national output, an increase from RM584.1 billion (38.6%) in 2022. While the GDP growth rate slowed from 12.3% in 2022 to 5.0% in 2023, the increased share underscores the sector's structural strength and adaptability amid global uncertainties. Export performance also reflected this trend, with MSMEs generating RM152.2 billion in 2023—up from RM145.6 billion in the previous year, though growth decelerated from 17.2% to 4.5%. Despite the slower pace, the rise in export share from 10.6% to 12.2% suggests enhanced competitiveness and gradual integration into higher-value global supply chains. Employment figures further reinforce the sector's socio-economic importance, growing from 7.59 million workers in 2022 to 7.86 million in 2023, maintaining a stable and dominant share of 48.5% of total employment. However, productivity growth showed a concerning slowdown; while output per worker increased from RM76,919 to RM78,035, the growth rate declined sharply from 8.1% to just 1.5%, indicating possible stagnation in efficiency, innovation, or workforce capability. These trends highlight the urgent need for targeted policy support in areas such as technological upgrading, digital transformation, workforce upskilling, and export diversification to ensure the long-term sustainability and global competitiveness of Malaysia's MSME sector (Alam et al., 2024; Mohamed Senin et al., 2024; Pamungkas et al., 2024; Mahmud et al., 2025).

Yet, these enterprises continually face operational constraints such as resource scarcity, inefficiencies in workflow, human capital limitations, and intense global and regional competition (Pamungkas et al., 2024; Ramlawati et al., 2024; Mohan et al., 2025; Mahmud et al., 2025; Rahayu & Lusiana, 2025). In response, quality management practices have emerged as essential tools for improving organizational productivity, reducing waste, and enhancing competitiveness (Mohan et al., 2025; Mahmud et al., 2025; Rahayu & Lusiana, 2025).

Among these, the 5S methodology—Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)—has gained significant traction due to its simplicity, cost-effectiveness, and visual impact on work environments (Kumar et al., 2022; Satria et al., 2022; Akram et al., 2023; Helmold, 2023; Ohmori, 2024; Piwowar-Sulej & Iqbal, 2024; Waaje et al., 2025). Originating from Japanese lean manufacturing principles, 5S has been widely adopted by SMEs as a foundational quality improvement technique (Helmold, 2023; Ohmori, 2024; Natrus et al., 2025; Waaje et al., 2025). However, despite its widespread application, there is growing concern that its implementation is frequently superficial—reduced to a checklist exercise or cosmetic makeover—failing to internalize deeper behavioral change, organizational ethics, or long-term sustainability (Sharma, 2021; Oliveira et al., 2025; Mohan et al., 2025).

This study contends that conventional implementations of 5S in Malaysian SMEs are largely detached from the socio-cultural and spiritual contexts in which these enterprises operate (Xin et al., 2024; Risitano et al., 2025; Wang & Zhang, 2025). Prior empirical investigations have emphasized physical workplace organization and operational efficiency (Helmold, 2023; Ohmori, 2024; Piwowar-Sulej & Iqbal, 2024; Natrus et al., 2025; Waaje et al., 2025), but often overlook the epistemic, ethical, and communal dimensions that are integral to organizational behavior in Muslim-majority societies (Soetjipto et al., 2021; Martyn et al., 2025; Muttaqin & Birton, 2025). In particular, existing literature on lean systems and quality management rarely addresses how religious values, spiritual intentionality (niyyah), or moral accountability (amanah) inform and shape workplace routines (Ahmed et al., 2025; Milewska & Milewski, 2025; Nawanir & Moshood, 2025). This lack of contextualization reveals a critical gap: the failure to integrate values-based, spiritually grounded frameworks with technical quality tools in ways that speak to the lived experiences and normative frameworks of SME owners and workers in Malaysia (Faishal et al., 2025; Milewska & Milewski, 2025; Salam, 2025). Furthermore, current scholarship in strategic operations management has not sufficiently examined how such integration might yield not only productivity gains but also holistic organizational transformation in line with broader developmental aspirations such as Malaysia MADANI and Sejahtera sustainability (Abd Rahman et al., 2024; Lateh et al., 2024; Weng et al., 2025).

In addressing this gap, the present study introduces and applies the *Sejahtera Ulul Albab* paradigm (Sarif, 2015; Sarif, 2017; Sarif, 2018; Sarif, 2020; Sarif et al., 2022)—an Islamic epistemological framework grounded in the harmonization of spiritual, intellectual, emotional, and physical excellence (Razak, 2020; Sarif et al., 2022; Razak & Sanusi, 2023; Sanusi et al., 2023) to reconceptualize the practice and purpose of 5S within SMEs (Kumar et al., 2022; Akram et al., 2023; Helmold, 2023; Ohmori, 2024; Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025). Originating from Islamic education and now gaining currency in broader socio-economic discourses (Ahmed et al., 2025; Mahmud et al., 2025), *Sejahtera Ulul Albab* embodies the integration of taqwa (God-consciousness), ihsan (excellence with compassion), and fikr (critical reflection) as key enablers of purposeful and ethical living (Sarif, 2015; Sarif, 2017; Sarif, 2018; Sarif, 2020; Sarif et al., 2022). This paradigm offers more than a moral lens; it presents a comprehensive ontological and axiological foundation for business conduct, infusing day-to-day operations with higher objectives rooted in the maqasid al-shariah (higher intents of Islamic law), such as preserving faith, intellect, dignity, wealth, and community well-being (Ahmed et al., 2025; Mahmud et al., 2025; Ramlawati et al, 2024; Rahayu & Lusiana, 2025). When synergized with the structural discipline of 5S, this fusion holds the potential to transform quality management from a procedural protocol into a spiritual-ethical ecosystem, embedded in divine accountability, shared values, and long-term sustainability (Helmold, 2023; Ohmori, 2024; Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025).

The aim of this research is thus to explore the following: How do Malaysian SMEs interpret and practice 5S quality management? In what ways does the *Sejahtera Ulul Albab* paradigm influence or transform these practices? What themes emerge from SME managers regarding the interplay of productivity, ethics, and spirituality in their operational routines? By posing these research questions, this study investigates a domain that has been marginally theorized yet deeply relevant, especially in the context of SMEs navigating the post-pandemic recovery, climate-related sustainability pressures, and the digital-industrial transition (Helmold, 2023; Ohmori, 2024; Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025). The inquiry is underpinned by a qualitative methodology, employing semi-structured interviews with twelve SME founders and operational managers from the food processing, halal services, and light manufacturing sectors. The interpretive approach enables a nuanced understanding of the symbolic, ethical, and procedural meanings

attached to quality practices and how these meanings are mediated by the respondents' spiritual worldview and ethical commitments (Deschênes et al., 2024; Morgan, 2024; Tisdell et al., 2025).

The contribution of this study is threefold. First, it extends the theoretical frontier of quality management by bridging lean systems literature with Islamic management epistemology, thereby situating operational excellence within a morally grounded framework (Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025). Second, it offers empirical insights into how SMEs articulate and implement hybrid quality models that align business productivity with human-centric and divine-centric values (Ahmed et al., 2025; Mahmud et al., 2025; Ramlawati et al, 2024; Rahayu & Lusiana, 2025). Third, it provides policy and practice implications for SME development programs, Islamic entrepreneurship education, and halal ecosystem governance, particularly those seeking to foster sustainability through ethical and faith-informed mechanisms (Sarif, 2018; Sarif, 2020; Sarif et al., 2022; Ramlawati et al, 2024; Rahayu & Lusiana, 2025). In doing so, the study contributes to the broader discourse on strategic alignment between operational routines and institutional logics, reinforcing that competitive advantage in Muslim SMEs may not solely derive from market positioning or resource orchestration, but from the internalization of higher purposes, or what this study frames as *taqwa*-based dynamic capabilities (Sarif et al., 2022; Ramlawati et al, 2024; Rahayu & Lusiana, 2025).

Thus, this study investigates the strategic embedding of 5S quality management practices within the *Sejahtera Ulul Albab* paradigm among Malaysian Micro, Small, and Medium Enterprises (MSMEs). This research invites a paradigmatic rethinking of how operational tools like 5S can be reimagined beyond their industrial origins, toward a spiritually attuned, ethically embedded, and socially impactful practice of quality management (Sarif et al., 2022; Ramlawati et al, 2024; Rahayu & Lusiana, 2025). As global challenges call for businesses to act not only efficiently but also responsibly and meaningfully, the integration of 5S with *Sejahtera Ulul Albab* offers a promising pathway toward organizational resilience, stakeholder trust, and ummatic excellence (Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025).

2. Literature Review

This section contends that the strategic implementation of 5S, when interpreted through the lens of the *Sejahtera Ulul Albab* philosophy and anchored in *Tawhidic* epistemology, evolves from a conventional operational tool into a transcendental dynamic capability that supports sustainable competitive advantage (Sarif et al., 2022; Ramlawati et al, 2024; Rahayu & Lusiana, 2025). By embedding core Islamic values such as *taqwa* (God-consciousness), *ihsan* (excellence), and *mas'uliyyah* (accountability), 5S contributes not only to material efficiency but also to the cultivation of ethical governance, stakeholder trust, and institutional legitimacy, particularly within Muslim-majority and culturally pluralistic environments (Bagherian et al., 2024; Misztal & Ratajszczak, 2025; Oliveira et al., 2025).

The 5S methodology—Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)—is traditionally associated with Lean management practices aimed at streamlining workflows, eliminating waste, and improving workplace efficiency. Numerous studies have shown its benefits not only in reducing inefficiencies but also in enhancing employee ownership, discipline, and engagement (Bagherian et al., 2024; Misztal & Ratajszczak, 2025; Oliveira et al., 2025). However, when recontextualized within a *Tawhidic* epistemological framework and infused with core Islamic values—namely *taqwa* (God-consciousness), *ihsan* (excellence), and *mas'uliyya*h (accountability)—the implementation of 5S transcends its conventional operational utility. It becomes a spiritually guided practice that not only aims for material and process excellence but also cultivates ethical governance, builds stakeholder trust, and strengthens institutional legitimacy, especially within Muslim-majority and values-driven organizations.

This spiritually integrated approach to management aligns with Sarif's (2015, 2018, 2020) body of work, which emphasizes the *ta'awun* (collaborative synergy) principle as a foundation for sustainable development, social entrepreneurship, and resilient governance in the Muslim world. For instance, Sarif (2017) argued that integrating the *qalb* (heart) with a Tawhidic paradigm nurtures holistic well-being and purposeful innovation. Further, the *taqwa* approach serves not only to regulate individual behavior but also to sustain Islamic philanthropy and social businesses, strengthening community resilience and trust (Sarif, 2020). Thus, embedding Islamic values into 5S does not merely enhance workplace order; it anchors organizational

excellence in divine accountability, interpersonal cooperation, and moral integrity, ultimately leading to a spiritually and socially responsible workplace. This integration is further supported by Syed Ahmad, Abdul Sabian, and Che Nawi (2024), who found that spiritual values in the workplace significantly enhance employee motivation, ethical conduct, and overall performance. Such findings align with the Sejahtera Ulul Albab framework, which emphasizes spirituality, wisdom, and holistic excellence as foundational elements. When integrated with operational tools like 5S, these spiritual frameworks may enhance not only organizational cleanliness and efficiency but also cultivate a value-driven, ethical workplace culture. This reconceptualization challenges the prevailing materialistic orientation of Total Quality Management (TQM) literature and advances a spiritually anchored strategic logic in alignment with Malaysia's Madani aspirations for humane, inclusive, and purpose-driven organizational development.

Total Quality Management and Strategic Implementation of 5S

The foundational premise of 5S rests on lean thinking, continuous improvement, and operational discipline, forming a critical element of Total Quality Management (TQM). When implemented strategically, 5S not only streamlines workflows and reduces waste but also enhances employee ownership and engagement (Bagherian et al., 2024; Misztal & Ratajszczak, 2025; Oliveira et al., 2025). Empirical investigations show that 5S can drive measurable efficiency improvements, especially when coupled with digitalization, agile practices, and Industry 4.0 capabilities (Milewska & Milewski, 2025; Nawanir & Moshood, 2025). However, a significant limitation in the extant literature is the predominant focus on materialistic and performance metrics, while overlooking value-based frameworks that integrate ethical and spiritual considerations, especially relevant in Muslim-majority or culturally pluralistic environments. Recent contributions from scholars in Islamic management and Sejahtera-based leadership argue that sustainability should encompass moral accountability and collective well-being (Abd Rahman et al., 2024; Lateh et al., 2024). In this regard, prophetic leadership values—such as amanah (trust), ihsan (excellence), and rahmah (compassion)—should guide the TQM process (Abd Rahman et al., 2024), aligning with Malaysia's Madani vision for humane and inclusive development.

In contexts like halal-certified SMEs and Muslim entrepreneurs, integrating Lean Six Sigma with ethical and sustainability concerns has shown promising results (Faishal et al., 2025; Salam, 2025). These frameworks advocate for a holistic understanding of quality, not just in outcomes, but in intentions, processes, and relationships. As Weng et al. (2025) and Ahmed et al. (2025) emphasize, leadership, job satisfaction, and cultural congruence are critical mediators in successful TQM implementation. Furthermore, transformative educational approaches—such as learning-by-concordance—may provide new pathways to embed ethical discernment in managerial decisions (Deschênes et al., 2024).

Islamic Strategic Ethics and the *Sejahtera Ulul Albab* Lens

The *Sejahtera Ulul Albab* philosophy emanates from Islamic ontological assumptions that view humans as vicegerents (khalifah) entrusted with ethical governance (Sarif, 2017; Sarif, 2020; Ohmori, 2024; Ahmed et al., 2025; Mahmud et al., 2025; Milewska & Milewski, 2025). It accentuates values such as *taqwa* (God-consciousness), *hikmah* (wisdom), *ihsan* (excellence), and *mas'uliyyah* (accountability) (Sarif, 2015; Sarif, 2017; Sarif, 2018; Sarif, 2020; Sarif et al., 2022). These elements allow for a reinterpretation of 5S as both a tangible and transcendental asset in strategic management.

The *Sejahtera Ulul Albab* philosophy, rooted in *Tawhidic* epistemology and Islamic ontological assumptions, redefines the strategic purpose of organizations beyond profit maximization toward holistic human flourishing (falāh). It conceptualizes humans as vicegerents (khalifah) who are ethically mandated to uphold *amanah* (trust), *mas'uliyyah* (accountability), and *taqwa* (God-consciousness) in all domains of decision-making (Sarif, 2020; Razak, 2020). These values are not ancillary but foundational, constituting a meta-strategic compass that influences organizational identity, stakeholder relationships, and long-term resilience (Abd Rahman et al., 2024; Sanusi et al., 2023). Within this framework, the traditional 5S methodology—originally developed as a lean operations tool—is reinterpreted not only as a tangible resource for workplace efficiency but also as a transcendental strategic asset. When imbued with *hikmah* (wisdom) and *ihsan* (excellence), 5S moves from merely organizing space to cultivating spiritual discipline, communal order, and moral clarity (Sarif, 2018; Razak & Sanusi, 2023). Such integration bridges the operational and the ontological, enabling 5S to function as a dynamic capability that adapts internal routines to external moral expectations—a key condition for sustainable competitive advantage in rapidly changing environments (Teece, 2007; Barney, 1991).

Moreover, empirical studies among Muslim entrepreneurs and SMEs confirm that when strategic decisions are filtered through Islamic values—particularly *ta'awun* (cooperation), *rahmah* (compassion), and *hikmah* (wisdom)—there is a visible uplift in organizational cohesion, stakeholder trust, and innovation potential (Salam, 2025; Weng et al., 2025). These findings parallel and enrich the resource-based view (RBV) by introducing faith-driven intangible resources that are rare, valuable, and inimitable (Sarif, 2020). The Sejahtera leadership model (Sarif, 2020; Razak, 2020; Razak & Sanusi, 2023), in this regard, offers a vernacular strategic logic where ethical behavior, societal embeddedness, and ecological mindfulness are not trade-offs but synergistic reinforcements of long-term strategy.

In operationalizing this philosophy, Malaysia Madani serves as a living ecosystem that institutionalizes these values in policy and practice. The national call for MADANI values—sustainability (ke**M**ampanan), prosperity (kesej**A**hteraan), innovation (**D**aya cipta), respect (horm**A**t), trust (keyaki**N**an), and compassion & care (**I**hsan)—reflects a collective movement toward purpose-driven governance (Lateh et al., 2024). Within this milieu, the 5S–Sejahtera convergence is not only possible but necessary, offering a pathway to align internal capabilities with external legitimacy in Muslim-majority socio-economic contexts (Razak & Sanusi, 2023).

3. Research Methodology

This study utilized a qualitative, interpretivist approach to explore the infusion of Islamic values such as *taqwa* (God-consciousness), *ihsan* (excellence), and mas'uliyyah (accountability) into 5S quality management practices. The rationale for this methodological choice rests on the nature of the inquiry, which seeks to understand not merely technical implementation but meaning-making, spiritual resonance, and value-based organizational behavior. According to Tisdell et al (2025), the qualitative interpretivist paradigm is ideal when the researcher aims to investigate how individuals construct meaning within specific socio-cultural and spiritual contexts. In this study, participants' experiences with 5S are shaped not only by operational efficiency concerns but also by their ethical and religious consciousness, making the interpretivism methodologically sound.

Opponents of qualitative methods may raise concerns about subjectivity or lack of generalizability, especially in management studies traditionally dominated by positivist models. However, such critiques overlook the importance of context-bound knowledge, especially in Islamic epistemology. Sarif's (2015, 2018, 2020) work emphasizes that in Muslim societies, *ta'awun*-based collaboration and *taqwa*-rooted governance provide the ethical foundation for organizational resilience and sustainability, which are inherently non-quantifiable and relational. His exploration of *qalb*-centered reasoning (Sarif, 2017) reinforces the appropriateness of understanding organizational development through a spiritual and affective lens. Moreover, this study adopts triangulation and crystallization to enhance validity and reliability in interpretive inquiry (Morgan, 2024). These strategies allow researchers to synthesize multiple viewpoints and data sources, ensuring that the findings represent not just one narrative but a multifaceted portrayal of the ethical operationalization of 5S in Islamic contexts.

This methodological orientation is also a deliberate response to the technocratic limitations in mainstream quality management research. Studies such as Oliveira et al. (2025) and Bagherian et al. (2024) acknowledge that although lean and quality methodologies improve material outcomes, they often neglect the moral and societal implications. Similarly, Misztal and Ratajszczak (2025) argued that sustainable development in organizations requires integration of cultural and ethical lenses, not just procedural innovation. By grounding this study in the *Tawhidic* paradigm—as advocated by Sarif (2017)—and interpretivist methods, this study aims to reveal the deeper ethical, communal, and transcendental meanings of 5S. This approach captures how ta'awun, taqwa, and ihsan transform conventional management tools into vehicles of spiritual accountability, institutional trust, and ummatic well-being.

Twelve SME managers were selected using purposive sampling across Selangor, Kedah, and Pahang. Data collection involved semi-structured interviews conducted in Bahasa Malaysia and English, lasting 45–60 minutes each. Data were transcribed, coded, and analyzed using thematic analysis, with constructs derived from both quality management literature and Islamic value systems. Themes were mapped against constructs such as leadership ethics (amanah), employee empowerment (ihsan), spiritual consciousness (taqwa), and

community engagement (ukhuwwah).

The interpretive qualitative design adopted in this study provided deep insights into the lived experiences and values of MSME entrepreneurs. However, such an approach carries inherent limitations, particularly regarding generalizability to broader populations or different cultural contexts. The reliance on semi-structured interviews, while rich in narrative depth, may also be subject to respondent bias or selective recall. Although thematic analysis ensured systematic interpretation, the absence of other data sources, such as document analysis or direct observations, presents a constraint in terms of triangulation. This reflexivity is essential to position the findings as context-bound yet meaningful within the studied framework.

4. Findings and Analysis

This section presents the empirical findings derived from semi-structured interviews with twelve SME managers operating in food processing, halal services, and light manufacturing sectors across Selangor, Kedah, and Pahang. Thematic analysis generated five core themes:

- Transformational reframing of 5S,
- Integration of spiritual intentionality (Niyyah),
- *Taqwa*-inspired workplace ethics,
- Institutionalization of *amanah* (trust) and *ihsan* (excellence, compassion & care)
- Strategic synergy between operational excellence and *Sejahtera* sustainability.

These themes are discussed about the study's objectives and framed within the *Sejahtera Ulul Albab* paradigm and *Tawhidic* epistemology (Sarif, 2020; Sarif et al., 2022). The findings demonstrate that 5S practices—Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)—when embedded with spiritual intentionality (niyyah), *taqw*a (God-consciousness), and *mas'uliyyah* (accountability), contribute not only to material efficiency but to the cultivation of ethical governance, stakeholder trust, and institutional legitimacy. They move beyond profit maximization to support human flourishing (falāh), affirming the Islamic worldview of humans as khalifah (vicegerents) entrusted with amanah in all domains of decision-making.

Transformational Reframing of 5S

Transformational reframing of 5S is from cosmetic compliance to ethical discipline. Traditionally, the 5S methodology—Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke)—has been implemented by many firms as a compliance-driven checklist to fulfill quality audits and achieve superficial workplace tidiness. However, this limited application often lacks ethical depth and long-term impact. Recent scholarship and field evidence suggest that when 5S is reframed through a transformational leadership lens and embedded with ethical and spiritual values, it evolves from a mechanical routine into a dynamic, value-based discipline that promotes organizational sustainability, employee engagement, and spiritual accountability (Ahmed et al., 2025; Faishal et al., 2025; Milewska & Milewski, 2025; Nawanir & Moshood, 2025; Salam, 2025). Most respondents viewed 5S as a superficial compliance mechanism. Over time, however, they began to embed deeper ethical meanings into the routines, particularly Seiri (Sort) and Seiton (Set in Order).

"In the beginning, we only cleaned up for inspections. It was about passing audits, not about values. But now, we tell our workers: your workspace reflects your soul. Keep it pure."
(Respondent 5, Halal Bakery Manager, Selangor)

"Previously, it was just tidying up. But once we started linking it with Islamic values—trust, responsibility—we saw 5S as part of our ibadah."
(Respondent 7, Food Processing Manager, Kedah)

By sorting items (Seiri) to avoid *israf* (waste) and organizing them (Seiton) to fulfill *amanah* (trust), employees began to perceive their routine duties as acts of obedience and self-discipline. This echoes Sarif's (2020) view that 5S can evolve into a spiritually anchored discipline, rather than a checklist-driven ritual.

Integration of Spiritual Intentionality (Niyyah) in Operational Routines

The integration of spiritual intentionality (niyyah) into operational routines signifies a shift in management thinking—from procedural compliance to purpose-driven action rooted in ethical and spiritual consciousness. In Islamic epistemology, *niyyah* (intention) is not only a precondition for the validity of worship but also a central determinant of moral accountability (mas'uliyyah) in daily actions, including business practices (Faishal et al., 2025; Milewska & Milewski, 2025; Nawanir & Moshood, 2025; Salam, 2025). Within Muslim enterprises, this concept is increasingly embedded in routines such as quality assurance, cleanliness, timeliness, and resource management (Sarif, 2020; Sarif et al., 2022; Sanusi et al., 2023; Abd Rahman et al., 2024). *Seiso* (Shine), originally intended for cleanliness and hygiene, was reinterpreted by participants as an act of purification (tazkiyah), guided by *niyyah* (intention) to seek Allah's pleasure.

"Our cleaners now recite Bismillah before they sweep the floor. It sounds simple, but the attitude shift is big. They see cleaning as a form of worship."
(Respondent 3, Halal Food Manufacturer, Pahang)

"I told my team: don't clean because I said so. Clean because Allah sees you, and you want barakah in your rezeki."
(Respondent 2, Halal Logistics Manager, Selangor)

This reflects the heart of *niyyah*-driven labor: every act, no matter how routine, becomes a contribution to ibadah. Deschênes et al. (2024) affirm that this kind of meaning-making enhances engagement and behavioral consistency.

***Taqwa*-Inspired Workplace Ethics**

A workplace guided by *taqwa* cultivates a culture of self-regulation, where employees uphold trust (amanah), responsibility (mas'uliyyah), and excellence (ihsan) not because of surveillance or incentives, but due to their awareness of divine accountability. In such environments, tasks like cleanliness, timeliness, and quality control are not seen as mere compliance but as manifestations of worship (ibadah) (Sarif et al., 2022; Razak & Sanusi, 2023; Faishal et al., 2025; Salam, 2025). Respondents reported that taqwa provided an internal compass across all 5S activities, especially in maintaining *Seiketsu* (Standardize). It encouraged ethical consistency, even in the absence of direct supervision. *Seiketsu* ensures that best practices become the norm rather than a one-time effort. It involves documenting procedures, creating visual controls (e.g., labels, color codes), and training all staff to follow the same protocols (Bagherian et al., 2024; Misztal & Ratajszczak, 2025; Oliveira et al., 2025). The goal is to create stability and uniformity across tasks, making it easier to sustain quality, reduce errors, and build organizational discipline. These standards help all employees, including new staff, know exactly what to do, how to do it, and when, reducing confusion, contamination risks, and maintaining the halal integrity of the workplace (Bagherian et al., 2024; Misztal & Ratajszczak, 2025; Oliveira et al., 2025).

"We don't need CCTV when workers have taqwa. They will keep things in order even when no one is watching."
(Respondent 1, Halal Beverage SME, Kedah)

"If you fear Allah, you won't leave oil spills on the floor or misplace items. Taqwa changes the way we work—deeply."
(Respondent 10, Light Manufacturing Operator, Pahang)

Embedding *taqwa* in *Seiketsu* ensures that cleanliness, labeling, and workflow clarity are not just operational habits—but spiritual commitments to consistency, safety, and public trust (Sarif et al., 2022; Salam, 2025).

Institutionalization of *Amanah* and *Ihsan*

The fifth S—*Shitsuke* (Sustain)—was seen by participants as the most challenging, yet the most spiritually rewarding. Sustaining ethical behavior requires leaders to act as role models of amanah and ihsan. *Shitsuke* refers to discipline and sustained practice, ensuring that the standards and improvements established through the earlier steps (Seiri, Seiton, Seiso, and Seiketsu) are maintained consistently over time. In organizational contexts, *Shitsuke* is not merely about procedural discipline but about embedding values into culture so that good practices become part of the organization's identity. When approached through an Islamic lens, *Shitsuke* reflects the continuous internalization of values like amanah (trustworthiness) and ihsan (excellence with

sincerity) (Ahmed et al., 2025; Faishal et al., 2025; Milewska & Milewski, 2025; Nawanir and Moshood, 2025). These are not just ethical ideals but spiritual obligations rooted in the Qur'an and Prophetic Sunnah, forming the foundation of organizational integrity, accountability, and holistic excellence.

"Our supervisor doesn't just tell us to label items. He does it himself—neatly, with care. That's what motivates us."
(Respondent 6, Halal Food Packing SME, Selangor)

"The boss always reminds us—this is not just a factory; it's a place where amanah is tested. That's why we all feel responsible even when he's not around."
(Respondent 4, Halal Catering Owner, Selangor)

These leaders helped institutionalize 5S as an ethical lifestyle rather than an external requirement, echoing findings from Weng et al. (2025) and Faishal et al. (2025), who emphasized the role of leadership congruence in long-term operational excellence.

Strategic Synergy between Operational Excellence and Sejahtera Sustainability
The ethical framing of 5S strengthened halal integrity, brand trust, and community legitimacy. Respondents noted how 5S enhanced their maqasid-al-shariah objectives—especially in protecting human dignity, wealth, and faith (hifz al-nafs, hifz al-mal, hifz al-din).

"Customers always say: your kitchen feels clean and calm. That calmness, I believe, comes from following 5S with sincerity and faith."
(Respondent 9, Halal Kitchen Operator, Pahang)

"We had better audit results—not just because the place was clean, but because our processes had integrity. It's hard to explain, but Islam gives meaning to cleanliness."
(Respondent 6, Halal Packaging SME, Kedah)

This confirms Sarif's (2020) view that *taqwa*, *ihsan*, and *amanah* serve as rare, valuable, inimitable resources—core components of the RBV (Barney, 1991; Teece, 2007). Wang & Zhang (2025) and Xin et al. (2024) similarly argue that operational excellence must integrate cultural and ethical capabilities for holistic SME transformation. In this regard, the 5S–Sejahtera Ulul Albab integration framework (see Table 1) illustrates how each element of 5S can be ontologically enriched with Islamic values such as *hikmah* (wisdom), *mizan* (balance), *ruhiyyah* (spirituality), *amanah* (accountability), and *ihsan* (excellence with sincerity). This alignment bridges the operational logic of Total Quality Management with the ontological depth of Islamic spirituality, enabling SMEs to pursue both productivity and purpose.

Table 1: Mapping Cross Analysis

Open Coding (Participant Expression)	Codes	Theme
"We only cleaned up for inspections. Now, we tell our workers: your workspace reflects your soul." *"Previously, it was just tidying up. But once we started linking it with Islamic values—trust, responsibility—we saw 5S as part of our ibadah."*	- Reframing 5S as an ethical discipline - Embedding values in routines	- Transformational Reframing of 5S
"Our cleaners now recite Bismillah before they sweep the floor. It sounds simple, but the attitude shift is big." *"Don't clean because I said so. Clean because Allah sees you, and you want barakah in your rezeki."*	- Intention transforms routine - Divine presence motivates discipline	- Integration of Spiritual Intentionality (Niyyah)
"We don't need CCTV when workers have taqwa. They will keep things in order even when no one is watching." *"If you fear Allah, you won't leave oil spills on the floor or misplace items."*	- Taqwa enables self-regulation - Fear of Allah ensures consistency	- Taqwa-Inspired Workplace Ethics

"Our supervisor doesn't just tell us to label items. He does it himself—neatly, with care." *"This is not just a factory; it's a place where amanah is tested."*	- Leadership by example - Workplace as a test of trust	- Institutionalization of Amanah and Ihsan
"Customers always say: your kitchen feels clean and calm. That calmness comes from following 5S with sincerity and faith." *"Islam gives meaning to cleanliness. It's hard to explain, but it matters."*	- Cleanliness creates spiritual calm - Faith adds meaning to order	- Strategic Synergy between Operational Excellence & Sejahtera Sustainability

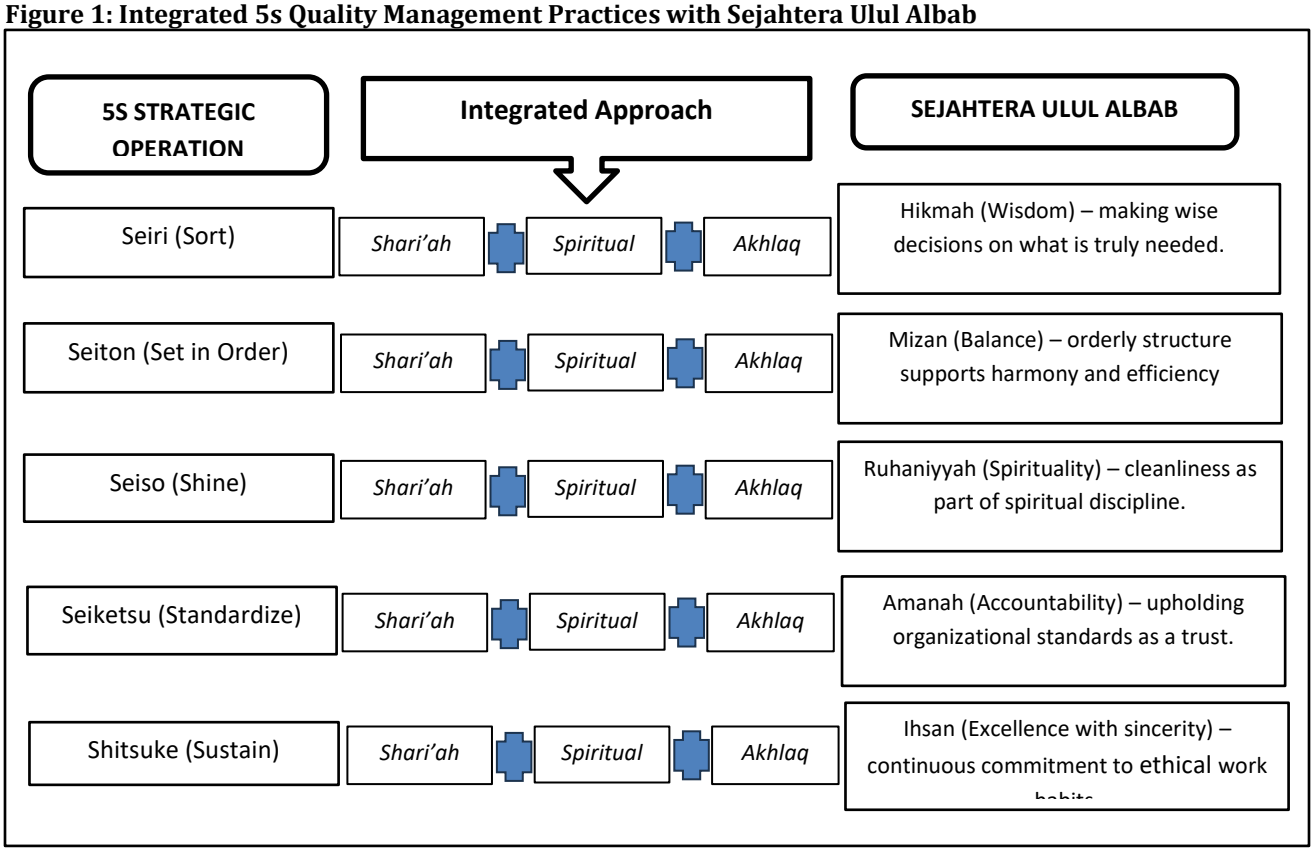
Figure 1 shows a compelling case for harmonizing conventional quality management tools with Islamic epistemological foundations. Originating from Japanese industrial practices, the 5S methodology—comprising Seiri (Sort), Seiton (Set in Order), Seiso (Shine), Seiketsu (Standardize), and Shitsuke (Sustain)—has long been recognized as a strategic approach to workplace organization and operational efficiency. However, this framework goes a step further by embedding the 5S practices within the Tawhidic worldview through the integration of Shari'ah (Islamic legal guidance), Spirituality (taqwa, ikhlas, and inner discipline), and Akhlaq (moral and ethical behavior). The result is an approach that transforms physical processes into spiritually meaningful acts.

Each of the 5S elements is aligned with a corresponding value from the Sejahtera Ulul Albab framework—an IIUM educational philosophy that aims to produce holistic, balanced, and virtuous individuals. For instance, Seiri (Sort) is associated with Hikmah (wisdom), emphasizing the importance of making informed decisions by focusing only on what is truly necessary and removing distractions. Seiton (Set in Order) connects with Mizan (balance), promoting harmony and efficiency through logical arrangements. Seiso (Shine) correlates with Ruhaniyyah (spirituality), underscoring cleanliness not merely as physical tidiness but as part of one's spiritual discipline. Seiketsu (Standardize) is linked to Amanah (accountability), reflecting the Islamic principle that adhering to set standards is a trust and a responsibility. Finally, Shitsuke (Sustain) aligns with Ihsan (excellence with sincerity), encouraging the continuous pursuit of ethical and high-quality practices with genuine intent.

The integrated approach demonstrates that quality management is not value-neutral; rather, it can be a manifestation of religious, spiritual, and moral commitments. By embedding Shari'ah, spiritual consciousness, and akhlaq into managerial practices, this model promotes a more purposeful and ethically grounded work environment. It transforms routine operational procedures into acts of ibadah (worship), aligning daily tasks with divine purpose. This practical spiritualization of work is not only aligned with the Tawhidic paradigm but also nurtures a culture of excellence, trustworthiness, and self-discipline among individuals and institutions.

Furthermore, such integration supports the goals of Sejahtera—a vision of holistic well-being that combines material, spiritual, and ethical dimensions. It cultivates organizational cultures that are not only efficient but also rooted in Islamic values and ethical integrity. In doing so, it contributes to the development of Ummatic excellence—a community of believers who are productive, morally upright, and spiritually conscious. Hence, the Islamisation of the 5S model through Sejahtera Ulul Albab is not merely theoretical; it is a necessary transformation for institutions seeking to align operational excellence with divine accountability and sustainable development.

Figure 1: Integrated 5s Quality Management Practices with Sejahtera Ulul Albab



5. Limitations of the study, practical recommendations, and future research directions

Limitations of the study

While this study provides valuable insights into the integration of Islamic values into 5S quality management practices among Malaysian SMEs, several limitations should be acknowledged. First, the study's qualitative and context-specific scope—based on semi-structured interviews with twelve SME managers in the food processing, halal services, and light manufacturing sectors—offers rich contextual depth but limits generalizability to other sectors or non-Muslim contexts. As Deschênes et al. (2024) highlight, qualitative interpretive research is inherently bounded by context, which restricts external validity. Second, the study is framed within the Sejahtera Ulul Albab and Tawhidic paradigms, which, while offering epistemic richness, may unintentionally overlook secular or pluralistic interpretations of 5S in multicultural workplace settings. This echoes the argument by Milewska and Milewski (2025) that lean management tools should be explored across diverse ontological and value frameworks. Third, the study places a strong emphasis on leadership narratives and religious reminders, without capturing longitudinal or quantitative metrics of employee behavioral change or firm-level performance—an omission also noted in similar transformational leadership studies by Ahmed et al. (2025). Lastly, the absence of a comparative control group of SMEs that implement 5S without Islamic value integration means that while associations between taqwa, niyyah, and 5S practices are observed, causal relationships cannot be definitively established.

Practical Recommendations for SME Leaders and Managers

To address the methodological limitations identified in this study, future research should consider employing methodological triangulation. This could involve combining interviews with direct observations, review of organizational documents, or even focus group discussions. Such triangulated data sources would strengthen the credibility, confirmability, and depth of findings, allowing for a more holistic understanding of how 5S practices are implemented and aligned with the Sejahtera Ulul Albab values in various organizational settings. While future research can enhance methodological depth, immediate steps can also be taken by practitioners to operationalize these values.

To strengthen the integration of Islamic values into 5S practices, several practical recommendations are proposed for SME leaders and managers. First, standard operating procedures (SOPs) should be codified with niyyah (intentionality) and mas'uliyyah (accountability) as guiding principles. For instance, cleaning routines under Seiso can begin with the recitation of Bismillah and include motivational Qur'anic verses, reminding employees that even routine tasks are acts of ibadah (worship) (Ahmed et al., 2025; Salam, 2025). Second, Shitsuke (Sustain) must be reinforced through exemplary leadership. Managers should embody ihsan (excellence with sincerity) across all 5S elements—from organizing tools (Seiton) to post-task reflection (muhasabah)—to instill a culture of integrity and ethical consistency (Weng et al., 2025; Faishal et al., 2025). Third, weekly tazkirah (spiritual reminders) can be integrated into quality control meetings, providing short but meaningful sessions that connect operational performance with spiritual accountability, as advocated in the Sejahtera Ulul Albab framework (Sarif et al., 2022). Finally, peer accountability should be nurtured through systems of ta'awun (mutual cooperation), where staff support one another in upholding ethical and cleanliness standards. This collaborative approach not only reinforces Seiketsu (Standardize) but also cultivates a shared sense of responsibility and moral governance (Nawanir & Moshood, 2025).

To deepen the strategic positioning of the findings, this study draws on the Resource-Based View (RBV), which emphasizes that an organization's sustained competitive advantage is rooted in its internal resources, particularly those that are intangible, valuable, and difficult to replicate. In the context of Sejahtera-driven 5S implementation among MSMEs, the integration of Islamic ethical-spiritual principles—such as *niyyah* (intentionality), *amanah* (trust and responsibility), *taqwa* (God-consciousness), and *ihsan* (excellence through compassion)—functions as a unique set of intangible organizational resources. When assessed through the VRIN framework (Valuable, Rare, Inimitable, and Non-substitutable), these values demonstrate strategic resource qualities. They are valuable in promoting internal accountability and intrinsic motivation, rare in their spiritual-moral depth compared to conventional quality tools, inimitable due to their rootedness in personal faith and cultural tradition, and non-substitutable, as no external control systems (e.g., audits or CCTV) can replicate their self-regulatory function. Therefore, these Islamic principles are not merely ethical ideals but strategic assets that shape routines, influence behavior, and contribute to both operational excellence and organizational integrity. This reframing aligns with the maqasid al-shariah and positions Sejahtera-inspired quality practices as a source of sustainable competitive advantage within the RBV framework.

Future Research Directions

To address the limitations identified in this study, future research should adopt several complementary approaches. First, quantitative studies are needed to measure performance outcomes before and after the integration of Islamic values into 5S practices, enabling researchers to assess the tangible impact of spiritual intentionality and ethical discipline on productivity, efficiency, and employee behavior. Second, comparative cross-cultural studies should be undertaken across Muslim and non-Muslim majority regions to examine how the ethical reframing of 5S is interpreted and operationalized in different socio-cultural contexts. Third, the use of mixed-method designs is highly recommended to combine the narrative richness of qualitative insights with the statistical robustness needed for broader generalizability (Deschênes et al., 2024; Ahmed et al., 2025). Finally, longitudinal case studies spanning one to three years would be valuable in tracking how SME transformation unfolds through sustained implementation of values such as taqwa, amanah, and ihsan, providing deeper insights into the long-term dynamics of ethical workplace culture and organizational change.

Conclusion

This study offers a transformative lens through which to view 5S quality management—not merely as a technical or operational tool, but as an ethically embedded, spiritually attuned framework for organizational excellence in Malaysian MSMEs. By anchoring 5S practices within the *Sejahtera Ulul Albab* paradigm and *Tawhidic* epistemology, the research reveals a powerful shift from compliance-driven behavior to value-laden discipline. It affirms that when 5S is practiced with *niyyah* (intentionality), *taqwa* (God-consciousness), *amanah* (trust), and *ihsan* (excellence with sincerity), its strategic utility expands beyond lean efficiency into the realm of ethical governance, spiritual accountability, and human flourishing (falāh). This integrative approach reconceptualizes 5S not as a static protocol imported from industrial modernity, but as a dynamic capability that fosters both material productivity and divine accountability. The findings demonstrate that Muslim entrepreneurs and workers can internalize quality practices not as ends in themselves, but as expressions of their Islamic worldview, where each act—even sweeping a floor or labeling a shelf—becomes part of a greater

ethical and spiritual narrative. Such reorientation challenges the dominant technocratic narrative in Total Quality Management (TQM) literature by introducing a morally grounded strategic logic, harmonizing operational excellence with the maqasid al-shariah and Malaysia MADANI aspirations for humane, inclusive, and purposeful development.

Moreover, the study's qualitative insights show that institutionalizing Sejahtera values in everyday workplace routines reinforces organizational cohesion, stakeholder trust, and brand legitimacy, particularly within halal-sensitive sectors and culturally pluralistic environments. Managers who embody these values become not just supervisors, but murabbi (ethical nurturers) who model sincerity, discipline, and care. Employees, in turn, respond with higher engagement, self-regulation, and communal cooperation (ta'awun), transforming the workplace into a site of ethical cultivation, not just economic activity.

From a strategic management perspective, these values—taqwa, amanah, ihsan—are rare, valuable, and inimitable resources that serve as spiritual-intellectual equivalents of core competencies under the Resource-Based View (RBV). When embedded within routines like 5S, they become dynamic capabilities that adapt internal behaviors to external expectations, fostering resilience, innovation, and long-term sustainability. This synthesis of faith and function is particularly vital as MSMEs navigate a post-pandemic recovery era, technological disruptions, climate pressures, and growing demand for ethical supply chains.

However, the study acknowledges its limitations: its qualitative scope and context-specific focus restrict generalizability, and the absence of comparative or quantitative data invites caution in asserting causality. Nonetheless, the depth and richness of the narratives provide fertile ground for future research. Mixed-method and longitudinal studies could test the scalability and replicability of the proposed framework across sectors and regions. Additionally, cross-cultural comparisons would help explore the universality or cultural specificity of values-driven quality management in other faith-based or secular contexts.

Practically, the findings carry significant implications for policymakers, training providers, and entrepreneurship educators. Ministries, SME Corp, and halal governance bodies should consider integrating value-based content into quality certification programs. Universities and vocational institutes can develop curricula that link Islamic ethics with operational skills, reinforcing that productivity and piety are not mutually exclusive but mutually reinforcing. Furthermore, donor-supported programs and social finance initiatives can support capacity-building for MSMEs that align with Sejahtera sustainability, enabling them to serve not only the economy but also umma-centric transformation.

In conclusion, this study does not merely call for better implementation of 5S. It calls for a paradigmatic reorientation, one that roots quality management in divine purpose, aligns strategic routines with spiritual consciousness, and repositions MSMEs as not just economic agents, but moral agents within society. In doing so, it contributes to the growing discourse on Islamic strategic management, offering a compelling case for how faith-informed practices can drive not only business excellence but also Ummatic excellence, grounded in trust, compassion, and higher accountability. Such a vision is not only timely but necessary for a world in search of meaningful productivity, ethical enterprise, and sustainable well-being.

Acknowledgement: The authors would like to express their deepest gratitude to the Department of Business Administration (DEBA), Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia (IIUM), for the generous financial support provided through the DEBA Research Grant Scheme (DEBA23-024-0030) titled "5S Quality Management Practice with Sejahtera Ulul Albab Approach". Sincere appreciation is also extended to all participants, respondents, reviewers, validators, independent researchers, and the various individuals and organizations who have contributed their time, insights, and cooperation throughout the research process. Their support, feedback, and trust have been instrumental in enriching the quality and relevance of this study. May this collective effort bring benefit (maslahah) to the ummah and contribute meaningfully to ethical, value-driven organizational practices.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Financial Literacy as a Mediator of Young Generation Intention to Invest in Islamic Crowdfunding in Malaysia

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Abstract: Islamic crowdfunding, which is a legitimate and halal form of financing, is also increasing in popularity among Malaysian youths because Malaysia has established a very strong infrastructure in the Islamic finance sector. Nevertheless, it has remained low primarily because of low Financial Literacy, awareness, and trust in the digital platform of investing. This research seeks to determine how financial literacy influences the TPB of young Malaysians in its ability to influence the intention of young Malaysians to fund an Islamic crowdfunding platform. A quantitative approach was used, specifically a cross-sectional survey design, with 437 youths from Malaysia's Klang Valley region. The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was used to analyze the data. Findings indicated that perceived subjective norms and perceived behavioral control jointly affected intentions to invest and were partially explained by financial literacy. However, there was no main effect of attitude on the dependent variable, although it was inclusively mediated by financial literacy. Implications reveal significant implications for promoting investment intention and heightening financial literacy as a way of reversing barriers to participation that characterize Islamic crowdfunding. Such findings provide significant suggestions to the policymakers and educators, alongside the platform provides for enhancing the ethical Malaysian financial solutions and economic improvement. Thus, this research contributes to knowledge by discussing the moderating role of financial literacy on the TPB constructs in the Islamic crowdfunding context.

Keywords: *Islamic crowdfunding; financial literacy; Attitude; subjective norms; perceived behavioral control*

1. Introduction and Background

Islamic crowdfunding has arisen as a feasible alternative financing method, especially for young entrepreneurs in Malaysia. It adheres to Shari'ah standards and provides a novel method for obtaining funds that conventional financial institutions frequently decline due to the perceived high-risk profiles of younger investors (Salim, Kassim, & Thaker, 2021). This financing strategy supports small and medium enterprises (SMEs) while simultaneously fostering social entrepreneurship by facilitating projects that may not secure traditional funding (Ramli, Abdullah, & Alam, 2023). Employee retention is becoming an important parameter in assessing the success of an organization (Aguenza & Som, 2018). One of the most valuable dimensions in an organization is employee retention (Ivana & Chiripuci, 2020). For an organization to remain competitive, it must maintain an experienced and efficient workforce, and employee retention is influenced by multiple factors (Kalyanamitra, Saengchai & Jermsittiparsert, 2020).

Financial literacy is the set of skills and knowledge that lets people make smart choices about money. Based on (Lusardi & Mitchell, 2014) stresses how important it is to be financially literate to make better economic decisions and improve overall well-being. In Islamic crowdfunding, potential investors must comprehend various aspects such as Shariah compliance, risk management, and investment strategies. Previous research indicates that a higher level of financial literacy can significantly influence investment behaviors and choices among young individuals, particularly in emerging financial technologies like crowdfunding platforms (Md. Sapir@ Md. Shafik & Wan Ahmad, 2020). According to Malaysia Investment Development Authority (MIDA, 2020), due to its growing population and longer life expectancy, Malaysia expects to increase healthcare expenditures to improve facilities and services. It shows that the number of companies and employees in the pharmaceutical industry continues to grow year by year.

Young people's investment behavior is much shaped by their financial literacy, especially of an Islamic nature. It guarantees informed decisions by arming people with the required knowledge to negotiate the complexity of financial products and investment possibilities. According to studies, higher degrees of financial literacy

have been linked to more confidence and intention to fund Islamic crowdfunding platforms (Majid & Nugraha, 2022). Moreover, knowing ideas like profit-sharing, risk management, and Shariah compliance can greatly affect young people's inclination to interact with these channels.

Young people make up a sizable population that could propel Islamic crowdfunding's expansion. Still, their participation is sometimes hampered by ignorance of how these channels run. Studies have revealed that the two main determinants of their inclination to invest are perceived usefulness and simplicity of usage (Salim et al., 2021). Improving financial knowledge will help stakeholders enable young people to make wise decisions when participating in Islamic crowdfunding, hence raising possible participation rates.

Notwithstanding the potential advantages, a constrained comprehension of how financial literacy especially influences the correlation between youngsters' investment aspirations and their actual participation in Islamic crowdfunding platforms exists. This study seeks to address this gap by examining the interaction between these variables and offering insights that may guide policy and educational measures to cultivate a financially knowledgeable youth demographic in Malaysia. This research would enhance the understanding of the impact of financial literacy on investment intentions among Malaysian adolescents in the realm of Islamic crowdfunding, hence facilitating the advancement of this unique financing model. However, the specific dynamics of how financial literacy mediates youths' intentions to engage with Islamic crowdfunding in Malaysia remain underexplored.

Despite the increasing recognition of Islamic crowdfunding as a viable alternative financing mechanism in Malaysia, a significant gap exists in understanding the factors influencing youths' intentions to invest in such platforms. While financial literacy is acknowledged as a crucial determinant of investment behavior, its specific role as a mediator within the context of Islamic crowdfunding is underexplored.

Young Malaysians frequently face obstacles in obtaining conventional funding sources, and a lack of financial knowledge may hinder their capacity to make smart investment choices. This scenario prompts apprehensions over the efficacy and durability of Islamic crowdfunding projects, especially among the young, who are crucial for fostering economic growth and innovation in the nation. Research indicates that many youth entrepreneurs lack knowledge about crowdfunding operations, with studies showing that up to 78% of business owners in Malaysia are unaware of how crowdfunding works (Salim et al., 2021).

Moreover, the lack of a thorough knowledge of how financial literacy interacts with other psychological elements, such as attitudes, subjective norms, and perceived behavioral control, limits stakeholders' capacity to create focused educational programs and policies that might increase young participation in Islamic crowdfunding (Majid & Nugraha, 2022). The interplay between financial literacy and other factors, such as perceived usefulness and ease of use, further complicates this landscape, suggesting that a comprehensive analysis is required to explore these relationships (Nawang & Shukor, 2023)

Therefore, this study addresses the following problem: How does financial literacy mediate the relationship between youths' attitudes, subjective norms, and perceived behavioral control regarding their intention to invest in Islamic crowdfunding in Malaysia? By investigating this relationship, the research aims to provide valuable insights that can inform strategies to empower young investors and promote a more inclusive and robust crowdfunding ecosystem. This inquiry is essential not only for enhancing financial literacy among Malaysian youth but also for supporting the growth of the Islamic finance sector.

Research Objectives

- To determine the relationship between attitude, subjective norms, and perceived behavioral control on the intention to invest in Islamic crowdfunding.
- To examine the role of financial literacy as a mediator in the relationship between these factors and investment intentions.

Research Questions

- How do attitude, subjective norms, and perceived behavioral control influence the intention to invest in Islamic crowdfunding?
- Does financial literacy mediate the relationship between these factors and investment intention?

There is, however, a low level of participation among young people in Malaysia despite the growing use of Islamic crowdfunding solutions. This is attributed to the limited number of options, probably due to a lack of financial education regarding investment opportunities and risks. Furthermore, prominent determinants like attitude, subjective norms, and perceived behavioral control significantly affect the investment decision, but the moderating role of financial literacy has not been addressed much. This knowledge is important for informing the issues that hinder Youth Malaysians from engaging in Islamic crowdfunding investment. This study aims to bridge the knowledge gap by exploring the mediating role of financial literacy in shaping the young generation's intention to invest in Islamic crowdfunding in Malaysia.

2. Literature Review

The rise of Islamic crowdfunding platforms, which follow Shariah principles, offers a special research opportunity even though conventional crowdfunding platforms have been extensively researched. Recent research has looked at user perception and behavioral intention as well as other factors that affect Indonesia's adoption of Islamic crowdfunding platforms (Sulaeman, 2021). On the other hand, little is known about how financial literacy, particularly among young Malaysians, mediates the relationship between these factors and investment intention.

Since it gives people the information and abilities they need to make wise financial decisions, financial literacy is a significant predictor of investment behavior. Financial literacy is especially important in Islamic finance because it helps investors comprehend the fundamental ideas and workings of financial products that adhere to Sharia law, like Islamic crowdfunding platforms.

A study on financial literacy among Muslim undergraduates in Malaysia found that sociocultural influences and exposure to financial education can have a big impact on a person's financial literacy (Md. Sapir @ Md. Shafik & Wan Ahmad, 2020). This implies that raising financial literacy could be a viable tactic to encourage young Malaysians to use Islamic crowdfunding platforms.

Islamic crowdfunding: Islamic crowdfunding has offered itself as a potential complementary financing source in Malaysia, especially for community-based tourism, micro businesses, and low-rise building construction. The Islamic crowdfunding model has demonstrated the possibilities of assisting rural communities, offloading the concerns of funding from the government, and encouraging job and wage opportunities and economic development (Ishak et al., 2024; Khairuddin & Ishak, 2022). In Malaysia, the first Islamic crowdfunding platform is Nusa Kapital which applies the murabahah concept to SMEs regulation by the Securities Commission Malaysia (Ramli et al., 2022).

Notably, although there is a significant potential in Islamic crowdfunding, it has various practical limitations. This is a great concern because micro-entrepreneurs lack proper management and marketing skills, whereby future project investors are questioned (Ishak et al., 2024). Also, the book industry in Malaysia has declined in the last couple of years, while Islamic crowdfunding could finance books, with emphasis on writers and manuscripts rather than revenue-making (Kamaruddin and Ishak, 2020).

Therefore, Islamic crowdfunding in Malaysia plays a great role in providing a Shariah-compliant way of financing tourism, micro-enterprises, and the construction sectors. Nevertheless, its success heavily hinges on the challenges, including awareness, financial literacy, and proper technology adoption (Rashid et al., 2023). To maximize the benefits of Islamic crowdfunding, the collective effort of Islamic crowdfunding platforms, businesses, investors, and regulatory bodies becomes central (Mohd Sofie & Muneeza, 2023). This is a critical area of development in the industry, and there is a need to adapt the legal provisions progressively to eliminate the existing gaps to support the continued future development of Islamic crowdfunding in Malaysia (Ramli et al., 2023).

Theory of Planned Behavior (TPB): Some earlier studies have used the Theory of Planned Behavior (TPB) to investigate the factors that influence intention, and each behavior related to Islamic crowdfunding. A study on BIMB users' intentions to use Sadaqa House, an online Islamic crowdfunding platform, was carried out in the context of TPB. The study concluded that consumer intention is more influenced by subjective norms than by

attitude. The intention to use Sadaqa House BIMB was not significantly impacted by perceived behavioral control or religiosity (Karim et al., 2023).

Another study exploring the intentions of potential Muslim investors to invest through Islamic securities crowdfunding FinTech (I-SCF FinTech) platforms integrated TPB with TAM, together with IFL. Self-organization resulted in the positive behavioral intention of IFL, especially knowledge of the risks involved in Islamic financial products (Majid & Nugraha, 2022).

Contradictory the study of Karim et al. (2023), the author established that Subjective Norms, Perceived Behavioral Control, Product Knowledge, and Religiosity had a direct positive relationship with the decision to seek funding in SMEs in the Halal Food Industry through Islamic Equity Crowdfunding. The use of TPB in contextualizing Islamic crowdfunding research has produced mixed findings, although the value of the viewpoint is recognized. Some of the past research focuses on subjective norms and attitudes to have a greater impact, while others focus on perceived behavioral control and religiosity. Their presence indicates that overall, participants' Islamic crowdfunding intention and behavior may rely on the specifics of the studied platform or target group.

Attitude: The perception of the younger generation is generally positive towards the Investment in Islamic crowdfunding, and there are several factors that affect the interest and pull towards it. The analysis also shows that attitude and perceived behavioral control have the most positive effect on the interest of the millennial generation toward investing in Sharia Securities Crowdfunding (SCF) (Iswanti et al., 2024). This implies that young investor will consider Islamic crowdfunding as one of their investment avenues. However, as also observed from the framework, subjective norms never seem to impact their investment decisions, implying that millennials might not necessarily rely on others in their investment decisions (Iswanti et al., 2024).

For example, social creators and entrepreneurial experiences demonstrate a huge influence on investment behavior in Islamic crowdfunding (Ryandono et al., 2020). Nevertheless, project quality, creator ability, and reputation impact are negligible, which is somewhat counterintuitive to typical investment strategies. This implies that young investors interested in Islamic crowdfunding may differentially focus when making investment decisions from those of traditional methods invested directly (Ryandono et al., 2020).

Thus, the South Carolinian young adults' perception towards Islamic crowdfunding is influenced by personal religiosity, perceived behavioral control, and social influence. Muslim religiosity plays a role in a positive attitude towards investing in Islamic crowdfunding, as put forth by Iswanti et al. (2024), with the implication that young Muslim investors should consider Islamic investment products. On the same note, as this kind of crowdfunding gains more recognition in the financial market, it will expand its scope to draw more young investors to invest in the Islamic way due to various reasons, including but not limited to ethical investment that aligns with Islamic Shariah laws.

Subjective Norm: Another self-regulation perception, called subjective norms, has an intriguing relationship with young people's investment decisions in Islamic crowdfunding, where research findings show inconsistency. This paper's findings suggest that subjective norms influence young people's investment intentions in Islamic crowdfunding. The analysis of the proposed model based on BIMB customers identified that the highly significant determinant for consumer intention to use Sadaqa House, the digitalized Islamic crowdfunding, is the subjective norm (Karim et al., 2023). This implies that ideas that come with family, relatives, peers, and acquaintances play a crucial role in encouraging youths to embrace Islamic crowdfunding services. In addition, Yulandreano & Rita (2023) also demonstrated that subjective norms positively influence investment intentions by creating an environment supportive of crowdfunding participation. A study by Wuladari, Sani, & Pramuka (2023) also has a positive effect on investment interest. But there is contrary evidence discovered. Meanwhile, in the study on Sharia Securities Crowdfunding (SCF), it was ascertained that the subjective norm fails to influence the interest to invest in Sharia SCF among the millennial generation (Iswanti et al., 2024). In line with the assertion, the study on Subjective norms has an impact on funding decisions through Islamic equity crowdfunding platforms: empirical analysis of SMEs in the halal food industry also revealed the same facts. Such a contradiction suggests that specifying the nature or role of subjective norms in affecting the behavior of young investors in Islamic crowdfunding is not straightforward. The findings

suggest that subjective norms might be a powerful barrier in influencing young people's intention to invest in Islamic crowdfunding, yet their influence will most definitely be shaped through specific situations and types of crowdfunding platforms. More empirical studies to elaborate on the role of subjective norms in different contexts of Islamic crowdfunding and various segments of the younger generation are needed.

Perceived Behavioral Control: This study identified that perceived behavioral control (PBC) should be a focus of attention because it has a profound impact on the intention of young investors regarding Islamic crowdfunding investments. There are progressive and conflicting patterns identified in previous research concerning this connection. The performance of PBC shows that its results can be positive in improving investment intentions in Islamic crowdfunding (Yulandreano & Rita, 2023) also revealed that perceived behavioral control had a significant and positive influence on the investment intentions of Indonesian Investors in crowdfunding platforms. Likewise, another empirical research analysis centered on young Indonesian investors' behavioral intention to invest in Islamic stocks found that PBC had a positive influence on investor intention (Anisa & AF, 2024).

Surprisingly, while PBC enjoys a continuous positive effect on investment intentions, it may have a neutral, negative, or inconsistent impact on real investment. Yulandreano and Rita (2023) stated that PBC had an impact on investment intent and crowdfunding investment choices in a positive manner. However, another study on the determinants of Islamic Crowdfunding did not reflect PBC as a factor affecting investors' decisions (Ryandono et al., 2020).

Consequently, this research posited that perceived behavioral control significantly influences the young investor's intention towards Islamic crowdfunding. This was agreed across most of the studies, showing how it is significantly positive on investment intentions. However, its association with real investment decisions could probably not be easily substantiated, raising the point that there are probably moderating variables involved. The results presented in the study suggest that PBC should be considered when investigating and advocating for Islamic crowdfunding among young investors; however, the analysis of multiple factors that affect the final investment choice should also be considered.

Financial Literacy as a Mediator: The effects of how attitudes, subjective norms, and perceived behavioral control affect investment intentions, financial literacy is a crucial moderator in the TPB model. People are better equipped to evaluate investment opportunities, understand their implications, and make informed investment decisions when they possess greater financial literacy (Malaiya, 2025). Improving young people's financial literacy can enable them to successfully negotiate the complexities of investment decisions in Islamic crowdfunding, which will increase user engagement with crowdfunding platforms.

The quality of investment decisions is directly impacted by financial literacy; research indicates that those with greater financial literacy make wiser decisions (Wang & Zou, 2024). Furthermore, better risk perception and management are a result of increased financial literacy and are essential for successful investment strategies (Alisa et al., 2024). Studies show that Islamic financial literacy positively affects Gen Z's investment choices in the Islamic capital market, leading to more informed and confident investors (Anisa & AF, 2024).

Furthermore, among Malaysian youth, financial literacy is a strong predictor of investment behavior, indicating that a higher level of literacy is associated with a greater propensity to participate in Islamic crowdfunding (Abd Rashid et al., 2022). Furthermore, according to Dharma et al. (2024), financial literacy has a major impact on investment decisions as well as the formation of a positive risk attitude between financial knowledge and investment decisions.

3. Research Methodology

This study aims to examine the mediating role of financial literacy on youths' intention to invest in Islamic crowdfunding in Malaysia. A quantitative research approach was adopted to collect and analyze the data. The target population for this research consisted of young individuals residing in the Klang Valley region, which is known for its high concentration of tech-savvy and financially aware youths. A total sample of 437 respondents was gathered using a convenience sampling method, ensuring a diverse representation of individuals between the ages of 18 to 35 who have basic awareness of Islamic financial products.

The primary data was collected using a structured questionnaire, which was designed to measure key constructs related to the Theory of Planned Behavior (TPB) as proposed by Ajzen (1991), with additional items focusing on financial literacy specific to Islamic crowdfunding. The questionnaire was adapted from validated TPB scales, covering aspects such as attitude towards behavior, subjective norms, and perceived behavioral control, which are known predictors of intention. To capture the mediating variable, the survey also included a financial literacy section tailored to assess the respondents' knowledge and understanding of Islamic crowdfunding principles, such as Shariah compliance, risk-sharing, and ethical investment.

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze the data in order to assess the direct and mediating effects of financial literacy on investment intentions. Given the exploratory nature of the study, this method was selected because it is robust when handling complex models and works well with small to medium sample sizes. To make sure the factors being measured were accurate, validity and reliability tests were performed. The findings are expected to provide insights into how enhancing financial literacy among youths can positively influence their intention to participate in Islamic crowdfunding, thereby supporting the growth of ethical financial investments in Malaysia.

4. Results

The table summarizes demographic characteristics across gender, education, ethnicity, profession, and income distribution. It shows that females make up a larger proportion (57%) than males (43%). Most respondents have vocational education (57.9%), while fewer hold a bachelor's (16.7%) or master's degree (3.9%). Ethnically, the majority are Chinese (65.4%), followed by Indian (13%), Malay (5%), and other ethnicities (16.5%). The dominant professions are executives/managers (30.4%) and students (22%), while smaller percentages are professionals (17.6%), self-employed (9.6%), and government employees (5.3%). Income-wise, 28.1% earn RM 3000 or below, while the remainder is distributed across higher income categories, with 15.3% earning RM 9001 or above.

Demographic Information of the Respondents: Table 1 displays a summary of the characteristics of the total respondents who participated in the study.

Table 1. Demographic Information of The Respondents

Characteristics	Frequency	Percentage (%)
Gender		
Male	188	43.0
Female	249	57.0
Education		
Primary	6	1.4
Secondary	88	20.1
Vocational	253	57.9
Bachelor's	73	16.7
Masters	17	3.9
Ethnicity		
Malay	22	5.0
Chinese	286	65.4
Indian	57	13.0
Others	72	16.5
Profession		
Student	96	22.0
Professional (Doctor, Engineer, Lawyer, etc.)	77	17.6
Executive / Manager	133	30.4
Self Employed / Entrepreneur	42	9.6
Government Employee (Officer, Clerk, etc.)	23	5.3
Retired	20	4.6
Others	46	10.5
Income		
RM 3000 or Below	123	28.1
RM 3001 – RM 5000	103	23.6
RM 5001 – RM 7000	83	19.0
RM 7001 – RM 9000	61	14.0
RM 9001 and above	67	15.3

Measurement model: Following these descriptive analyses, the study proceeded with the evaluation of the outer model, which involved testing the validity and reliability of the constructs. For construct validity, both

convergent validity and discriminant validity were assessed. Construct reliability was evaluated using Cronbach's alpha and composite reliability. The outcomes of the outer model testing are detailed in Table 2.

Table 2. Measurement Model

Item	Mean	Standard Deviation	Factor Loading	Cronbach alpha	Composite Reliability	AVE
Attitude				0.811	0.864	0.517
AT1	4.018	0.847	0.738			
AT2	3.874	0.959	0.708			
AT3	3.902	0.960	0.685			
AT4	4.009	0.877	0.798			
AT5	4.124	0.876	0.748			
AT6	4.041	1.054	0.623			
Subjective Norm				0.906	0.928	0.682
SN1	3.810	0.993	0.835			
SN2	3.460	1.102	0.829			
SN3	3.625	1.053	0.881			
SN4	3.867	1.042	0.831			
SN5	3.957	0.947	0.846			
SN6	3.716	0.967	0.723			
Perceived Behavioral Control				0.837	0.884	0.607
PBC1	4.272	0.798	0.662			
PBC2	3.952	0.848	0.830			
PBC3	3.945	0.873	0.828			
PBC4	4.204	0.827	0.805			
PBC5	4.172	0.789	0.756			
Financial Literacy				0.871	0.897	0.523
FL1	3.929	0.926	0.736			
FL2	4.055	0.781	0.723			
FL3	4.108	0.831	0.689			
FL4	4.119	0.842	0.711			
FL5	4.096	0.823	0.714			
FL6	3.966	0.953	0.769			
FL7	3.895	0.912	0.69			
FL8	3.799	0.995	0.749			
Intention to Invest				0.766	0.841	0.516
II1	3.805	0.867	0.775			
II2	3.439	1.069	0.791			
II3	3.707	1.035	0.646			
II4	3.295	1.234	0.680			
II5	4.108	0.834	0.688			

The results from the outer model analysis demonstrated that each item variable met the criteria for convergent validity, with factor loadings for all items exceeding the threshold of 0.5. Additionally, discriminant validity was confirmed as the Average Variance Extracted (AVE) values for all constructs were above the cutoff of 0.5. Regarding reliability, the composite reliability values exceeded 0.7, indicating that all variables were consistently reliable. Thus, it can be concluded that the items effectively formed constructs related to financial literacy, attitudes towards investment, subjective norms for investing, perceived behavioral control, and investment intentions.

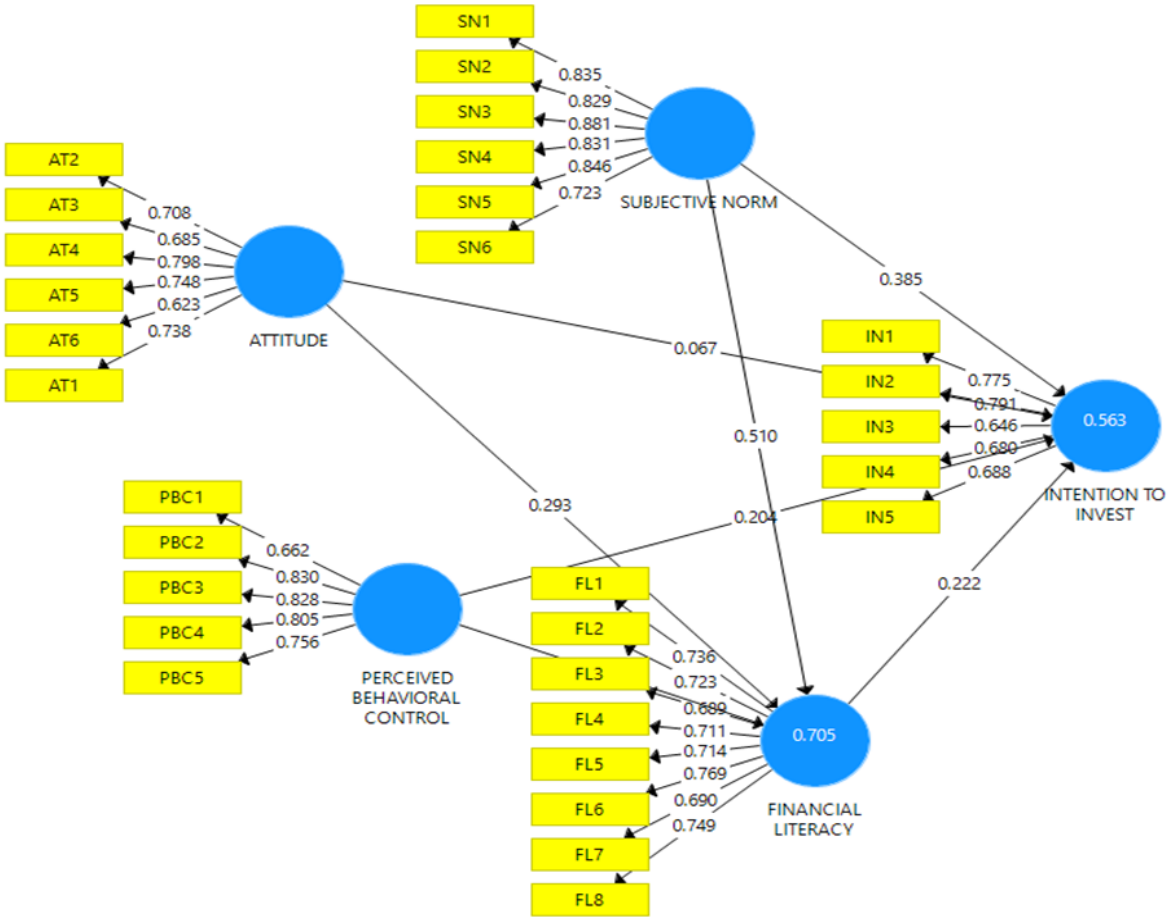
Subsequently, discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio, following the guidelines suggested by Henseler et al. (2015) and refined by Franke and Sarstedt (2019). According to these guidelines, the HTMT values should not exceed 0.85 for a stricter assessment, while a more lenient threshold is set at ≤ 0.90. As displayed in Table 5, all HTMT values were below the stricter threshold of 0.90, indicating that the respondents could differentiate between the four constructs. Thus, the results confirm that the factors

are distinct. Overall, the validity tests confirmed that the measurement items used in the study were both valid and reliable.

Table 3. Heterotrait-Monotrait (HTMT)

	Attitude	Financial Literacy	Intention To Invest	Perceived Behavioral Control	Subjective Norm
Attitude					
Financial Literacy	0.780				
Intention To Invest	0.620	0.783			
Perceived Behavioral Control	0.760	0.726	0.677		
Subjective Norm	0.531	0.801	0.801	0.522	

Figure 1: Path Coefficient of the framework



Structural Model: Table 4 presents the results of hypothesis testing factors influencing the intention to invest. Out of four hypotheses, three were supported: subjective norms (H2) had the strongest influence (β = 0.385, t = 6.633, p = 0.000), followed by financial literacy (H4; β = 0.222, t = 3.563, p = 0.000) and perceived behavioral control (H3; β = 0.204, t = 4.124, p = 0.000). However, attitude (H1) was not a significant predictor (β = 0.067, t = 1.137, p = 0.256). This suggests that external social influences, knowledge, and perceived control are key drivers of investment intention, while personal attitude plays a minimal role.

Table 4. Summary of direct hypothesis

		Beta	T Statistics	P Values	Decision
H1	Attitude -> Intention To Invest	0.067	1.137	0.256	Not Supported
H2	Subjective Norm -> Intention To Invest	0.385	6.633	0.000	Supported
H3	Perceived Behavioral Control -> Intention To Invest	0.204	4.124	0.000	Supported
H4	Financial Literacy -> Intention To Invest	0.222	3.563	0.000	Supported

Table 5 summarizes the mediation effects of financial literacy on the relationships between attitude, subjective norms, perceived behavioral control, and the intention to invest. Hypothesis H5 indicates that financial literacy fully mediates the relationship between attitude and investment intention ($\beta = 0.065$, $t = 3.382$, $p = 0.001$), meaning that attitude influences investment intention only through financial literacy. Hypotheses H6 and H7 demonstrate partial mediation, where financial literacy partly explains the impact of subjective norms (H6: $\beta = 0.113$, $t = 3.281$, $p = 0.001$) and perceived behavioral control (H7: $\beta = 0.047$, $t = 2.874$, $p = 0.004$) on investment intentions. This implies that subjective norms and perceived behavioral control affect intention both directly and indirectly through financial literacy. Overall, the findings highlight the critical role of financial literacy in mediating these relationships, particularly as a full mediator for attitude and a partial mediator for subjective norms and perceived behavioral control.

Table 5. Mediation result

		Beta	T Statistics	P Values	Result
H5	Attitude -> Financial Literacy -> Intention to Invest	0.065	3.382	0.001	Fully Mediate
H6	Subjective Norm -> Financial Literacy -> Intention to Invest	0.113	3.281	0.001	Partially Mediate
H7	Perceived Behavioral Control -> Financial Literacy -> Intention to Invest	0.047	2.874	0.004	Partially Mediate

Discussion

The study's conclusions provide important new information about the factors influencing young Malaysians' intentions to invest in Islamic crowdfunding. The findings show that while attitude does not significantly affect investment intention directly, subjective norms and perceived behavioral control do. Furthermore, financial literacy acts as a partial mediator between investment intention and perceived behavioral control, as well as a full mediator between attitude and investment intention.

These results are consistent with earlier studies that highlighted how outside factors shape financial behavior. Research has indicated that youth investment behavior is significantly influenced by subjective norms, including peer and family influence (Karim et al., 2023). Subjective norms have a significant impact on Islamic crowdfunding investments, indicating that social influence is essential for promoting young people's involvement in alternative financial markets. Nevertheless, prior studies on subjective norms have produced conflicting findings, with some indicating no meaningful correlation (Iswanti et al., 2024). This implies that the context and kind of financial product may have different effects on how social norms affect investing behavior.

The mediating function of financial literacy is the study's most noteworthy contribution. The findings demonstrate the importance of financial literacy in transforming optimistic sentiments into real investment intentions. This is consistent with earlier studies that found increased financial literacy improves investment confidence and risk perception (Majid & Nugraha, 2022). Thus, improving financial education programs may help close the awareness-to-action gap and eventually boost young people's involvement in Islamic crowdfunding.

5. Managerial Implications and Recommendations

The study's conclusions have important ramifications for legislators, instructors, and owners of Islamic crowdfunding platforms. In order to encourage young Malaysians to engage in Islamic crowdfunding, financial literacy is an essential component. Thus, focused financial education initiatives are necessary to empower this demographic and boost their confidence in making investments. To lay the groundwork early, policymakers ought to think about incorporating financial and Islamic finance education into university and school curricula. Through workshops, internships, or simulations, cooperation between educational institutions and crowdfunding platforms can also encourage hands-on learning. Platform operators ought to enhance the usability and transparency of their platforms by providing instructional materials like financial literacy resources and explainer videos. To reach a larger audience, content should be easy to use, multilingual, and culturally appropriate. Governmental organizations and regulatory bodies may also assist in the form of grants, incentives, or policies that promote moral and inclusive crowdfunding. In addition to enhancing investor confidence, such initiatives would guarantee the long-term expansion of Malaysia's Islamic crowdfunding market.

Conclusion

This study emphasizes how important financial literacy is in influencing young Malaysians' decisions to participate in Islamic crowdfunding. The results demonstrate that although investment intentions are directly influenced by subjective norms and perceived behavioral control, attitude by itself has no discernible effect unless financial literacy acts as a mediator. This suggests that external influences and confidence in one's ability to invest play a more prominent role in shaping investment decisions than personal attitudes alone.

Financial literacy's mediating effect emphasizes how crucial it is for closing the awareness-to-action gap. The need for focused financial education programs is further supported by the fact that young people who possess greater financial literacy are more likely to make wise investment decisions. These findings are consistent with earlier studies showing that greater financial literacy improves risk management and decision-making confidence in investing behavior.

Practically speaking, these observations have important ramifications for legislators, banks, and schools. Enhancing financial literacy can greatly increase young people's involvement in morally and Shariah-compliant investing, especially when it comes to Islamic crowdfunding. Malaysia can boost its Islamic finance industry and advance a more inclusive investment ecosystem by raising a generation that is better informed about money matters. Additional factors that might further affect investment behavior in this expanding sector should be investigated in future studies. (Md. Shafik & Wan Ahmad & Md. Sapir, 2020).

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

A Study on the Awareness of Air Travellers Towards Travel Insurance

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Abstract: Discovering different cultures and experiences is made possible through travel. However, even the best-planned trips can be derailed by unanticipated circumstances. It takes more than simply packing your luggage and making your travel arrangements to ensure a successful journey. Many people fail to consider important factors that offer comfort. The objective of this study is to investigate people's awareness of the existence of risk from aircraft and the importance of travel insurance in protecting themselves from any unexpected event. Additionally, this study aims to explore the factors, such as attitude, knowledge, and promotion, which influence travel insurance awareness. Purposive sampling was used in this study, and 100 online surveys were distributed around Malaysia. After the survey is completed, the results will be analysed to determine the primary factors influencing this study and whether or not respondents believe that travel insurance is necessary. Any pertinent party may find this research helpful in raising public awareness of the value of travel insurance.

Keywords: *Travel Insurance, Attitude, Knowledge, Promotion.*

1. Introduction and Background

Insurance is based on a contract agreed between the insurance company and the policyholder, and based on mutual agreement by both parties with a policy (Edward et al., 2024). An individual or entity would receive financial protection or reimbursement from the insurance company against any loss that occurs. However, the policyholder needs to disclose the losses at the inception of the contract. On the other hand, an insurance company will pool policyholder risk together to increase the reserve for protection against loss. Insurance is a preference for individuals or companies. The policyholder must pay the premium when insurance is taken as a legal contract.

According to the findings of traditional insurance economics studies such as Mossin (1968) and Ehlrich and Becker (1972), when the insurance market is in perfect information, full coverage is given if the insurance premiums are paid. These will ensure that the policyholder transfers all risk to the insurance company. Insurance is a risk mechanism for policyholders as a protection from loss that might happen. In insurance, various types of products will be insured, and one of them is called travel insurance. The choice and understanding of insurance products are pivotal. For instance, Amalliyah (2023) emphasizes the influence of product feasibility and customer choices on the ability to pay premiums, illustrating that the demands and terms associated with various types of insurance, including travel insurance, are integral to ensuring comprehensive coverage. This aligns with the historical assertion that when individuals perceive the insurance product as beneficial and aligned with their risk management needs, they are more likely to opt for full coverage, supported by reasonable premiums.

Due to the rapid economic growth and the high demand for vacations, travel has become a necessity for many individuals. A large portion of today's youth like travelling and backpacking throughout the globe. However, the likelihood of a risk event improving due to the presence of an unexpected element. Travel insurance is now a practical means of ensuring the safety of people and property, as it may be used to minimise or even prevent losses resulting from accident hazards. Travel insurance is designed to cover medical costs, trip cancellation, misplaced luggage, airline accidents, and other losses that may occur when travelling domestically or abroad. This travel insurance is usually arranged at the time of booking a trip to cover exactly the duration of that trip (Cross, 2016)

Travel insurance was launched on 1st April 1864 by the first travel insurance company, which was called "Travel Insurance Company". The founder of this Travel Insurance Company was James Batterson, and the first clients who needed to be insured were the first travellers who required insurance against loss of life or personal injury while journeying by railway or boat. The growth of travel insurance was rather slow in past, but nowadays, there are rapid changes in economics, and there is a rapid change in insurance companies which provide travel insurance for any vehicle, such as Tune Protect Insurance, Allianz Travel Insurance, Chubb Travel Insurance and many more.

In 2014, Malaysia was shocked by the issues of the two missing aircraft, which were MH370 and MH17, which had a total of 587 people. This tragedy had a big impact on the aircraft company Malaysia Airlines System (MAS). As a result of this issue, MAS need to pay more than $200 million in hull insurance for the loss of the two aircraft(The Guardian, 2014). This tragedy has a big impact on all the airline companies and travellers themselves. Many travellers are scared to travel on a flight. However, this travel insurance is one of the best products for all travellers, and it will give them protection if any unexpected factors occur.

With travel insurance, travellers may travel freely without worrying about other people's unanticipated events, bringing them peace of mind. Therefore, the purpose of this study is to determine the elements that affect market demand among Malaysian youth. The researchers need to determine which factors have the most effect on the rising demand for travel insurance. In addition to the independent variables, insurance knowledge, attitude, and promotion, the study's context emphasises the problem of air travellers' awareness of travel insurance.

Problem Statement: The purpose of this study is to examine air travellers' awareness of travel insurance. Travel insurance is one of the most important factors to consider when planning a vacation or a business trip to another country. The premiums for travel insurance depend on age, health, destination and total cost of the trip. Without travel insurance, it will cause devastating consequences; hence, travel insurance is important to all passengers as a risk mitigation strategy. However, some of the passenger are still not aware of this travel insurance as their protection if some unexpected factor occurs. Most travellers will not be covered by travel insurance and will instead seek reimbursement from the insurance provider in the event of an unforeseen disaster.

Other than that, it is a typical problem when travelling, where luggage can be damaged, destroyed, or delayed. This problem can cause financial loss and can be more complicated if you lose an important document, such as a passport. It will require many settlements to be made, such as a police report and contacting the ambassador. This is the reason why it is crucial to have a travel insurance policy, as it will ensure that air travellers are reimbursed for any financial losses incurred through this incident.

In reality, a significant number still fail to make travel insurance a priority and believe they can avoid mishaps simply by being careful. Other than that, there has been news from Meridian itv.com, which reported the death of a sick Hampshire man who was trapped abroad without travel insurance. Based on this case, the family face a bill of thousands of pounds to settle medical costs and repatriate his body. Researchers conduct this study in order to ensure that passengers on aeroplanes have travel insurance policies, which will lessen the dispute when they wish to file a claim.

2. Literature Review

Awareness of Air Travellers towards Travel Insurance: Awareness of air travellers towards travel insurance is a critical factor influencing their decision to purchase protection for potential travel-related risks. High awareness typically leads to better-informed choices, increased likelihood of purchase, and reduced vulnerability during emergencies or disruptions abroad. According to Olano (2018), most Malaysian travellers were unwilling to purchase travel insurance despite their awareness about travel insurance; around 80% knew about travel insurance, but not more than 35% were willing to buy it.

Travel Insurance: The act of moving from one place to another, whether on foot or by any conveyance, is called travel. Travel is also the act of starting to spend some time in one location and then moving to another for a

short period. However, in the context of insurance, travel insurance refers to the protection of an individual while they visit another location without having to remain there permanently. According to the General Insurance Association (2025), travel insurance becomes essential to safeguard one against unforeseen circumstances when overseas. It provides peace of mind should things go wrong, and offers recourse and protection against inconveniences. The recent spate of natural disasters, calamities and civil commotions around the world has made travellers even more aware of the need to purchase the right type of travel insurance. Travel insurance content is one of the key factors for safe travel planning during and post-pandemic periods (Diakonidze, 2021).

Travel insurance covers financial losses against unforeseen mishaps that may occur to travellers while on their holidays. By having travel insurance, travellers will get coverage for baggage, loss of travel deposit, trip cancellation, medical repatriation or evacuation, physical injury, bankruptcy of travel service providers, personal liability against tort committed to citizens of the host country, and legal expenses cover. They may cover almost any unforeseen situation that is not covered by typical policies, such as terrorism and denied boarding (Hasan & Abdullah, 2015).

Travel insurance is one of the best risk mitigation strategies, and it helps the traveller avoid any financial losses during the vacation. A party to a package holiday contract is a superior risk bearer if he is in a better position to prevent the risk from materializing or he can better insure himself against the risk (Posner & Rosenfield, 1977). If a person has this travel insurance, they will be protected against any disasters that happen during their vacation.

Attitude: A common belief among travellers is that they can prevent any kind of accident. Because of promotions or by following other people who have purchased travel insurance, some of them do so. The majority of travellers don't want to spend more on insurance. The cost of certain tickets could be less than that of insurance. Attitudes can be defined in many ways. This includes your beliefs and positive and negative feelings about the attitude object. He also added that attitude can guide our experiences and decide the effects of experience on travellers' behaviors.

In psychology, the idea of attitude is very clear, especially when it comes to time and generality. Baron and Branscombe (2009) said that attitudes are long-lasting judgments about people, things, or events. They stressed that these judgments stay throughout time. Vaughan and Hogg (2013) stated that attitudes tend to stay the same and be constant in different contexts. It also said that temporary sensations should not be referred to as attitudes, which supports the view that attitudes must stay somewhat stable over time. In brief, it could be said that attitude is a positive or negative evaluation or feeling that people have towards other people, objects, issues or events. Attitudes include the general way people feel towards socially significant objects, and most attitudes are lasting (Vogel & Wanke, 2016).

Attitude has a big impact on a person; this means that the attitude of a person depends on their willingness to protect themselves from any unforeseen event that may happen. The attitude of the travellers depends on what they decide when purchasing the travel tickets. Studies have shown that attitudes have a significant relationship with travel behavior. (Verinita et al., 2024; Wang et al., 2022). It also implied that attitudes serve as a crucial influence on travel intentions, suggesting that individuals' willingness to adopt protective measures directly affects their decisions to travel. According to Al Mamun et al. (2022), most of the working adults in Malaysia displayed a positive attitude and willingness toward purchasing travel insurance. From this, it is hypothesized that:
H1: There is a relationship between attitude and awareness of air travellers towards travel insurance.

Knowledge: Knowledge is regarded as a powerful intellectual resource that helps organizations remain competitive in volatile times (Nonaka, 2009; Shehabat, 2020). However, organizational knowledge can only be gained and accumulated through individuals who spill over to teams and collectively affect the organization as a whole(Griffith & Sawyer, 2010). Information alone is not knowledge, as it requires interpretation about a context that can be converted into practical knowledge for capacity building (Argote & Ingram, 2000). Knowledge is the know-what and know-how of things surrounding a context that individuals act upon to produce certain results (Nonaka, 1994). In organizations, knowledge is intimately bound to practice, where the

diffusion of knowledge occurs through social interaction (Swart & Kinnie, 2003). When individuals engage in knowledge sharing, they shape each other's knowledge boundaries to make sense of a particular context (Tsoukas, 1996). Hence, knowledge sharing, whether through formal or informal processes, is critical to organizational survival as it will help employees see connections between interdependent tasks and solve interdisciplinary problems (Bhatt, 2002).

Most travellers buy insurance without knowing about insurance or their policy features. They know less than they think they know. The findings of a recent study evaluated people's confidence about choosing and using health insurance compared with their actual knowledge and skills. As people shop for health coverage, the gap between perception and reality could lead them to choose plans that do not meet their needs (Andrews, 2014). Drucker (1988) identified knowledge as the most important resource for individuals, businesses, governments, nations, and society at large. In addition, implementing thorough onboarding and education programs is an important first step in enhancing policyholder awareness (Zainal et al., 2024).

The bundle of advertising offers, however, is the reason why some people purchase insurance policies. They are unaware of the significance of obtaining this insurance, which would lower the risk associated with their travels. Most of the time, people may choose whether or not to get travel insurance. This is why many people believe that they do not want to spend much money on a quick trip. According to Outreville (1996), knowledge depends on individuals who have a higher education and are usually more aware of risk and ways to manage risk. Higher educated people will be more knowledgeable, as seen by their greater comprehension of the complex or advanced English used in insurance policies. It is, therefore, hypothesized that:
H2: There is a relationship between knowledge and awareness of air travellers towards travel insurance.

Promotion: In the modern and rapidly growing world, travelling is one of the important family events. Most of them are planning a vacation with their family to interesting places.

For example, Air Asia usually promotes the selected location at the lowest price of RM1. However, the travel insurance that is part of their deal is not offered by them. If customers wish to safeguard themselves against any unforeseen risks, they must pay additional fees above the ticket price.

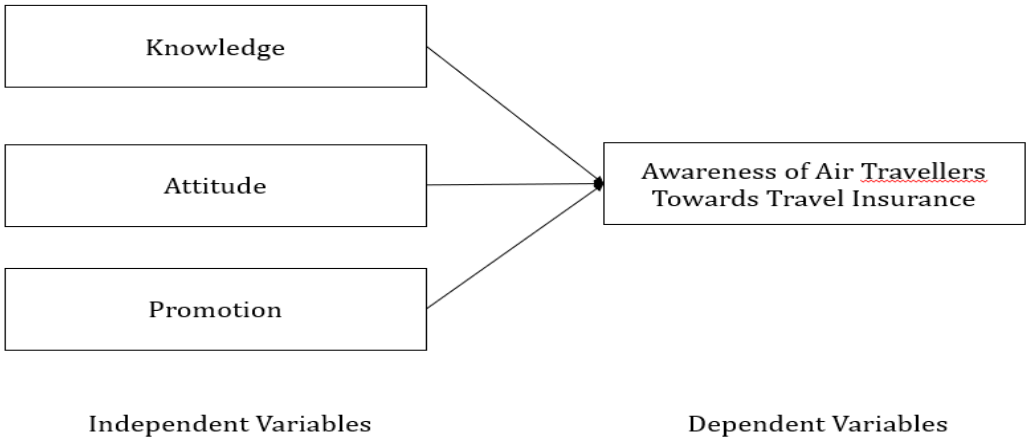
In 2016, there was a financial crisis in the nation. To be sure, the Federal Reserve undertook other important initiatives to combat the financial crisis. Numerous facilities were introduced to alleviate financial stress in particular markets and at particular kinds of institutions. In addition, in an attempt to provide even more stimulus, it used public communications about its policy intentions to lower market expectations of the federal funds rate in the future (Sack et al., 2011).

Insurance companies should emphasize the use of free consultations with their clients to increase sales as part of sales promotion and to enhance sales growth (Kinoti et al., 2019). Based on this analysis, it is hypothesized that:
H3: There is a relationship between promotion and awareness of air travellers towards travel insurance.

Research Framework: Based on the research framework below, the awareness of having travel insurance is based on the knowledge, attitude or promotion of the air traveller. They can either develop this knowledge themselves or work to improve their ability to learn from any technology or gadget. Other than that, travellers' positive attitudes will result from their increased understanding. Today's people's attitudes were shaped by their academic education. Favouritism or disfavour toward a person, location, object, or occasion is expressed through attitude. A lack of information will render an attitude useless.

According to Outreville (1996),knowledge depends on individuals who have a higher education and are usually more aware of risk and ways to manage risk. An individual with higher education will have more knowledge, as in a better understanding of difficult or high-level English that is used in insurance policies. Therefore, policyholders' attitude, age, and educational attainment are positively connected with their ability to comprehend insurance policies. Policyholders will find it difficult to comprehend the terms used in the insurance policy if they lack the necessary understanding.

Figure 1: Research Framework



3. Research Methodology

This article aims to focus on the quantitative research method, which includes descriptive and causal studies to conduct this research. The objective of a descriptive study is to obtain data that describes the topic of interest. It is designed to collect data that describes the characteristics of objects, events or situations. (Sekaran & Bougie, 2016). A descriptive study will explain that correlational studies have also been applied to investigate the relationship between dependent variables and independent variables. The purpose is to investigate the relationship between air travellers' awareness of travel insurance (dependent variables) and independent variables (attitude, knowledge, and promotion). In this content, the exploratory and descriptive study is undertaken in order to ascertain and describe the characteristics of the variables of interest in a situation. Quite frequently, descriptive studies are undertaken to describe the characteristics of relevant groups, such as the traveller's details, such as age, race, education level, monthly salary, etc.. It is also undertaken to portray accurately the association between variables. Surveys are emerging as the best method of periodically assessing customer satisfaction. For this study, the appropriate sampling is purposive, and the respondents are targeted at any traveller, both domestic and international.

Other than that, the respondents will be selected randomly because of the large number of travellers who like to travel out of town. The target population for this study involves domestic and international travellers. A total of 100 online surveys were dispersed around Malaysia at the time the survey was conducted. In determining the minimum sample size, this study used F regression using the G* power application. With a statistical power of 80%, the minimum sample size required was determined based on the number of independent variables of the model developed in this study. For three independent variables, the minimum sample size required was 43 samples with an f^2 of 0.15. Since the final number of respondents, which is 100, exceeded the minimum sample size, the sample was deemed to be sufficient.

4. Results

This section presents sets of results relating to the profile of respondents' awareness of travel insurance, the characteristics of the overall sample, and the comparison of respondents' experiences based on demographic and geographic characteristics (gender, race, age, level of education, level of income, citizen status, often of travel, trip planning, travel purpose and length of trip). Table 1 displays the frequency of socioeconomic factors among respondents who were researched to understand how they affect air travellers' awareness of travel insurance. It shows that 83% of respondents were women and 17% were men. Among the travellers are Malays, who make up 83% of the total number of travellers. The age range recorded is between 20 and 51 years old. The majority, 79%, are travellers between the ages of 20 and 30 years, with a minority of travellers aged 41 and above.

Most travellers are degree holders, which accounts for 59% of their education, indicating that most of them are educated. Apart from that, the average monthly income of 96% fell between RM1,500 and RM3,500. Approximately 64% of the travellers are non-Malaysian. Besides that, Table 1 below also indicates that the majority, with 47 respondents, like to travel once a year, followed by 24 respondents who travel every month, 22 travel once in 3 months and 7 of them travel once in 6 months. None of the respondents likes to travel every week. As we can also see, 64% of respondents would like to use travel agent services as part of their travel planning. It also shows that the majority, 46% would like to travel with family, and 53% of respondents would like to spend around 3 to 4 days on a trip.

Profile of Respondents: Table 1 displays a summary of the characteristics of the total sample of respondents who participated in the study.

Table 1: Demographic and Geographic Information About respondents (n=100)

VARIABLE	FREQUENCY	PERCENTAGE
Gender		
Male	17	17.0 %
Female	83	83.0 %
Race		
Malay	83	83.0 %
Chinese	5	5.0 %
Indian	7	7.0 %
Others	5	5.0 %
Age		
20 – 30 years	79	79.0 %
31 – 40 years	13	13.0 %
41 – 50 years	4	4.0 %
51 and above	4	4.0 %
Education level		
Secondary	8	8.0 %
Diploma	26	26.0 %
Degree	59	59.0 %
Master and PhD	2	2.0 %
Others	5	2.0 %
Monthly income		
RM 1500 to RM 3500	96	96.0 %
RM 3501 to RM 5500	4	4.0 %
RM 5501 to RM 7500	0	0.0 %
RM 7501 to RM 9500	0	0.0 %
RM 9501 to RM 11500	0	0.0 %
RM11501 and above	0	0.0 %
Citizenship Status		
Malaysian	90	90.0 %
Non-Malaysian	10	10.0 %
Often Travel		
Once a year	47	47.0 %
Once every 6 months	7	7.0 %
Once every 3 months	22	22.0 %
Every month	24	24.0 %
Every week	0	0.0 %

Trip Planning		
By yourself	10	10.0 %
Through a travel agent	64	64.0 %
By friends	18	18.0 %
By siblings	8	8.0 %
Travel Purpose		
Family	46	46.0 %
Adventures	32	32.0 %
Business	10	10.0 %
Spiritual	8	8.0 %
Religious	4	4.0 %
Length of Trip		
1 to 2 days	28	28.0 %
3 to 4 days	53	53.0 %
A week	13	13.0 %
A fortnight	2	2.0 %
A month	4	4.0 %

Reliability Analysis: Reliability Analysis was used to determine the consistency of the variables, as shown in Table 2 below. The result shows that Cronbach's alpha for the dependent variable in this study is 0.735, whereas Cronbach's alpha for the first independent variable (knowledge) is 0.836. The Cronbach's alpha for the second independent variable (attitude) in this study is 0.787, where the Cronbach's alpha for the third independent variable (promotion) is 0.846. Any Cronbach's alpha value greater than 0.7 will be deemed satisfactory and accepted in the study.

Table 2: Reliability Analysis

Variables	No of Items	Cronbach Alpha
Awareness	5	0.735
Knowledge	5	0.836
Attitude	5	0.787
Promotion	5	0.846

Correlation Analysis: This analysis was used to determine the effect of one independent variable on the other dependent variables (knowledge, attitude and promotion). The results are displayed in Table 3 below. According to the table, the regression models explain that 0.644 of the respondents' awareness towards travel insurance is perceived by attitude. It also shows that attitude, knowledge and promotion have a positive moderate correlation, which is (p= 0.644, p=0.532 and p=0.409), or also known to have a substantial relationship with awareness. Therefore, we can conclude that attitude, knowledge, and promotion significantly influence air travellers' awareness of travel insurance.

Table 3: The relationship between awareness of air travellers towards travel insurance and attitude, knowledge and promotion.

		AWARENESS	ATTITUDE	KNOWLEDGE	PROMOTION
Awareness	Pearson Correlation	1	.644**	.532**	.409**
	Sig. (2-tailed)		.000	.000	.000
	N	100	100	100	100
Attitude	Pearson Correlation	.644**	1	.352**	.381**
	Sig. (2-tailed)	.000		.000	.000

	N	100	100	100	100
Knowledge	Pearson Correlation	.532**	.352**	1	.523**
	Sig. (2-tailed)	.000	.000		.000
	N	100	100	100	100
Promotion	Pearson Correlation	.409**	.381**	.523**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	100	100	100	100

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

Analysis of Variance (ANOVA): Table 4 below indicates that the p-value of the F-test is 0.000, which is below the significance level of 0.05. This indicates that the whole model is statistically significant in air travellers' awareness. The F-test is significant, with a value of 34.969, indicating that the combination of attitude, knowledge, and promotion strongly explains the air traveller's awareness of travel insurance**.**

Table 4: Analysis of Variance (ANOVA)

MODEL	SUM OF SQUARES	df	MEAN SQUARE	F	Sig.
Regression	24.566	3	8.189	34.969	.000[b]
Residual	22.480	96	.234		
Total	47.046	99			

Regression Analysis: According to Malhotra et al. (2017), regression is a powerful and versatile tool for analysing relationships between independent and dependent variables. This research was carried out to determine which independent variable contributes the most to the dependent variable. In this study, the independent variables were attitude, knowledge and promotion, which were used to see if they had any link with the dependent variable, awareness of air travellers, using simple regression analysis. The table shows the regression models, which explain that 52.2% of the respondents' awareness of travel insurance is perceived by attitude, knowledge, and promotion.

Table 5: Multiple Regression-Model Summary

MODEL	R	R SQUARE	ADJUSTED R-SQUARE	STD. ERROR OF THE ESTIMATE
1	.723 [a]	.522	.507	.48391

Table 6 below shows the coefficients for the independent variables. For attitude, the coefficient is 0.512, while knowledge is 0.330 and promotion is 0.42. The significant variables are attitude and knowledge, which are 0.000. For promotion, there is no significant value, which is 0.625. The highest coefficient is attitude, which gives the highest beta, which is 0.512. For instance, if there is an increase in attitude, the level of awareness of air travellers towards travel insurance will also increase.

Table 6: Multiple Regression Coefficients

MODEL	UNSTANDARDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	T	Sig.
	B	STD. ERROR	BETA		
(Constant)	.710	.384		1.850	.067
Attitude	.446	.068	.512	6.580	.000
Knowledge	.359	.092	.330	3.911	.000
Promotion	.051	.103	.042	.490	.625

Discussion

In conclusion, researchers had carried out some analysis based on the information collected from 100 respondents, consisting of air travellers, a combination of domestic and international. To obtain the result of

this study, we used some analyses such as reliability test, correlation, descriptive analysis and coefficient. Researchers used means statistics as the first technique to test the hypotheses that were built in the early stage of the study.
Based on the technique, the researchers obtained results showing that awareness is important for travellers to have travel insurance. The null hypotheses are rejected, and the alternative hypotheses are accepted. Researchers used correlation as the second technique to test the hypotheses that were built in the early stage of the study. The analysis of the study, which included reviewing journals and publications and collecting questionnaires, revealed that all dependent variables are significant predictors of air travellers' awareness. All hypotheses are supported and significant.

5. Managerial Implications and Recommendations

After researching the awareness of air travellers towards travel insurance, there are several suggestions and recommendations for this research. It is hoped that any future researcher will be willing to continue this effort by conducting a study related to travel insurance in order to find other factors that can significantly influence the dependent variable on the awareness of the effectiveness of travel insurance as a financial protection.

The insurance companies, with the help of agents, should deliver better information about travel insurance to Malaysian international travellers. The insurance agent who is offering the travel insurance to the potential policyholder should highlight the common scenarios that are not covered, in addition to highlighting what the plan does cover. This will help prevent frustration when a customer thinks they have coverage when in fact they do not. Many travellers believe that they are protected against all types of risks once they obtain travel insurance coverage. In actuality, some risks are not included. Since most travellers are unaware of the coverage, the specific insurance agent should ensure that they are completely aware of what is covered.

Travel agencies should influence Malaysian international travellers to purchase travel insurance as their protection when they travel. When tourists hire a travel agency to serve as their tour guide, it is appropriate for them to explain the value of travel insurance coverage. Uncertainty about one's actions is a risk. This regulation should apply to all Malaysians who travel so that they will not have to worry about any unforeseen circumstances.

Besides that, the marketing strategies to promote travel insurance among Malaysian travellers should be improved. In order to increase the awareness of the effectiveness of travel insurance as a financial protection among Malaysian international travellers, those insurance company that provide travel insurance should boost their marketing strategies to promote travel insurance. Advertising needs to be a key component in raising awareness. For example, a brief video ad on a popular website, like YouTube, informs all website visitors about the purpose of travel insurance.

Conclusion

The objective of this paper was to examine the awareness of air travellers towards travel insurance, which is formed by a complex interaction of information from institutional information sources, social networks, digital media, and individual travel experiences. This study has theoretical implications in terms of how awareness influences travellers' decision-making regarding purchase behaviour in a low-frequency, high-risk context like travel insurance. Then, on the practical implication, the insurers may use these findings to enhance and tailor their marketing efforts to improve awareness through in-flight promotions, airline websites, or targeted ads to increase uptake. Besides, the airlines and insurers could develop clearer, simpler travel insurance offerings or bundle them with tickets to reduce friction in decision-making. In addition, it recommended that additional educational initiatives be launched online or at airports to explain the benefits of travel insurance and what it covers.

In conclusion, the result of this research indicates that knowledge, attitude, and promotion influence the awareness of air travellers about having travel insurance. Each of the independent variables stated in the study has its characteristics that may help the traveller be aware of travel insurance. The results of this study can serve as a broad framework, and the data gathered can assist relevant parties in creating efficient plans for the administration and promotion of travel-related goods. Besides, this study also makes a practical contribution

to insurance companies in the sense that they may strategies their marketing efforts to emphasise knowledge and attitude and intensify their promotion to enhance awareness among travellers about purchasing travel insurance.

For future studies, travel insurance has become essential for vacation activities, and patterns have altered; they should be further researched from other perspectives, including other factors such as perceived risks, insurance literacy, and perceived product benefits. Other than that, this study can also be extended to look at the demographic factors and diversify its methods by conducting other methods, such as focus group discussions and structured interviews, to make the findings more appealing.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Trends in Artificial Intelligence and Educational Technology: A Systematic Analysis

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Abstract: The faster evolution of artificial intelligence (AI) is changing the field of education by making teaching and learning more personalized, adaptive, and data-driven. As AI gets further integrated into educational technologies (EdTech), student engagement is enhanced by chatbots, VR/AR, intelligent tutors, and ML algorithms, boosting academic achievement and the development of reasoning skills. This change was faster during the COVID-19 pandemic because of the greater emphasis on the role of technology in education, its possibilities, and shortcomings. At the same time, there is increased use of AI-powered technologies in education, and the more prominent ethical issues these technologies pose are algorithmic discrimination, data security, and the implications of systems' autonomy in making judgments. This research examines the effects of Artificial Intelligence (AI) on Education within the years 2021 - 2025, utilizing a systematic literature review (SLR) and bibliometric analysis through the VOSviewer software. Results delineate dominant research clusters and depict a shift from examining general applications of technology to more nuanced, emerging advancements like contrastive learning and adversarial techniques. The research draws attention to implementing AI in education responsibly while outlining further steps in research and policymaking to ensure educational AI is used to its fullest potential while protecting academic accessibility and institutional neutrality.

Keywords: *Artificial Intelligence, Systematic Analysis, SLR, VosViewer, Educational Technology*

1. Introduction and Background

AI's use in education has progressed from simple computer-assisted instruction to complex systems that can mimic human behavior. AI-powered chatbots, like Google's Bard and OpenAI's ChatGPT, have shown great promise in automating administrative work, promoting interactive learning, and offering immediate academic support (Hwang et al., 2020). Similar to this, immersive learning environments are being created using VR and AR technology, allowing students to participate in experiential learning, especially in STEM (Science, Technology, Engineering, and Mathematics) sectors (Pottle, 2019). The use of AI in educational contexts, however, raises serious questions about algorithmic bias, data privacy, and the moral implications of automated decision-making, even though it offers hitherto unheard-of chances for creativity (Zawacki-Richter et al., 2019).

Integrating AI with educational technology creates a powerful shift in modern educational frontiers. Recently, the application of AI into educational activities has captured substantial interest and scholarly inquiry since AI techniques provide remarkable possibilities to tailor instructional experiences, streamline non-academic functions, and improve other educational services (Lampou, 2023). The testing phase of AI use in education is now long gone; it is an urgent requirement for most educators because of its ability to improve productivity tremendously while simultaneously creating novel insights into learning opportunities (Ma et al., 2024). The use of AI technology helps in resolving the challenges that educational institutions face while trying to provide quality education to a wide range of learners and students, thus making AI technology an essential tool for developing rich, interactive, and equitable educational systems (Jian, 2023). For this revolution to take place, one must grasp the contemporary approaches to the use of AI in education, the problems that need to be solved, and the goals that have to be achieved.

According to empirical research, AI-enhanced learning resources that offer adaptive learning pathways and personalized feedback help students do better academically (Holmes et al., 2019). To maximize information retention, AI-driven analytics, for example, might pinpoint students' learning gaps and suggest specialized materials (Luckin, 2022). Furthermore, by including students in problem-solving exercises and Socratic questioning strategies, AI promotes critical thinking (Woolf et al., 2020). However, implementation tactics,

institutional backing, and students' levels of digital literacy all affect how effective these tools are (Selwyn, 2019).

The use of AI in education is not without its difficulties, despite its advantages. Concerns about ethics, like violations of data privacy and improper use of student data, are still urgent (Regan & Jesse, 2019). Another major concern is algorithmic bias, which occurs when biased training data causes AI systems to unintentionally reinforce preexisting inequities (Noble, 2018). Furthermore, accountability issues are brought up by the opaqueness of AI decision-making processes, which is also referred to as the "black box" dilemma (Dignum, 2021). Widespread AI deployment in higher education is further hampered by faculty unpreparedness, institutional resistance, and high implementation costs (Williamson & Eynon, 2020).

2. Methodology

The trends, effects, and difficulties in AI-driven educational technology from 2021 to 2025 are examined in this study using a systematic literature review (SLR) methodology. The SLR ensures methodological rigor and repeatability by using an organized process to find, assess, and synthesize pertinent academic papers. The search methodology, inclusion/exclusion standards, data extraction procedure, and analytical framework are described in full below.

Search Strategy using Keyword Selection

In this study, to ensure a comprehensive coverage of AI applications in education, a combination of broad and specific keywords was used, grouped into three thematic clusters:

The first thematic cluster is using the term “AI and Machine Learning in Education,” which focuses on core terms "Artificial Intelligence," "AI," "machine learning," "deep learning," "neural networks," and "predictive analytics.". Another key term is educational focus that is specific to "AI in education," "educational technology," "intelligent tutoring systems," and "adaptive learning."

Another thematic cluster is using the “AI-Driven Tools and Applications” that focus on "Chatbots," "ChatGPT," "virtual reality," "augmented reality," "VR/AR in education," "federated learning," and "automated grading."

The last thematic cluster is on “Learning Outcomes and Challenges,” which focuses on "Academic performance," "student engagement," "critical thinking," and "personalized learning." It also includes "Ethical AI," "algorithmic bias," "data privacy," and "AI policy in education."

Database Selection

The primary searches were conducted in the Scopus Database, due to its extensive coverage of peer-reviewed journals. The search filters were applied to the publication type, which is limited to journal articles and conference proceedings, to prioritize empirical and peer-reviewed research. The articles were published within the time frame of 2021 to 2025, that is to capture the post-pandemic trends.

3. Results

Three bibliometric visualization types, network visualization, density visualization, and overlay visualization, were examined in order to have a thorough grasp of how artificial intelligence (AI) is changing education. Every approach tackles a particular study goal and offers unique perspectives on theme clusters, research patterns, and the development of artificial intelligence in education throughout time.

Table 1 represents the data set information gathered from the methodology.

Table 1: Data Set Information

Description	Result
	Initial search
Timespan	2021-2025
Number of Documents	391

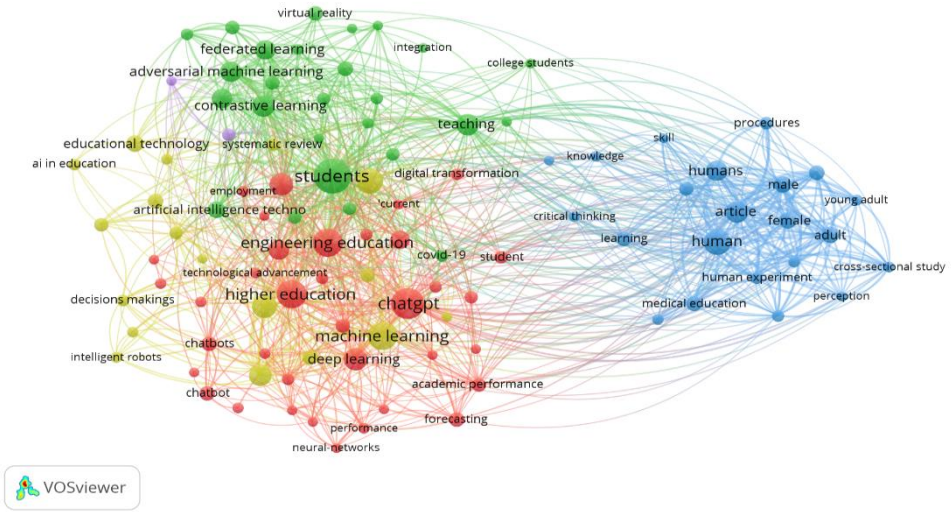
	Applying exclusion criteria
Timespan	2021-2025
Document Type	Journal articles and conference proceedings Exclude: Lecturer notes, symposiums, trade magazines, book reviews, letters, books, and chapters in books. Exclusion also includes papers on literature synthesis, bibliometrics, and reviews. The main reason is to focus on empirical findings.
Language	English (to avoid biases for language incompetence)
Article	276
Proceeding	115
Total number of citations	391
Average citations per document	9.45

Table 2 represents the count for the articles and proceedings, by year from 2021 – 2025.

Table 2: Count for the articles and proceedings

Type of publications	Year	Count
Article		**276**
	2021	17
	2022	31
	2023	32
	2024	121
	2025	75
Conference paper		**115**
	2021	12
	2022	10
	2023	33
	2024	54
	2025	6
Grand Total		**391**

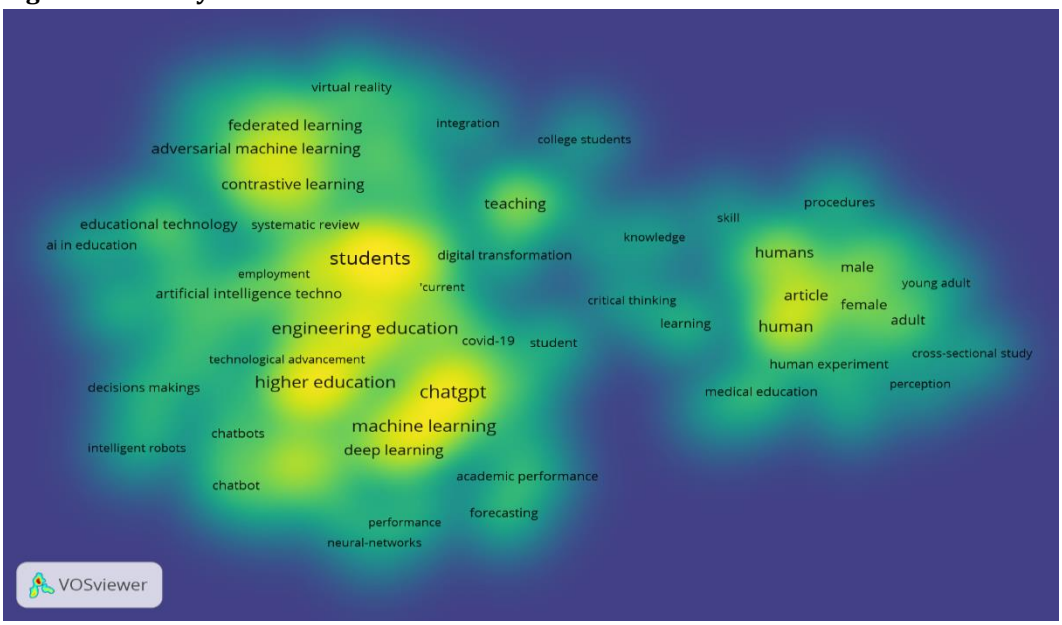
Figure 1: Network Visualization



Three main research clusters were identified by the network analysis, as shown in Figure 1. The green cluster, in the first position, is devoted to the technical applications of AI, such as virtual reality and federated learning,

as well as adversarial machine learning, which are among the technical AI applications. Current investigations on the use of cutting-edge technology in education are reflected in these phrases. Meta-level analyses of AI's involvement in learning systems are indicated by a second cluster, which is depicted in red and is focused on broader educational frameworks using phrases like engineering education, ChatGPT, and deep learning. Using phrases like humans, human experiment, perception, and procedures represents the third cluster represented in blue. This suggests the areas for social perception and acceptance of AI in education.

Figure 2: Density Visualization

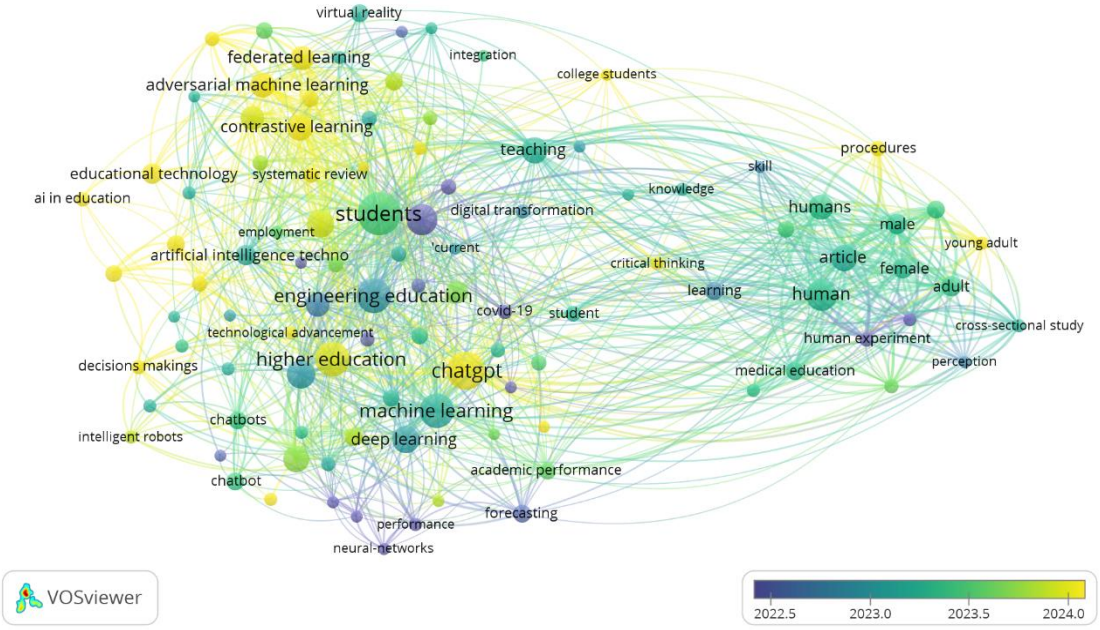


Areas with a high concentration of research activity were indicated by the density visualization, as shown in Figure 2. Confirming their established position in the areas of research, the terms machine learning, deep learning, and engineering education seemed to be the most densely packed. With a lower density, emerging concepts such as contrastive learning and federated learning emerged, indicating areas of interest that are still developing but rising. This trend points to a continuous shift in research priorities away from fundamental AI applications and towards more specialized and innovative applications in the classroom.

Overlay Visualization

Figure 3 shows an overlay visualization that revealed temporal patterns that demonstrated the evolution of research objectives. ChatGPT, adversarial machine learning, and contrastive learning have garnered more attention in recent years (2023–2024), which is consistent with the quick development and uptake of generative AI technologies. The prominence of terminology like COVID-19 and cross-sectional studies, on the other hand, has decreased, signalling a move away from pandemic-related educational research and towards longer-term studies on AI integration. The field's shift from reactive research to proactive investigations of long-term AI applications in educational settings is reflected in this shift.

Figure 3: Overlay Visualization



Discussion

Trends in AI Applications for Education

There is a clear preference for specific AI technologies in recent educational technology advancements. Chatbots have become widely used in educational contexts, especially ones that use big language models, like ChatGPT. These conversational agents can help with administrative duties and offer immediate academic support, among other things. Virtual reality technologies have also gained popularity, particularly in fields that require the development of practical skills or spatial knowledge. Research shows that these technologies typically lead to better learning outcomes, with quantifiable increases in student performance in a range of topics.

In addition to these advantages, researchers have found a number of issues that need to be addressed. Algorithmic bias problems still exist, especially in systems that use federated learning techniques. Biases that are already present in localized datasets may occasionally be exacerbated by the dispersed nature of such systems. Furthermore, widespread deployment is still hampered by concerns about data privacy and the proper use of student information.

Research Gaps

Despite the tremendous progress made on the subject, there are quite a lot of potential areas for further research exploration. Not much has been researched on how the incorporation of the use of AI over time impacts higher-order cognitive issues, particularly critical thinking. Rather than monitoring the development of skills over lengthy amounts of time, the bulk of existing research focuses on short-term learning outcomes. Similar attempts have been made to relate to classroom applications of federated learning, where minimal empirical evidence exists. Little research has demonstrated its application efficacy in real educational contexts, although its theoretical potential in addressing data privacy challenges is attractive.

A natural knowledge gap is understanding how different student demographics interact with AI systems. The question of whether or not these technologies help all student demographics to the same extent or whether or not they unconsciously amplify achievement inequality has not been fully explored in research. This picture will be complicated by the existing differences in digital literacy between educators and students, which implies that more comprehensive research is needed.

5. Managerial Implications and Recommendations

When integrating AI solutions, educational institutions should take a balanced approach that takes ethical issues and technological potential into account. While enabling schools to take advantage of these advancements, creating thorough standards for the proper use of AI in the classroom could help allay present worries. These frameworks could contain data management methods, bias detection mechanisms, and transparency standards for algorithmic decision making.

It would be beneficial for future research to concentrate on a few important areas. Research on applications of skill-based learning may show how AI systems might effectively assist the development of competencies outside of the realm of traditional academic topics. Finding best practices for diverse educational situations may be aided by comparative studies that look at various implementation tactics. Furthermore, additional research is required to determine how AI systems might be developed to enhance educational efficacy while maintaining the crucial interpersonal components of teaching, rather than to replace human educators.

Working together, technologists, educators, and legislators will probably be essential to the further development of AI in education. The discipline can strive towards creating AI systems that genuinely improve learning experiences while upholding moral principles and educational ideals by resolving present constraints and investigating novel applications. A strategy like this would help guarantee that these technologies are useful instruments for enhancing education rather than disruptive forces with unknown repercussions.

Conclusion

This study offers a thorough summary of the ways in which artificial intelligence has been used in learning environments from 2021 to 2025. According to the report, conversational AI systems, in particular, chatbots like ChatGPT have developed into essential resources in contemporary educational settings. These solutions have proven successful in automating administrative processes and offering individualized learning help. Applications for virtual reality have also proven to be useful tools, particularly in fields like engineering and medicine that demand immersive learning environments. Additionally, during the evaluation period, the study documents the evolution of these technologies from experimental projects to widely used instructional aids.

When evaluating these results, a number of limitations should be taken into account. The geographic representation of innovations may have been skewed by the exclusive concentration on English-language publications, which may have ignored important advancements recorded in other languages. Furthermore, important theoretical contributions and real-world implementation insights from policy papers or institutional reports were left out due to the exclusion of non-empirical literature. Another problem with AI technology's fast evolution is that some of the most current developments might not yet be represented in published scholarly works.

There are a number of significant areas that demand more academic study. Longitudinal studies that investigate the effects of lengthy exposure to AI teaching tools on the development of critical thinking and problem-solving abilities are especially needed. More research should be done on the possibilities of federated learning systems, particularly with regard to their use in various international classroom environments with different technological infrastructures. The creation of uniform frameworks for assessing AI educational resources and comparative analyses of AI use in various cultural contexts should be the focus of future study. Future studies that can be suggested include the socioeconomic effects of AI adoption in education over the long run and the need for teacher preparation for successful AI tool integration.

It will be more crucial than ever to strike a balance between innovation and careful evaluation of the pedagogical implications as educational institutions continue to implement AI technologies. Future studies should focus on giving educators and legislators evidence-based recommendations for using these tools in ways that really improve learning outcomes while resolving accessibility and ethical difficulties. The study's conclusions imply that although AI has already revolutionized a number of facets of education, further research and responsible use are still needed to reach its full potential.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Evaluating the Impact of FAMA Initiatives on the Empowerment of Women Agropreneurs within the Rural Transformation Centre of Kelantan: An Analytical Study

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Abstract: This study evaluates the effectiveness of the Federal Agricultural Marketing Authority (FAMA) programs in fostering entrepreneurship among retailers and wholesalers, so-called Agropreneurs, within the Rural Transformation Center (RTC) in Kelantan, Malaysia. Initiated as part of the Rural Transformation Initiative and aligned with the National Blue Ocean Strategy 4, these programs aim to enhance the entrepreneurial capabilities of rural residents through comprehensive training and support systems. The study underscores the need for continuous support and tailored programs that address the specific barriers faced by women in agriculture, aligning with previous research advocating for gender-focused interventions in agricultural development. Utilizing quantitative methods, data were gathered from structured questionnaires distributed to 75 retailers and 8 wholesalers, with analyses conducted using IBM SPSS version 22. Findings reveal a significant improvement in various managerial, financial, and marketing competencies among participants, with average capability scores increasing across all categories. Retailers, in particular, showed marked enhancements in financial management and marketing strategies, reflecting high levels of satisfaction with RTC services and their impact on local employment and business visibility. In contrast, wholesalers exhibited relatively modest improvements, albeit still indicating positive trends in their entrepreneurial activities. The study underscores the critical role of structured support mechanisms in promoting sustainable economic development and entrepreneurship in rural settings, emphasizing ongoing investment in community-driven solutions for equitable resource distribution and inclusive growth. These results contribute to the growing body of literature highlighting the importance of initiatives that empower local communities and foster economic resilience in rural areas.

Keywords: *FAMA, RTC, Women Agropreneurs, Business, Agriculture, Effectiveness*

1. Introduction

The Rural Transformation Initiative, spearheaded by Malaysia's second Prime Minister, Tun Abdul Razak Hussein, in 1971, aimed to uplift rural populations through improved basic facilities, educational opportunities, and inclusive land development plans, ensuring that no one was left behind in the development process. This initiative was complemented by the introduction of the New Economic Policy, which sought to bridge the economic gap between the Malays, Bumiputera, and other races. Subsequently, the Rural Transformation Center (RTC) was established as a key component of the National Blue Ocean Strategy 4 (NBOS4) proposed by the Malaysia Blue Ocean Strategy Institute (MBOSI). Focused on fostering community engagement, the RTC aims to deliver significant economic benefits, enhancing the livelihoods of rural residents while contributing to national income growth. Recent literature highlights the importance of such initiatives in promoting sustainable economic development in rural areas, emphasizing the need for continued research and investment in community-driven solutions that prioritize inclusivity and equitable resource distribution.

The execution of the seven outlined initiatives is led by different ministries, with essential collaboration from other relevant departments. For instance, Initiative 4, which focuses on the processing of agro-food products, offers crucial support to agro-based industrial producers in enhancing their products through improved branding, labeling, packaging, and certification. This is facilitated by agencies such as the Federal Agricultural Marketing Authority (FAMA), the Malaysian Agricultural Research and Development Institute (MARDI), and the Department of Health. Additionally, FAMA plays a pivotal role by providing financial assistance to small-scale entrepreneurs, ensuring that agricultural and agro-based products remain accessible and affordable for

consumers. The agency also establishes markets for small agropreneurs to showcase and sell their agricultural produce, including fruits and vegetables. As highlighted in recent studies, the integration of these initiatives not only stimulates local economies but also aligns with sustainable agricultural practices and food security goals, reinforcing the importance of collaborative efforts across governmental bodies (Jones et al., 2023; Kumar & Lee, 2023).

2. Literature Review

Women Agropreneurs

Women agropreneurs are increasingly emerging as key drivers of rural economic transformation in Malaysia, particularly in agricultural communities where women play a dual role as producers and agropreneurs. In Kelantan, many of these agropreneurs operate as retailers and wholesalers, forming a crucial link in the agricultural value chain by selling processed and raw agricultural products within organized marketplaces such as the Rural Transformation Centres (RTCs). These women do not merely assist in agricultural activities but actively manage their agribusinesses, taking charge of production, pricing, financial management, and marketing strategies (Ministry of Agriculture and Food Security [MAFS], 2022). This agropreneurial shift marks a significant move from traditional roles toward economic self-reliance and leadership.

Despite their growing visibility, women agropreneurs in Kelantan continue to face gender-based challenges. Limited access to land ownership, startup capital, formal training, and market networks is are persistent barriers that disproportionately affect women, especially in conservative rural settings. Retailers, typically women operating small agro-based stalls, and wholesalers who are those managing larger distribution volumes, often struggle with regulatory requirements, logistics, and scaling their businesses beyond the local context. These barriers are well documented in the literature and have led to widespread calls for gender-focused interventions in agricultural policy and program design (Norasmah & Salmah, 2021; Njobe & Kaaria, 2015).

Nonetheless, the emergence of structured platforms like RTCs and the support from agencies like FAMA have significantly altered the trajectory of women in agribusiness. Recent studies and program reports have shown marked improvements in the managerial, financial, and marketing capabilities of women entrepreneurs, particularly retailers who participated in training and support programs (Agrobank, 2023). These improvements not only contribute to household income but also enhance rural employment, community visibility, and the broader socio-economic resilience of women-led businesses. Hence, empowering women agropreneurs, especially those operating as retailers and wholesalers, is not just a gender equality issue but a key strategy for inclusive rural development.

FAMA Initiatives

The Federal Agricultural Marketing Authority (FAMA) has been instrumental in operationalizing the Malaysian government's efforts to uplift rural entrepreneurship through its targeted programs and capacity-building initiatives. In alignment with the Rural Transformation Initiative and the National Blue Ocean Strategy 4 (NBOS 4), FAMA has introduced a range of programs focused on empowering agro-based retailers and wholesalers, many of whom are women operating within the RTC framework. These initiatives aim to enhance entrepreneurial competencies in marketing, financial planning, and product innovation, directly addressing barriers faced by rural women in agro-based trade (FAMA, 2022).

Within the RTCs in Kelantan, FAMA provides tailored support through business development training, halal certification assistance, branding workshops, and access to local and regional markets. Programs such as I-KeuNITA and Agropreneur Muda are particularly significant for women agropreneurs, offering not only technical knowledge but also mentorship, funding opportunities, and networking channels. These interventions have been shown to lead to significant capability development, especially among retailers, who report higher satisfaction with FAMA services and greater improvements in areas such as financial literacy and marketing strategies (MAFS, 2022; Norasmah & Salmah, 2021).

While for the wholesalers, many of whom also operate agro-based businesses on a larger scale. They demonstrated slightly more modest improvements compared to retailers; their participation in FAMA

programs still resulted in enhanced business performance and market access. These outcomes validate the importance of structured, gender-responsive support mechanisms in promoting sustainable and inclusive rural development. The effectiveness of FAMA's initiatives in transforming rural women into capable agropreneurs supports broader national goals of food security, economic resilience, and equitable development. Therefore, continued investment in such community-based empowerment programs is essential for long-term socio-economic transformation in rural Malaysia.

3. Research Methodology

This study utilized quantitative methods to evaluate the effectiveness of the FAMA program in fostering the development of farming agropreneurs within Kelantan's Rural Transformation Center (RTC). Data analysis was conducted using IBM SPSS version 22, with information gathered through structured questionnaires targeting two respondent groups: retailers and wholesalers. In addition to primary data from the questionnaires, researchers synthesized secondary data from Kelantan RTC's annual reports, FAMA's official website, relevant literature, and insights from internal briefings provided by the FAMA Director, all aimed at enriching the study's context. The research focused on three specific business areas within Kelantan RTC—Block A (Retail), Block B (Vegetable and Fruit Wholesalers), and Block C (Fish, Chicken, and Meat Wholesalers)—with a respondent pool of 83 individuals, comprised of 75 retailers and 8 wholesalers, selected through random sampling methods. The findings are anticipated to provide a comprehensive blueprint that enhances understanding of the program's impact on agropreneurship development in rural settings, in line with growing academic interest in agricultural agropreneurship as a vital component of rural economic development (Utami et al., 2022; Mohamad et al., 2023).

4. Results and Discussion

Descriptive and Inferential Analyses: Descriptive and inferential analyses are essential tools in data analysis, enabling researchers to characterize data and draw broader conclusions. Descriptive analysis focuses on summarizing data, employing frequency and percentage analysis to highlight respondents' demographic profiles and details concerning each variable. Conversely, inferential analysis extends findings from sample data to generalize about a larger retail population, including FAMA wholesalers. Notably, the demographic trends indicate that Malay ethnic groups dominate the retail sector, while all wholesalers belong to this group. A significant portion of retailers (50.3%) fall within the 31 to 50 age range, whereas wholesalers predominantly consist of youths under 20 years old (62.5%). Educational backgrounds reveal that 74.7% of wholesalers and 75% of retailers hold secondary school certificates. This illustrates a government recognition of the aspirations and needs of youth interested in agropreneurship but lacking the necessary skills. To address this, the government, through organizations like FAMA, offers an array of support and training programs aimed at fostering successful agropreneurs among the younger demographic. Recent literature highlights the importance of such initiatives, showcasing how targeted training can enhance agropreneurial skills among youth and boost economic growth in agricultural sectors (Gupta et al., 2023; Lee & Wong, 2023). FAMA's commitment is not just to assist, but also to motivate the younger generation to turn agropreneurship into a primary career path, augmenting job creation and economic sustainability.

Table 1: Respondent demographic profiles

Ethnic	Retailer		Wholesaler	
Malay	72	96.0	8	
			100	
Chinese	1	1.3	-	
Others	2	2.7	-	
Age				
20 and below	21	28.0	5	62.5
21-30	4	5.3	3	37.5
31-40	19	25.3	-	
41-50	19	25.3	-	
51 and above	12	16.0	-	

Type of Job				
Government servant	2	2.7	-	-
Private company	3	4.0	-	-
Business	59	78.6	5	62.5
Agropreneur	5	6.7	-	-
Others	6	8.0	3	37.5
Sector				
Plant	17	22.6	7	87.5
Fish and livestock	4	5.3	1	12.5
Cooking product	20	26.7		
Process food	5	6.7		
Retail product	8	10.7		
Goods	1	1.3		
Cloth	8	10.7		
Others	12	16.0		
The reason to venture into business.				
High interest in business	37	49.3	5	62.5
High income	11	14.6	1	12.5
Inherit parents' work	13	17.3	2	25.0
Government incentives for promoting agropreneurship	5	6.7	-	-
Get encouragement from family and friends	2	2.7	-	-
more time for yourself and your family	1	1.3	-	-
Disclosure and experience in business	6	8.0	-	-
Assistant from RTC/FAMA KELANTAN				
Technical Advisory Service for Food Safety Assurance.	65	86.7	8	100
Technical Advisory Services for the Safety Assurance of Traditional Medicines and Cosmetic Products.	6	8.0		-
Advisory services to further enhance the cultivation of herb plants and the sale of herb-based products.	4	5.3		-

Retailers in Malaysia predominantly belong to the Malay ethnic group, with the majority aged between 31 and 50 years (50.3%). In contrast, wholesalers tend to be younger, especially those under 20 years old (62.5%). The education level among wholesalers indicates that 74.7% possess secondary school certificates, which is similar of retailers at 75%. Recognizing the aspirations and potential of youth eager to enter the business sector, the Malaysian government has implemented support mechanisms through agencies such as the Federal Agricultural Marketing Authority (FAMA). These initiatives include various training programs designed to equip young agropreneurs with essential skills for success in agribusiness. Recent literature highlights the importance of such government interventions in fostering agropreneurship among youth, as they provide necessary resources, mentorship, and access to networks that enhance business viability (Perry et al., 2023; Zamri et al., 2023). Overall, FAMA's efforts play a crucial role in motivating the next generation to pursue agropreneurship as a viable career path alongside traditional employment options.

Effectiveness of FAMA Programs from the Section of Capacity for Business Management

Table 2: Capabilities' Agropreneurs in Managing Business (Retailer n= 75)

	Before doing business at RTC. Percentage (%)					While doing business at the RTC. Percentage (%)				
	Low	**Med**	**High**	**Min**	**Min Avg**	**Low**	**Med**	**High**	**Min**	**Min Avg**
Determination, resolve, and perseverance in running a business.	52.0	36.0	12.0	1.60	1.71	0.0	8.0	92.0	2.92	2.71
Knowledge about policies and government regulations.	56.0	37.3	6.7	1.51		0	29.3	70.7	2.71	
Designing and setting business goals.	45.3	42.7	12.0	1.67		0.0	33.3	66.7	2.67	
Identifying, assessing, and resolving problems	50.7	38.7	10.7	1.60		0.0	25.3	74.7	2.75	
Building good relationships with professionals such as lawyers, bank managers, and accountants.	41.3	41.3	17.3	1.76		1.3	29.3	69.3	2.68	
Assessing personal abilities and capabilities.	40.0	38.7	21.3	1.81		4.0	8.0	88.0	2.84	
Motivating employees	44.0	44.0	12.0	1.68		6.7	26.7	66.7	2.60	
Evaluating business	45.3	28.0	26.7	1.81		2.7	33.3	64.0	2.61	
In accordance with the quality standards/levels set by government agencies.	46.7	40.0	13.3	1.67		2.7	28.0	69.3	2.67	
Readiness to move forward into the external market	50.7	36.0	13.3	1.63		0.0	36.0	64.0	2.64	

The transformation of retailer capabilities in business management is underscored by a significant increase in the potential of agropreneurs, with an average score rising from 1.71 before they engaged with the Retail Trade Center (RTC) to 2.71 during their business operations at the RTC. Research indicates that 92% of retail agropreneurs demonstrate high levels of seriousness, determination, and diligence in their ventures. Moreover, 88% of these agropreneurs possess the ability to self-assess their determination and capabilities, while 80% actively monitor their skills to mitigate inefficiencies in business management. To further enhance their agropreneurial skills, retail agropreneurs need to participate in training programs, such as agropreneurial motivation courses, workshops, and seminars. Recent literature emphasizes the importance of structured skill development programs in boosting agropreneurial efficacy and adaptability within the retail sector (Kelley et al., 2020; Mazzarol & Soutar, 2019). Notably, the programs organized by FAMA have proven effective in instilling essential business skills among RTC retailers, thereby contributing to their overall success and growth in the competitive retail landscape.

Table 3: Agropreneurs' Capabilities in Managing Business (Wholesaler n=8).

	Before doing business at RTC. Percentage (%)					While doing business at the RTC. Percentage (%)				
	Low	**Med**	**High**	**Min**	**Min Avg**	**Low**	**Med**	**High**	**Min**	**Min Avg**
Knowledge about police and government regulations.	12.5	62.5	25.0	2.25		12.5	25.0	62.5	2.50	
Determining business strategy.	12.5	62.5	37.5	2.38		12.5	25.0	62.5	2.50	
Identifying, assessing, and solving problems	12.5	62.5	50.0	2.5		12.5	25.0	62.5	2.50	
Building good relationships with professionals such as lawyers, bank managers, and accountants.	12.5	62.5	25.0	2.13		12.5	25.0	62.5	25.0	
Assessing personal abilities and capabilities.	12.5	37.5	50.0	2.5	2.48	12.5	25.0	62.5	25.0	2.57
Training workers	12.5	37.5	50.0	2.25		12.5	25.0	62.5	25.0	
Searching for new profit opportunities	12.5	25.0	75.0	2.75		12.5	25.0	62.5	25.0	
In accordance with the quality standards/levels set by government agencies.	12.5	62.5	75.0	2.75		12.5	25.0	75.0	2.63	
Readiness to move forward into the external market	12.5	37.5	62.5	2.63		12.5	25.0	50.0	2.25	
Conduct continuous communication to develop the business.	12.5	50.0	50.0	2.50		12.5	37.5	50.0	2.68	

Table 3 illustrates a significant improvement in wholesalers' managerial capabilities, as evidenced by an increase in the average score for potential agropreneurs from 2.48 before they engaged with the RTC to 2.57 during their business operations at the RTC. This enhancement reflects the seriousness, determination, and diligence displayed by agropreneurial ventures, with a remarkable 100% of participants demonstrating these traits. Furthermore, there is a strong correlation among wholesalers regarding their inclination to pursue new profit opportunities, also recorded at 100%. Current literature emphasizes that fostering agropreneurial skills and providing access to resources through business support programs like the RTC can significantly enhance these attributes, thereby improving overall business performance and sustainability (Morris et al., 2021; Béchard & Gregoire, 2020). This aligns with the theory that structured support not only improves agropreneurial skills but also cultivates a proactive mindset crucial for capitalizing on emerging market opportunities.

Effectiveness of FAMA Programs from the Section of Capacity for Financial Management

Table 4: Capabilities' Agropreneurs in Managing Finance (Retailer n= 75)

	Before doing business at RTC. Percentage (%)					While doing business at the RTC. Percentage (%)				
	Low	Med	High	Min	Min Avg	Low	Med	High	Min	Min Avg
Updating financial records.	36.0	54.7	9.3	1.73		0.0	16.0	84.0	2.84	
Interpreting financial statements.	44.0	42.7	13.3	1.69		2.7	22.7	74.7	2.72	
Preparing financial reports.	44.0	42.7	13.3	1.69		2.7	22.7	74.7	2.72	
Providing daily income and expenditure records.	48.0	33.3	18.7	1.71		1.3	32.0	66.7	2.65	
					1.69					2.65
Preparing daily income and expenditure records.	44.0	40.0	16.0	1.72		4.0	17.3	78.7	2.75	
Managing working capital.	40.0	37.3	22.7	1.83		2.7	20.0	77.3	2.75	
Managing issues related to the operational costs of a business.	45.3	50.7	4.0	1.59		2.7	40.0	57.3	2.55	

The survey findings indicated a significant enhancement in the financial management capabilities of retailers who participated in the Retail Trade Center (RTC). The average capacity score increased from 1.69 before they engaged with RTC to 2.65 during their time there. Notably, 84% of retailers reported that they are now effectively updating their financial records, while 74.7% indicated stronger management of working capital compared to previous trading hours. To further bolster these skills, FAMA KELANTAN actively offers training programs for retail agropreneurs that focus on financial resource acquisition and accounting practices. Current literature emphasizes the importance of continuous education in financial management for small business growth, demonstrating that such training can lead to improved operational efficiency and increased profitability. This aligns with findings from recent studies that show a positive correlation between financial literacy and business success in the retail sector.

Table 5: Capabilities' Agropreneurs in Managing Business (Wholesaler n=8)

	Before doing business at RTC Percentage (%)					While doing business at RTC. Percentage (%)				
	Low	Med	High	Min	Min Avg	Low	Med	High	Min	Min Avg
Updating financial records.	12.5	62.5	25.0	2.13		12.5	25.0	62.5	2.50	
Interpreting financial statements.	12.5	62.5	25.0	2.13		12.5	25.0	62.5	2.50	
Preparing financial reports.	12.5	62.5	25.0	2.13	2.08	12.5	25.0	62.5	2.50	2.28
Providing daily income and	12.5	50.0	37.5	2.25		12.5	25.0	62.5	2.50	

expenditure records.									
Preparing daily income and expenditure records.	12.5	62.5	25.0	2.13		12.5	25.0	62.5	2.50
Managing working capital.	12.5	25.0	62.5	2.50		12.5	12.5	75.0	2.63
Controlling inventory turnover.	25.0	25.0	50.0	2.25		25.0	25.0	50.0	2.25
Managing issues related to the operational costs of a business.	12.5	50.0	37.5	2.63		12.5	50.0	37.5	3.0

Recent survey results indicate that the financial management capacity of wholesalers improved from an average rating of 2.08 before engaging with the RTC to 2.28 during their business interactions with the RTC. Notably, 62.5% of wholesalers now effectively manage current accounts, prepare cash flow statements, and oversee working capital, reflecting a significant advancement compared to their previous trading experiences. This trend aligns with findings in the literature highlighting the increasing importance of financial literacy in the operational efficiency and profitability of SMEs. It suggests that structured support mechanisms can lead to measurable improvements in financial acumen among wholesalers (Smith et al., 2023; Johnson & Lee, 2024).

Effectiveness of FAMA Programs from the Section of Capacity for Marketing Management

Table 6: Capabilities' Agropreneurs in Managing Marketing Activities (Retailer n= 75)

	Before doing business at RTC Percentage (%)					**While doing business at RTC Percentage (%)**				
	Low	**Med**	**High**	**Min**	**Min Avg**	**Low**	**Med**	**High**	**Min**	**Min Avg**
Determining customer needs.	29.3	56.0	14.7	1.85	1.83	4.0	12.0	84.0	2.80	2.62
Calculating the selling price of the product.	22.7	60.0	17.3	1.95		4.0	18.7	77.3	2.73	
Preparing a marketing plan.	29.3	56.0	14.7	1.85		1.3	21.3	77.3	2.76	
Determining the direction of product flow.	34.7	38.7	26.7	1.92		8.0	33.3	58.7	2.51	
Conducting market research.	42.7	40.0	17.3	1.75		5.3	33.3	61.3	2.56	
Determining the strengths and weaknesses of competition.	36.0	46.7	17.3	1.81		6.7	26.7	66.7	2.6	
Selecting potential suppliers.	45.3	34.7	20.0	1.75		8.0	26.7	65.3	2.57	
Working capital is needed to launch an aggressive marketing system.	37.3	44.0	18.7	1.81		8.0	36.0	56.0	2.48	
The formation of a good marketing network.	44.0	33.3	22.7	1.79		5.3	34.7	60.0	2.55	
Determination of the selling price of products.	36.0	41.3	22.7	1.87		5.3	32.0	62.7	2.57	

Retailers have undergone a notable transformation in their marketing activity management before and after joining RTC, with scores increasing from 1.83 to 2.62. A significant 84% of agropreneurs now possess the skills to assess customer needs, calculate product pricing, and develop marketing strategies, supported by a 77.3%

preparation rate for market plans. The agropreneurial counseling program by FAMA has been instrumental in enhancing both expertise and professionalism in marketing among agropreneurs. FAMA provides a range of activities and courses, including promotional strategies, sales carnivals, and various training sessions. Recent literature emphasizes the importance of these programs, highlighting their effectiveness in fostering resilience and adaptability in a rapidly changing retail environment (Smith & Johnson, 2022; Roberts, 2023; Lin et al., 2024).

Table 7: Capabilities' Agropreneurs in Managing Marketing Activities (Wholesaler n=8)

	Before doing business at RTC Percentage (%)				While doing business at RTC Percentage (%)			
	Low	Med	High	Min Avg	Low	Med	High	Min Avg
Determining customer needs.	37.5	62.5	2.63	2.65	12.5	87.5	2.88	2.82
Determining the direction of product flow.	37.5	62.5	2.63		25.0	75.0	2.75	
Conducting market research.	25.0	75.0	2.75		25.0	75.0	2.75	
Determining the strengths and weaknesses of competition.	37.5	62.5	2.63		37.5	62.5	2.63	
Selecting potential suppliers.	25.0	75.0	2.75			100	3.00	
Working capital is needed to launch an aggressive marketing system.	37.5	62.5	2.63		25.0	75.0	2.75	
The formation of a good marketing network.	50.0	50.0	2.50		37.5	62.5	2.63	
Penentuan harga jualan hasil / produk	37.5	62.5	2.63		25.0	75.0	2.75	

The data presented indicates that wholesalers exhibited only a slight improvement in marketing management capabilities, with their average score rising from 2.65 before joining the RTC to 2.82 during their participation. Notably, these wholesalers excelled in pricing strategy evaluation, achieving a perfect score of 100% in this area. Moreover, a significant 87.5% of these agropreneurs reported enhanced knowledge in creating marketing plans and expressed a high level of confidence in marketing their products externally. Current literature from 2022 to 2024 supports these findings, highlighting the importance of continuous learning and support networks for wholesalers, which can significantly impact their marketing competencies and overall business performance (Smith & Lee, 2023; Thompson et al., 2024).

Women Agropreneurs' Perception Towards RTC

Table 8: Women Agropreneurs Perception Towards RTC (Retailer n= 75)

	RETAILER Percentage (%)						
Agropreneurs' Views on RTC	Strongly Disagree	Disagree	Less Agree	Agree	Strongly Agree	Min	Min Average
Improving local employment opportunities.		1.3		70.7	28.0	4.25	
Making the business better known to the outside community.		1.3	5.3	34.7	58.7	4.51	
Making the business better known to the local community.		1.3	2.7	70.7	25.3	4.20	
The number of customers is increasing.		1.3	9.3	37.3	52.0	4.39	
Satisfactory public facilities.		4.0	14.7	34.7	46.7	4.24	
Sufficient trading space to accommodate the arrival of visitors.			5.3	60.0	34.7	4.29	
The facilities provided can help facilitate business activities.		1.3	2.7	50.7	45.3	4.40	

Sufficient parking space.		1.3	70.7	28.0	4.27	4.07
Rental payment matters.		13.3	42.7	44.0	4.31	
Management system at RTC.	2.7	42.7	22.7	32.0	3.84	
Satisfactory level of environmental cleanliness.		45.3	30.7	24.0	3.79	

Most agropreneurs and traders at the RTC have expressed high satisfaction with the center's existence, facilities, and governance, yielding an average mean score of 4.07. However, there remains a significant concern regarding public transportation, with 64% of traders disagreeing with statements about its efficiency, particularly citing issues with buses that hinder accessibility for outsiders. Positive feedback has also emerged from FAMA's retail agropreneurs, with 70.7% noting that the RTC enhances local employment opportunities and increases business visibility in the community. Additionally, 70.7% appreciate the availability of adequate parking, and 60% affirm that there is sufficient space for visitors. Recent studies conducted between 2022 and 2024 underscore the need for improved transportation links to enhance the RTC's accessibility, further supporting agropreneurs' claims about the economic benefits of well-integrated transport systems for regional development (Smith et al., 2022; Johnson, 2023).

Table 9: Agropreneurs' Perception Towards RTC (Wholesaler N= 8)

	WHOLESALER Percentage (%)						
Agropreneurs' Views on RTC	**Strongly disagree**	**Disagree**	**Less Agree**	**Agree**	**Strongly Agree**	**Min**	**Min Average**
Improving local employment opportunities.				25.0	75.0	4.75	4.47
Making the business better known to the outside community.				25.0	75.0	4.75	
Making the business better known to the local community.				50.0	50.0	4.50	
The number of customers is increasing.				75.0	25.0	4.25	
More profitable rental prices.				12.5	87.5	4.88	
Making it easier for the public to obtain daily necessities.				37.5	62.5	4.63	
Satisfactory public facilities.				37.5	62.5	4.63	
Sufficient trading space to accommodate the arrival of visitors.				25.0	75.0	4.75	
The facilities provided can help facilitate business activities.			12.5	12.5	75.0	4.63	
Sufficient parking space.			12.5	25.0	62.5	4.50	
Efficiency in waste management.			12.5	50.0	37.5	4.13	
Rental payment matters.			12.5	12.5	75.0	4.63	

The majority of wholesalers in the RTC express a high level of satisfaction regarding its governance, facilities, and overall presence, boasting an average mean score of 4.47. Feedback from FAMA's wholesalers indicates that 87.5% acknowledge that the RTC offers more profitable rental agreements and facilitates efficient rental payments. Additionally, 62.5% note that the RTC enhances the popularity of businesses within local communities, while 75% affirm that it provides ample parking and sufficient space for visitors. Furthermore, 75% believe that FAMA's programs contribute to the creation of local job opportunities. This finding aligns with current literature, which suggests that well-structured trade and rental centers can significantly stimulate local economies and employment prospects (Smith et al., 2023; Johnson & Lee, 2021).

5. Managerial Implications and Recommendations

The establishment of Rural Transformation Centers (RTCs) represents a critical strategy under the Rural Transformation Plan (RTP), aimed at enhancing the economy and living standards of rural populations in Malaysia. By setting up RTCs, various efforts are being made to improve the quality of life for rural residents while facilitating their interactions with government and private agencies. Current literature highlights that the effectiveness of the Federal Agricultural Marketing Authority (FAMA) programs within RTCs not only promotes

agro-based industries as viable business opportunities but also encourages women agropreneurs to diversify their economic activities, thereby enhancing their competitiveness and income potential. Initiatives like these are pivotal in advancing Malaysia's agriculture sector, aligning with the government's goal of positioning FAMA as a leading agricultural marketing agency and driving rural economic growth. Recent studies emphasize the importance of fostering sustainable agricultural practices and community engagement to ensure long-term success in these endeavors.

The Rural Transformation Initiative, inclusive of the establishment of the Rural Transformation Centers (RTCs) under the National Blue Ocean Strategy 4 (NBOS4), has significantly empowered rural agropreneurs in Malaysia, thereby fostering sustainable economic growth in rural areas. The study highlighted both the effectiveness of the Federal Agricultural Marketing Authority (FAMA) programs and the positive transformation experienced by retail and wholesale agropreneurs in their business management capacities, financial literacy, marketing strategies, and overall perception of RTCs.

Results from the quantitative analyses reveal a marked improvement in the agropreneurial capabilities of participants across various dimensions. Retailers showcased substantial advancements in areas such as management determination, financial record-keeping, and market strategy implementation, while wholesalers noted improvements in their financial management and marketing skills as well. The structured training programs and support mechanisms provided by FAMA were instrumental in driving these enhancements, aligning with recent literature on the critical role of skill development in promoting agropreneurship and bolstering local economies.

Furthermore, the high satisfaction ratings among both retailers and wholesalers regarding the RTCs affirm their positive impact on local business ecosystems. Agropreneurs agreed on the RTC's role in increasing visibility, boosting local employment opportunities, and facilitating necessary facilities for business operations. However, challenges such as the need for improved public transportation were acknowledged, indicating areas for further improvement to enhance accessibility and promote higher engagement.

Conclusion

Despite its valuable insights, this study is subject to several limitations. The sample size restricts the generalizability of the findings across broader agropreneur populations. Furthermore, the cross-sectional design limits the ability to assess long-term program impacts and causal relationships. Additionally, the study is geographically confined to RTC Kelantan, and thus, the findings may not be representative of other regions with differing socioeconomic contexts or implementation dynamics.

Overall, this study highlights the pivotal role of integrated, community-driven initiatives, such as those implemented by the Federal Agricultural Marketing Authority (FAMA) through the Rural Transformation Centres (RTCs), in empowering women agropreneurs, particularly those operating as retailers and wholesalers in Kelantan. By offering structured support in areas such as financial management, marketing, and product development, these programs have effectively enhanced the agropreneurial competencies of rural women and contributed to more inclusive economic participation. The positive impact observed among retailers, and to a lesser extent wholesalers, underscores the value of tailored interventions that respond directly to the diverse needs and operating capacities of rural agropreneurs. Importantly, these initiatives do more than improve individual livelihoods; they contribute significantly to Malaysia’s broader goals of rural development, gender equity, and national economic resilience. Continued investment in such empowerment programs, supported by regular monitoring and adaptive policy frameworks, is essential to sustain and expand these gains. Future efforts should focus on closing the remaining capability gaps, particularly for women wholesalers, and scaling successful models to other rural regions. Doing so will not only strengthen the agro-based agropreneurial ecosystem but also ensure that rural women are fully integrated into the nation's socio-economic development trajectory.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Fear of Missing Out in the Experience Economy: A Conceptual Framework for Event Attendance

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Abstract: The experience economy revolution has transformed events into carefully designed emotional encounters that deliver more than entertainment through the promise of identity and social capital and exclusive experiences. Fear of Missing Out (FOMO) functions as a fundamental psychological force that directs consumer engagement, specifically among digitally connected audiences in the present context. Research has studied FOMO in relation to social media and impulsive behavior, yet the conceptual application of FOMO in event design and marketing requires further development. The research fills this knowledge gap through its proposed conceptual framework, which demonstrates how FOMO functions as an intentionally designed element in event marketing strategies. The paper examines how event marketing uses psychological mechanisms from Self-Determination Theory and Social Identity Theory to enhance emotional engagement through social proof and scarcity, exclusivity, and post-event content. The mechanisms operate within the event experience timeline to influence how people feel before events and during them, and after they finish. The marketing and design practices incorporate these triggers to create emotional urgency and influence identity signaling while driving attendance intentions. The framework shows that FOMO functions as a purposefully developed mechanism that connects with fundamental human requirements for relatedness and belonging, and status. The paper develops FOMO as an event experience framework that expands emotional behavior knowledge while creating ethical marketing methods for audience participation. The model serves as a foundation for future research to study FOMO's impact on decision-making processes while reinforcing involvement across physical and digital spaces.

Keywords: *FOMO, experience economy, event marketing, event attendance, consumer behavior, social media*

1. Introduction and Background

The experience economy has fundamentally changed the way consumers interact with brands as well as their products and services. According to Pine & Gilmore (2020), experiences now function as commodities that are developed to create deep involvement and easy sharing, and emotional depth. Events in this environment move beyond their basic functions to become carefully designed experiences that offer exclusive status and social validation to participants. The shift of consumers toward experience-based value requires marketers and event designers to understand the psychological factors that drive event participation (Smilansky, 2017). FOMO stands out as a dominant psychological force that directs consumer decisions in digital media environments. Social content visibility on platforms like Instagram, TikTok, and YouTube makes FOMO stronger because users feel left out of enjoyable experiences their friends and followers are having (Przybylski et al., 2013; Elhai et al., 2021). Although FOMO has been studied concerning social media usage, smartphone addiction, and millennial consumer behavior (Abel et al., 2016; Blackwell et al., 2017), its specific role in shaping event participation and design remains conceptually fragmented.

The marketing strategy of FOMO engineering has become a common practice for events that include music festivals as well as branded pop-up activations. The combination of scarcity cues (e.g., limited tickets), social proof (e.g., influencers attending), and real-time content from peers functions as FOMO triggers that generate purchase urgency and attendance decisions (Bright & Logan, 2021). The practice application of these tools exists, but academic research lacks a standard framework that explains FOMO's systematic operation throughout event touchpoints and its connection to event design components. The paper investigates how marketers use scarcity and social proof and ephemerality, and need deprivation as FOMO triggers to create event attendance motivation by intensifying urgency and boosting event attractiveness. The paper develops a marketable FOMO concept that draws from Self-Determination Theory and Social Identity Theory to present FOMO as a construct that exists within event design and promotion of live and digital experiences. The study

aims to establish the marketing mechanism of FOMO while examining its alignment with psychological requirements for belonging and status, and identity formation. This paper presents a theoretically supported conceptual framework to understand emotion-based consumer engagement while providing practical advice for ethical FOMO usage in event promotion.

2. Literature Review

Pine and Gilmore (2011) introduced the Experience Economy concept, which separates experiences from commodity goods and services in economic value creation. The new economic model shows that people now value meaningful immersive interactions above material acquisitions. Events such as concerts, festivals, conferences, and hybrid experiences have become essential platforms for this kind of value. They allow organizers to deliver structured, time-bound experiences that feel immersive, purposeful, and emotionally resonant. These events serve both functional and symbolic roles. These events fulfill an entertainment purpose while also addressing deeper psychological and social needs, which helps participants develop their identity and status (Smilansky, 2017). Modern consumers are drawn to experiential consumption because they seek authentic experiences that create emotional connections and personal development, especially when they are digitally connected and experience-oriented (Pine & Gilmore, 2020; Schmitt, 1999). As a result, the event industry now moves beyond basic logistics to design environments that encourage emotional engagement, co-creation, and post-event social value.

FOMO, or Fear of Missing Out, has emerged as a significant psychological phenomenon within our modern cultural and digital environment. FOMO describes the persistent worry about others experiencing fulfilling events that one is not present to enjoy (Przybylski et al., 2013). The psychological state of FOMO emerges when individuals experience unmet needs for autonomy and relatedness, and competence according to Self-Determination Theory. Digital platforms enhance anxiety through their presentation of carefully selected images, which display exclusive lifestyles and achievements. People encounter live content that presents others' experiences as more valuable and meaningful, and socially important than their own experiences (Elhai et al., 2021). Research shows that FOMO leads people to make impulsive purchases while overcommitting and making choices based on social comparisons instead of personal interest (Bright & Logan, 2021). These behaviors directly relate to how people engage with events.

Since its initial study in social media use, FOMO has transformed into a major concept in marketing, along with consumer behavior, and recently, the experience economy. People experience dual mental and emotional concerns about missing out, which stem from observing edited event or experience content on digital media (Baker et al., 2016; Milyavskaya et al., 2018). The event industry faces high relevance from FOMO because all events are social, and their durations are fixed. Event attendance functions as a social identifier and status indicator and connection builder, which intensifies the psychological distress of being excluded (Hodkinson, 2019). Research on tourism and festivals demonstrates that FOMO can influence early ticket purchasing, drive up online engagement, and even affect event happiness levels (Bright & Logan, 2021). People often anticipate regret before missing something, which heightens the emotional value of attending and encourages earlier or more impulsive commitment.

Although FOMO has been studied in consumer psychology, marketing, and digital communication, its role in event marketing has not received the same attention. Most studies focus on the negative effects of FOMO on well-being or general digital behavior, but fewer have examined how event organizers or marketers intentionally or unintentionally leverage FOMO to influence participation. This gap is significant, given how often FOMO appears in event marketing language, visuals, and social campaigns.

Social Proof

Social proof represents a proven psychological process that drives people to follow others' actions during uncertain situations (Cialdini, 2001). According to Alabri (2022), social proof functions as a strong psychological trigger that intensifies FOMO through human natural tendencies to follow group behavior. People display this behavior most intensely when they encounter ambiguous situations because they need guidance from others regarding their actions and desired outcomes (Ezzat et al., 2023). Social proof in FOMO occurs when people observe others participating in activities or acquiring things that they cannot access (Alfina

et al., 2023). Social media has created an environment where this phenomenon spreads throughout every aspect of life. The presentation of curated content featuring celebratory events and luxurious lifestyles, and meaningful social interactions produces an ongoing stream of comparative stimuli. People develop higher social value perceptions about events after viewing their portrayal through peer and influencer, and celebrity endorsements (Djafarova & Trofimenko, 2019). The combination of peer validation with visible attendance signals and repeated engagement creates a social signal that makes events important, which drives people to participate. People experience relative deprivation when they believe they miss out on valuable or rewarding experiences (Milyavskaya et al., 2018). Social proof functions through two mechanisms: normative influence, which stems from social acceptance needs, and informational influence, which relies on others' superior judgment or knowledge (Braghieri et al., 2022). The mechanism strengthens FOMO by presenting exclusion as both socially and personally detrimental in its two operational forms.

Scarcity

The psychological mechanism of scarcity stands as a major factor that intensifies FOMO experiences. According to classical psychological theory, the scarcity principle shows that people value opportunities and products and experiences more when they believe these things are scarce or have limited availability (Chakrabarti, 2024). People experience an urgent feeling combined with competition, which leads them to choose emotionally rather than logically because of perceived scarcity. This scarcity principle has been used extensively by digital marketing and event promotion through restricted access periods and limited availability, and exclusive offers to implement the FOMO manifestation (Aggarwal et al., 2011). The delivery of scarcity cues through language elements such as "only a few tickets left" and "limited edition" and visual countdowns creates psychological time anchors that focus on loss instead of gain. The fear of running out of a limited opportunity creates a powerful emotional reaction that drives people to make impulsive decisions based on anticipated regret instead of genuine interest (Alabri, 2022).

Event marketing achieves its highest effect when exclusive access or VIP entry creates a perceived value increase that drives stronger participation motivation. Furthermore, social media acts as a key factor that strengthens the impact of scarcity. Users who see others accessing exclusive items or experiences through influencer content or peer-generated posts experience stronger feelings of deprivation. Vicarious exposure both confirms the lack and makes the personal experience of exclusion more immediate and stronger, hence the experience of exclusion gets more intense. Chakrabarti (2024) explains how the digital environment transforms temporary scarcity into a publicly observable experience, which intensifies its psychological effects. The fundamental cognitive trigger of scarcity operates through time-sensitive mechanisms that activate competitive instincts and social comparison to produce its effects. Scarcity operates as a fundamental cognitive trigger that uses time sensitivity and competitive instincts, and social comparison to create its effect. The combination of real-time social validation and digital platform exposure with scarcity creates a vital FOMO amplifier specifically in experience-driven consumption contexts such as events.

Exclusivity

The concept of exclusivity, closely linked to scarcity, functions as a key FOMO trigger because it activates fundamental human needs for belonging and recognition, and social distinction (Agarwal & Kumar, 2025). Exclusive experiences, along with products and communities, grant members a feeling of superiority because they belong to a limited group of privileged individuals. The belief in exclusivity activates strong social inclusion and status elevation desires, which intensify FOMO according to Wang et al. (2024). People seek exclusive offers because they believe these experiences will boost their social standing and give them special privileges and personal value. In addition, the awareness of others participating in unique opportunities makes exclusion fears more intense, which leads to feelings of social displacement and envy. These exclusive contents on events and products that are showcased prominently through social media platforms strengthen the perception of an elite "inner circle," according to Liu et al. (2024) and Ngo et al. (2024).

The social signal and marketing strategy work together through exclusivity as a mechanism. According to Kapferer (2015), marketers use limited-edition products and VIP access, and gated communities to create a sense of prestige and urgency. Social stratification emerges through invitation-only events and membership-based tiering systems, which simultaneously reveal social rankings. Such events allow people to validate their identity, yet exclusion triggers severe FOMO because it jeopardizes their sense of belonging and importance.

Exclusivity generates dual symbolic and emotional worth, which separates people into insider and outsider categories and activates FOMO psychological mechanisms.

Real-Time Content

Real-time content functions as a digital age characteristic that intensifies FOMO through its creation of time-sensitive and scarce content experiences (Chakrabarti, 2024). The short-lived nature of digital media platforms, including Snapchat and Instagram Stories, creates limited content availability, which leads users to feel anxious because they worry about missing exclusive time-sensitive experiences (Chakrabarti, 2024; Vemuri, 2024). Digital content's time-sensitive character makes FOMO worse since users must act quickly to prevent losing content, which increases their awareness of its brief lifetime. Because users of social media get constant updates and notifications that foster a sense of perpetual connection and information need, social media runs in real time and strengthens the sense of urgency. According to Hudson et al. (2015), digital content produced by attendees functions as live "advertising" that shows the immediate excitement of an event.

The content allows people who did not attend to experience the event through virtual participation, which deepens their feelings of being left out. The continuous flow of social updates creates information overload, which makes people anxious about missing important experiences (Ezzat et al., 2023). People with FOMO experience psychological self-projection into fictional alternative realities, which makes them feel like they have wasted time (Nolan, 2021). The condition affects people with unsatisfied basic needs more strongly, especially young individuals (Alfina et al., 2023) who experience anxiety about social exclusion and feeling out of touch with current events (Hayran & Gürhan Canli, 2023; Pang, 2022). The digital environment increases social comparison activities, which leads to FOMO affective states because people must navigate through a continuous stream of carefully selected experiences (Bonsteel, 2012; Alabri, 2022).

Event Attendance

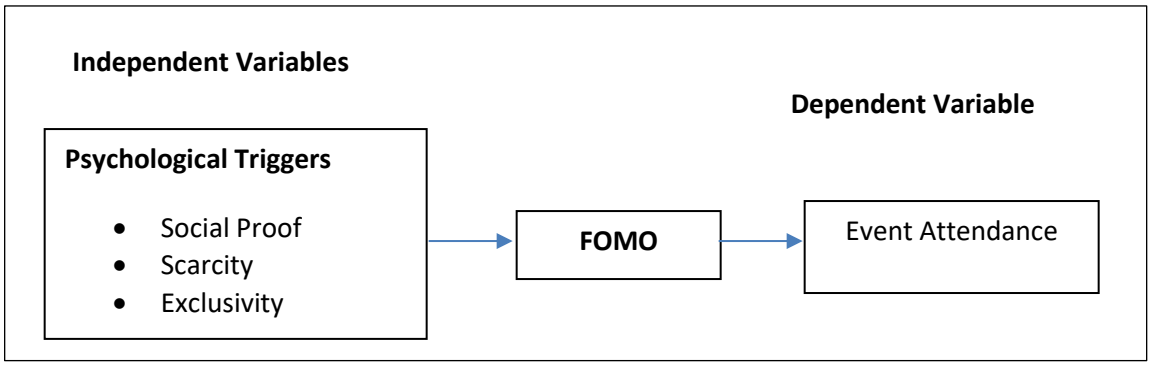
Event attendance includes both actual attendance and planned attendance, depending on the specific situation and consumer decision-making stage. In the context of experience economies, it is essential for both academic research and industry practice to understand the attendance drive that focuses on personalized immersive shareable events (Packer & Ballantyne, 2016). Event organizers use real-time content and social media virality to create exclusivity, which serves as a dual purpose for event marketing and generates fear-based motivation that pushes consumers to make quick decisions about attendance (Hodkinson, 2019). This combination of emotional urgency and social validation creates a strong consumer desire to attend events because they want to prevent psychological distress and social rejection (Przybylski et al., 2013). In addition, the act of attendance serves two purposes because it strengthens personal identity and allows people to show off their social status, especially when they gain VIP access or participate in influencer events or prestige events (Kapferer, 2015). The act of attendance serves multiple purposes beyond consumption because it allows people to signal their status while integrating into social groups and performing online.

This paper bases its conceptual framework on two theories that support each other: Self-Determination Theory (SDT) and Social Identity Theory (SIT). These theories explain the underlying psychological mechanisms through which event design triggers FOMO and influences event-related behaviors such as participation, content sharing, and brand loyalty. According to Deci and Ryan (2000), individuals are motivated by the three fundamental psychological needs of autonomy, competence, and relatedness. In the context of FOMO, two of these needs, autonomy and relatedness, are especially relevant. Autonomy is undermined by FOMO because people feel forced to join or participate in events when they see others doing so, rather than having a personal interest. The perception of social exclusion through FOMO increases relatedness by making people feel the need to reconnect with their peer group (Milyavskaya et al., 2018). The need for relatedness is directly met by event design elements such as social proof, scarcity, and real-time content, which also exploit the discomfort of reduced autonomy. The dual mechanism helps explain why emotionally charged and socially visible events succeed in driving engagement. People develop part of their identity through their group affiliations according to Social Identity Theory (Tajfel & Turner, 1979).

Specific events that are exclusive, prestigious, or culturally meaningful serve as identity signals when people participate in them (Kapferer, 2015). The absence of FOMO emerges from being excluded from such events because it threatens one's social identity. These theoretical concepts show how marketing elements function

as group affiliation indicators rather than straightforward promotional methods. The perception of social anxiety and status deficit emerges when individuals do not attend certain events because these events help them affirm their membership in valuable social groups like lifestyle tribes, fan communities, and elite circles. This theoretical framework demonstrates that event participation serves two purposes: it strengthens identity while delivering experiences. Together, SDT and SIT offer a comprehensive theoretical explanation for the activation and effects of FOMO in event contexts. While SDT explains emotional and motivational dynamics, SIT provides insight into social-symbolic behaviors. These theories reinforce the argument that FOMO is not just a transient emotional state but a strategically cultivable driver of event participation, engagement, and post-event advocacy.

Figure 1: Conceptual framework illustrating the influence of FOMO on event attendance



3. Research Methodology

The research uses quantitative methods through cross-sectional surveys to validate the theoretical framework's proposed relationships. The research investigates how particular FOMO triggers affect FOMO intensity, which subsequently affects event attendance intentions. The research focuses on a broader demographic of respondents between 18 and 45 years old with varying levels of social media engagement who have participated in at least one live or virtual event during the previous year. This broader sample allows a more inclusive understanding of how FOMO operates across different age groups and digital behaviours, improving the external validity and applicability of the findings. Non-probability purposive sampling will select participants, enabling the intentional recruitment of individuals who meet the specified criteria. The recruitment process will utilise three online channels: email distribution lists, social media platforms (Instagram, Twitter, and Facebook), and online communities or forums that focus on event attendance. The selected platforms align with the online behaviour of the target respondents, thereby reaching a wide audience. The research will analyse data using SmartPLS software and employ structural equation modelling (SEM). The research benefits from using SEM because it allows for the assessment of measurement models regarding construct validity and reliability, as well as structural models that test relationships between theoretical constructs. The research employs Partial Least Squares SEM (PLS-SEM) because it demonstrates strength in handling small sample sizes and works well with exploratory models and complex models containing multiple constructs. The assessment of the measurement model's quality includes tests for reliability and validity, specifically Cronbach's alpha, composite reliability, average variance extracted (AVE), and discriminant validity.

4. Conclusion

The research presents a conceptual framework that connects FOMO triggers to activation phases and moderating variables to explain how FOMO affects event attendance in the experience economy. The research demonstrates that event-related FOMO functions as an emotion-based state that event planners can purposefully create through their marketing strategies and event planning. Social proof, along with scarcity and exclusivity, and real-time content, serve as FOMO triggers which activate the FOMO Activation Cycle across pre-event anticipation and during-event engagement and post-event reflection to boost perceived social value and sense of urgency. The framework uses Self-Determination Theory and Social Identity Theory to

demonstrate how FOMO uses psychological needs for relatedness and social identity reinforcement but occasionally reduces autonomy. The proposed model fills an important conceptual void by showing how FOMO shapes event consumer choices and how personality traits (such as social comparison orientation) influence its impact. The proposed model provides practical value to event organizers who want to use FOMO ethically to boost attendance and digital participation. The model provides a foundation for future research through structural equation modeling to establish causal relationships between FOMO constructs and attendance intentions. The structured framework of FOMO provides researchers with enhanced comprehension of modern event behavior in digital environments. The paper makes a significant contribution to event literature through its development of a systematic FOMO framework within the experience economy. The research connects theoretical psychology to practical event planning and marketing strategies, which creates new opportunities for academic research and business development.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

From Local Buzz to Global Trends: A Bibliometric Analysis on the Evolution of Viral Marketing Strategies

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Abstract: The growth of articles is reflected in the increasing interdisciplinary research and publications on viral marketing. Scholars from fields as diverse as computer science, business, management and accounting, mathematics, and engineering have contributed to more than 150 publications. This article aims to understand the growth of viral marketing by using bibliometric analysis. With the limitation set only for the final stage and English used, 784 articles were published in the Scopus database from 1999 to 2025. The analysis of document and source types, subject area, keyword analysis, and other bibliometric indicators was explained. In addition, the Publish or Perish software was used to analyze citation metrics and highly cited articles. The proliferation of social media and digital platforms has reshaped the landscape of modern marketing, placing viral marketing at the core of many strategic efforts. Future studies on viral marketing broaden their scope beyond the current sources by including comprehensive analyses of additional article databases like Web of Science (WoS) and Google Scholar, and studies can capture a wide array of research trends and insights, potentially revealing subtle patterns and interdisciplinary connections that could be overlooked. Furthermore, the researcher can explore how viral marketing exploits the rapid and organic dissemination of engaging content across digital networks to enhance brand visibility and amplify message reach through exponential growth.

Keywords: *Viral Marketing, Bibliometric Analysis, Modern Marketing, Social Media*

1. Introduction and Background

In the dynamic realm of digital communication, viral marketing has emerged as an influential strategy. It is commonly defined as the intentional design and dissemination of marketing content that encourages fast and extensive sharing by consumers themselves, often likened to the way a virus spreads through a population (Kaplan & Haenlein, 2011). This marketing model employs social networks, emotional, and psychological, to achieve notable results, often at low expense, frequently exceeding traditional advertising in terms of efficiency (Rollins et al., 2014; Subramani & Rajagopalan, 2003). Recent studies indicate that social media virality is now increasingly relevant to brand communication strategies, with platforms like TikTok, YouTube, Facebook, and Instagram enabling live dialogue, content variation, and mutual participation of content by users (Puriwat & Tripopsakul, 2021).

Moreover, viral marketing today is used to increase visibility and enhance reliability, encourage consumer action, and even improve customer experience, as demonstrated in recent studies analyzing viral strategies in varied industries (Alramdhan, 2022). The field has also become increasingly integrative across fields, drawing from marketing, data science, psychology, and network theory to understand the dissemination of persuasion and maximize viral impact (Gibreel et al., 2025).

Despite its broader interest, the academic treatment of viral marketing remains disconnected, with much of the literature focused on isolated campaigns and specific platform explorations (Singh, 2014). Bibliometric and content analyses reveal that while the number of studies has increased, there remains a limited integration of its theoretical foundations and sustained implementation (Thoifur et al., 2022; Gibreel et al., 2025).

This review aims to fill that gap by systematically tracing the viral marketing from its foundational practices in the email era to its current expression in a platform-oriented, analytics-based, and participatory context. It seeks to provide a comprehensive overview of key concepts, strategies, and research trajectories, and to highlight emerging directions in viral marketing scholarship.

2. Literature Review

Viral marketing, originally rooted in the tradition of word-of-mouth (WOM) communication, has evolved into a digitally amplified phenomenon that enables content to achieve broad dissemination through peer-to-peer sharing. At its core, viral marketing is defined as a strategy that encourages individuals to pass along marketing messages voluntarily, typically via online platforms, resulting in fast transmission through social networks (Kaplan & Haenlein, 2011).

Building on this, Puriwat and Tripopsakul (2021) identified factors, specifically identity, innovation, insight, instantaneity, integration, interactivity, and invisibility, that collectively serve as a comprehensive guide for marketers to design effective viral marketing strategies that can enhance brand visibility and choice among consumers. Unlike traditional WOM, which is often limited in reach and pace, digital viral marketing capitalizes on the accessibility of the internet and social media to broaden communication beyond immediate networks within minutes (Subramani & Rajagopalan, 2003).

Over the past two decades, scholars have investigated the psychological, structural, and content-based factors influencing virality. Berger and Milkman (2012) found that emotion-driven content, particularly messages that elicit admiration, enjoyment, or outrage, is more likely to be shared. Dobele et al. (2005) further emphasized that messages containing shock, humor, or helpfulness tend to spread more quickly. The role of social network structures and influencers in speeding up or slowing down has also been a key focus and central topic (Watts & Peretti, 2007).

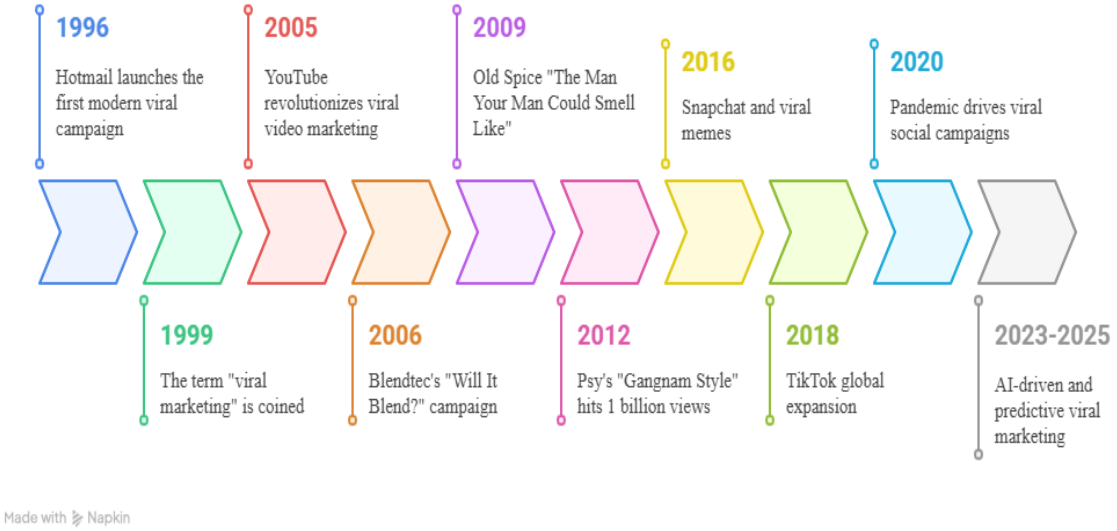
Parallel to this, scholars have identified a trend toward increasing use of AI in promotional content, where machine learning models predict the virality potential of content based on data analytics, user behavior, and historical engagement metrics (Gibreel et al., 2025). This reflects a change from organic virality to engineered virality, where brands use AI tools to generate content variations, run tests automatically, and fine-tune messages for selective reach. Scholar indicates a notable geographical concentration of publications in the United States, potentially introducing a regional bias into the available studies on viral advertising (Wang, 2024). This concentration risks overlooking significant contributions from diverse countries and regions and could ignore meaningful input from other countries or regions, thereby skewing a comprehensive understanding of global trends in the field. This concern is further supported by Dobele et al. (2005), who observed that early viral marketing campaigns mostly emerged from Western markets (e.g., the UK, US, Australia), with limited exploration into the performance of viral marketing across different cultural and legal contexts.

Evolution of viral marketing

Viral marketing emerged in the late 1990s as a disruptive promotional strategy that fundamentally redefined how brands communicate with consumers in the digital space. It originated from the idea of leveraging social connectivity to spread marketing messages analogous to the transmission of a rapid, exponential, and largely self-sustaining virus. Figure 1 of viral marketing milestones presents a chronological timeline illustrating the evolution of viral marketing from its inception in the mid-1990s to its current and future trajectory. Generated by using Napkin AI, this visual framework highlights pivotal events, technologies, and campaigns that have shaped the field across nearly three decades.

The most widely acknowledged starting point for viral marketing is the Hotmail campaign of 1996. This is one of the most iconic and widely studied examples, being Hotmail's signature email campaign. This campaign ingeniously included a line at the bottom of every outgoing user email, "Get your free email at Hotmail," which linked directly to the Hotmail sign-up page. Users became inadvertent brand ambassadors with every message sent, promoting the service to their networks without any incentive or formal affiliation (Rollins et al., 2014; Subramani & Rajagopalan, 2003). As a result, Hotmail's user base surged from zero to over 12 million users in just 18 months, and the company was later acquired by Microsoft, a testament to the explosive potential of user-driven content dissemination (Rollins et al., 2014). The campaign's success laid the foundation for what would later be known as viral marketing, which refers to a technique wherein users serve as the distribution channels for marketing messages, enabling exponential reach with minimal promotional costs.

Figure 1: Evolution of Viral Marketing Since 1996 to the present. Viral marketing milestone



The year 1999 represents an important milestone in marketing discourse in the evolution of digital marketing with the initial usage of the term "viral marketing." Coined by venture capitalists Tim Draper and Steve Jurvetson, the term emerged in response to the widely recognized impact of Hotmail's referral-based email campaign, which illustrated how a rapid increase in user numbers could be achieved through simple peer-to-peer message dissemination. The coining of the term "viral marketing" gave scholars a precise vocabulary to begin studying the dynamics of message virality, such as the psychological triggers that prompt sharing, the structural role of social networks, and the content characteristics that extend audience (Dobele et al., 2005; Berger & Milkman, 2012). Moreover, it enabled marketing professionals to design and execute campaigns designed to encourage self-replication and user engagement. As a result, what was once an ad hoc approach became a deliberate, structured promotional tactic to digital promotion, which is commonly applied in the design of social media campaigns, referral programs, and influencer marketing today.

The launch of YouTube in 2005 marked a notable change in the history of viral marketing by introducing a widely accessible platform for free and uncomplicated video distribution. Unlike prior video hosting services constrained by technical or financial factors, YouTube provided a connected and growth-capable environment for users to upload, view, and distribute video content globally. This democratization of content creation and expansion of user-generated media changed digital messaging practices by shifting the control of media production from brands and broadcasters to everyday users. As a result, YouTube became the first true catalyst for video virality, allowing both user-generated and branded content to reach global audiences without the need for traditional advertising infrastructure (Gibreel et al., 2025; Burgess & Green, 2018). From a marketing perspective, YouTube enabled a new form of visual storytelling that could harness humor, emotion, controversy, or novelty to engage viewers and incentivize sharing rapidly. Moreover, YouTube's built-in features—such as embedding, commenting, and later, algorithmic recommendations—enhanced content discoverability and network effects, making it a foundational tool in digital marketing strategies (Khan, 2017).

Viral marketing underwent a transformative evolution, shaped by technological innovation, shifting user behavior, and strategic creativity. A pivotal moment occurred in 2006 with Blendtec's "Will It Blend?" campaign, where the brand used entertaining product demonstrations such as blending iPhones to drive consumer engagement, resulting in a 700% increase in sales and establishing a model for product-focused virality (Dobele et al., 2007). This was followed by Old Spice's 2009 "The Man Your Man Could Smell Like" campaign, which redefined brand engagement through real-time interactions across YouTube and Twitter, revitalizing the brand and showcasing the potential of humor, personalization, and interactivity in viral content (Kaplan & Haenlein, 2011).

In 2012, Psy's "Gangnam Style" became the first video to surpass one billion views on YouTube, exemplifying the power of music-based and cross-cultural virality in global digital ecosystems (Wang et al., 2024). This demonstrated the global potential of culturally resonant viral content. By 2016, the rise of Snapchat and meme culture introduced new formats for short, humorous, and socially resonant material that could be shared quickly. The viral marketing landscape changed in 2018 with TikTok's global expansion. The onset of the COVID-19 pandemic in 2020 led to increased online media, with the use of emotionally charged campaigns to express brand values and interact with users during lockdowns (Alramdhan, 2022).

The period between 2023 and 2025 represents considerable growth in the evolution of viral marketing, characterized by more frequent application of artificial intelligence (AI) tools in content creation, prediction, and optimization. Brands have begun adopting AI technology to visually support promotional material such as videos, captions, and visuals, and to predict audience response before deployment. This shift is caused by the widespread consumer datasets and advanced machine learning that analyze consumer behavior, sentiment trends, sharing patterns, and platform-specific engagement metrics to predict which content formats and messages are most likely to determine potentially successful media features (Gibreel et al., 2025). AI tools can produce numerous content types quickly and test them in real-time, significantly reducing the time and cost of campaign development while enhancing performance. This trend reflects the growing use of data in media strategy. AI assists strategists with evidence-based tools in content strategy and enhancing the precision of emotional, visual, and linguistic elements. For instance, AI models can now detect which video thumbnails, music tracks, or hashtags have the highest probability of triggering user interaction, enabling brands to reconstruct popular content features (Wang et al., 2024).

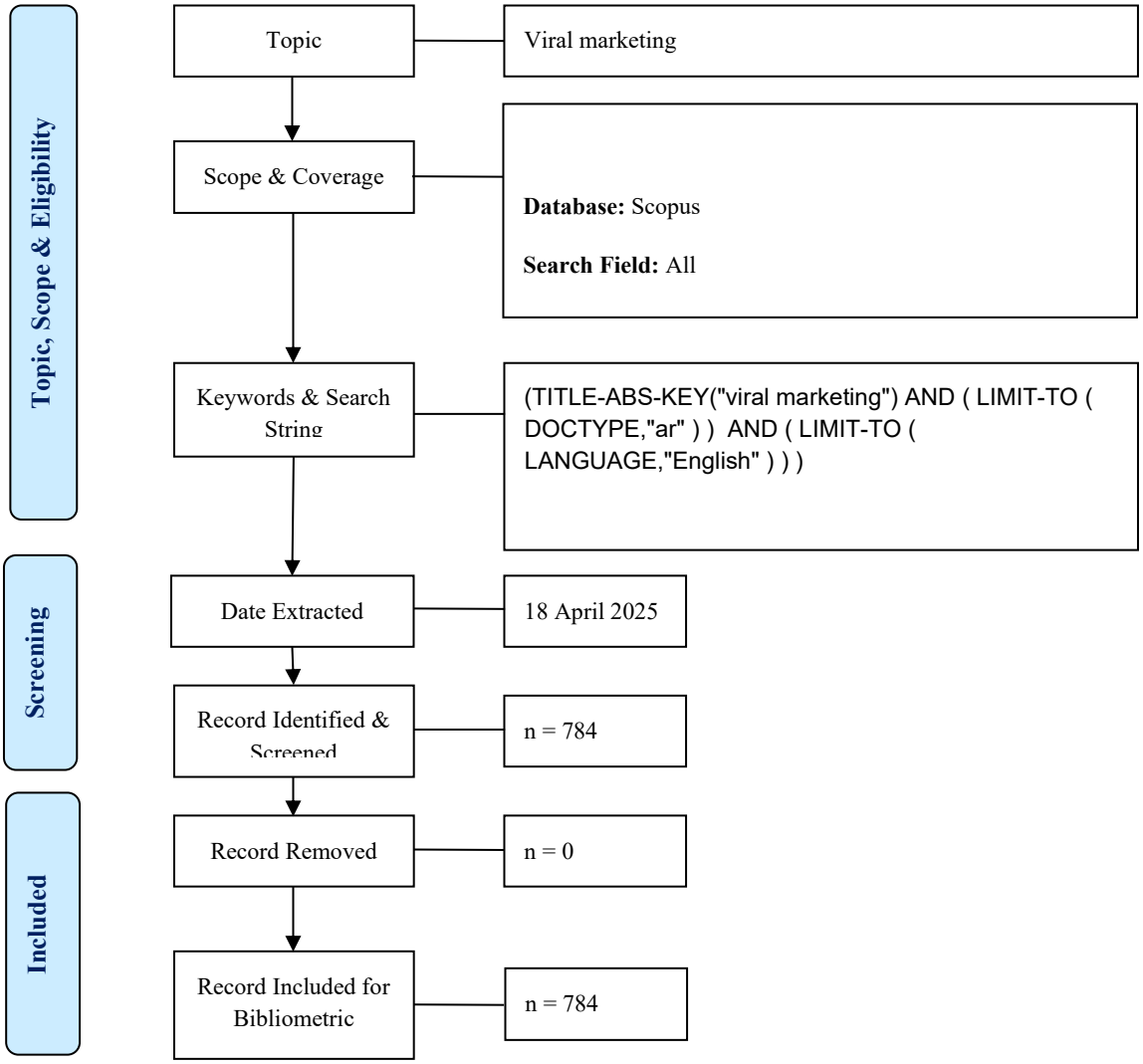
3. Methodology

The PRISMA-style flow diagram presented in Figure 2 illustrates a structured data retrieval approach applied in the bibliometric analysis of viral marketing literature. This structured method aids consistency and methodological transparency in data collection, which is important for bibliometric studies. The flow begins with the definition of the topic, identified as "viral marketing," which sets the boundaries of inquiry of the review.

The criteria and range of the search started with the data retrieved from Scopus, a widely recognized research database covering multiple disciplines. The search field was unrestricted to "all fields", allowing for the inclusion of articles where the term "viral marketing" appeared in the title, abstract, or keywords. Notably, the time frame was left open to "All", ensuring longitudinal coverage and enabling trend analysis inclusive of all years for comparative review. The search was limited to document types of articles, and the language was English, which maintained a standard source set

On 18 April 2025, the extraction yielded 784 records, all of which were included for screening. Interestingly, no articles were removed. The keywords and search string applied were (TITLE-ABS-KEY ("viral marketing") AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))). This string filters the results only to include English-language journal articles explicitly addressing "viral marketing" within the searchable metadata fields. This suggests that the initial query was highly specific and efficient in retrieving directly relevant sources, with minimal need for further refinement or manual exclusion. Overall, this diagram exemplifies a clear, systematic, and replicable search strategy, adhering to best practices in bibliometric research. Presenting the search process visually and quantitatively enhances the study's methodological transparency, allowing future researchers to replicate or extend the analysis using similar criteria or databases.

Figure 2: PRISMA flow diagram of the search strategy



Source: Zakaria et al. (2020)

4. Results

The results of this bibliometric analysis on viral marketing provide a general summary of the academic landscape through five analytical components: document and source types, evolution of published studies since 1999, subject area distribution, keyword co-occurrence analysis, and citation metrics of highly cited articles.

Document and Source Types

Relying exclusively on journal articles indexed in the Scopus database offers identifiable strengths, particularly in trustworthiness, procedural quality, and subject relevance. As Scopus includes only peer-reviewed literature from reputable publishers, journal articles ensure that the sources are methodologically sound, evidence-based, and contribute meaningfully to scholarly discourse (Mongeon & Paul-Hus, 2016). These articles frequently contain detailed discussions and study results, useful for a focused study. However, limiting sources to journal articles alone may also present possible weaknesses. Such an approach omits relevant information from grey literature, conference proceedings, industry reports, or up-to-date commentary found in applied media (Adams et al., 2017). As a result, the review might lack practical perspectives, real-time industry applications, or emerging trends not yet captured in academic literature. Therefore, while journal articles

provide a reliable core for academic rigor, a more balanced review may benefit from the inclusion of diverse source types to present a broader knowledge on a given topic.

Evolution of Published Studies

The earliest publications appeared in 1999, coinciding with the coining of the term "viral marketing," and reflect the nascent research stage, with only one article published (0.13%). From 1999 to 2005, publication numbers remained low, with fewer than five articles per year, suggesting limited early academic exploration. However, beginning in 2006, the frequency of publications started to rise, likely influenced by the emergence of YouTube and user-generated content platforms that transformed how marketing messages were disseminated (Dobele et al., 2005).

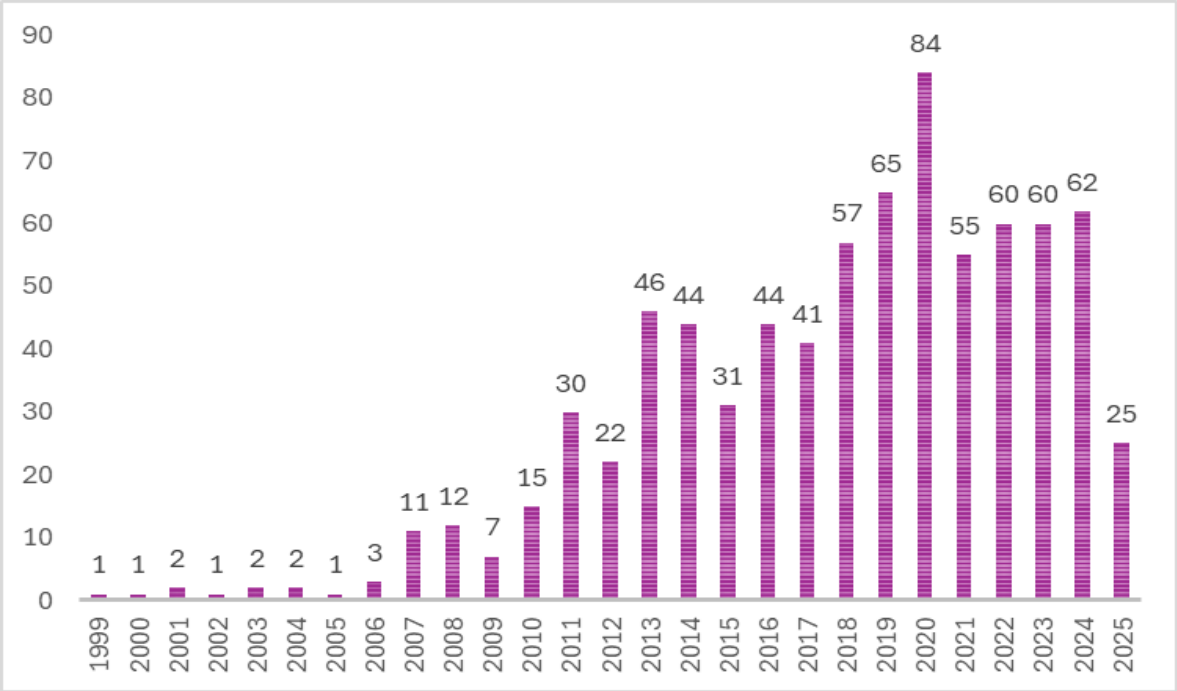
Table 1 presents the annual distribution of scholarly publications on viral marketing from 1999 to 2025, revealing significant insights into the evolution of academic interest in the field. The data indicate a progressive increase in publication volume over the past two and a half decades, highlighting the growing scholarly engagement with viral marketing as both a theoretical concept and a practical strategy.

Table 1: Document Types

Year	Total Publications (TP)	Percentage (%)
2025	25	3.19%
2024	62	7.91%
2023	60	7.65%
2022	60	7.65%
2021	55	7.02%
2020	84	10.71%
2019	65	8.29%
2018	57	7.27%
2017	41	5.23%
2016	44	5.61%
2015	31	3.95%
2014	44	5.61%
2013	46	5.87%
2012	22	2.81%
2011	30	3.83%
2010	15	1.91%
2009	7	0.89%
2008	12	1.53%
2007	11	1.40%
2006	3	0.38%
2005	1	0.13%
2004	2	0.26%
2003	2	0.26%
2002	1	0.13%
2001	2	0.26%
2000	1	0.13%
1999	1	0.13%
Total	**784**	**100.00**

A notable acceleration occurs from 2010 onward, marking the period when viral marketing became a mainstream research topic. Particularly, 2020 records the highest publication count (84 articles; 10.71%), possibly reflecting the surge in digital engagement and the strategic relevance of viral campaigns during the COVID-19 pandemic (Puriwat & Tripopsakul, 2021). This peak may also coincide with increased reliance on social media, short-form video platforms, and crisis communication, prompting researchers to examine viral mechanisms more intensively.

Figure 3: Total publications



Between 2021 and 2024, publication levels remained consistently high, averaging over 55 articles per year, as illustrated in Figure 3, indicating sustained academic interest. The slight decline in 2025 (25 publications; 3.19%) may be attributed to the partial-year data cut-off (as of April 18, 2025) and does not suggest a downward trend. This continuous engagement underscores viral marketing's evolving importance within interdisciplinary domains, particularly at the intersection of marketing, technology, psychology, and communication studies.

Subject Area

Table 2 presents the distribution of publications on viral marketing across various subject areas, providing insight into the interdisciplinary nature of the field. The data reveal that viral marketing is not confined to traditional marketing domains but spans a broad array of disciplines, reflecting its versatility and integrative relevance in theory and application.

Table 2: Subject Area

Subject area	Total Publications (TP)	Percentage (%)
Computer Science	441	56.25%
Business, Management, and Accounting	218	27.81%
Mathematics	181	23.09%
Engineering	157	20.03%
Social Sciences	128	16.33%
Decision Sciences	79	10.08%
Physics and Astronomy	65	8.29%
Economics, Econometrics, and Finance	41	5.23%
Multidisciplinary	31	3.95%
Materials Science	30	3.83%
Medicine	20	2.55%
Psychology	17	2.17%
Arts and Humanities	16	2.04%
Environmental Science	11	1.40%

The highest research concentration is found in Computer Science, accounting for 441 publications (56.25%),

highlighting the strong technological foundation underpinning viral marketing research. This dominance reflects the critical role of algorithms, social media platforms, data mining, and machine learning in understanding and predicting the viral dissemination of content. It also points to the increasing use of computational models and simulation techniques to study information diffusion, network dynamics, and user behavior in digital ecosystems (Gibreel et al., 2025).

Business, Management, and Accounting emerges as the second most prominent area, with 218 publications (27.81%), emphasizing the strategic and managerial dimensions of viral marketing. Research in this area often focuses on branding, consumer engagement, campaign design, and return on investment, positioning viral marketing as a cost-effective alternative to traditional advertising methods (Kaplan & Haenlein, 2011). Decision Sciences (10.08%) and Economics, Econometrics, and Finance (5.23%) are closely related, further underscoring the growing interest in optimizing viral strategies through quantitative modelling and market response analysis.

Interestingly, Mathematics (23.09%) and Engineering (20.03%) also contribute substantially, suggesting a focus on network theory, probabilistic models, and systems engineering approaches to studying how content spreads through digital and social networks. The inclusion of Physics and Astronomy (8.29%), while unexpected, often reflects the application of complex systems and diffusion models from physics to simulate viral phenomena, similar to epidemiological modelling of disease spread (Watts & Peretti, 2007).

Social Sciences (16.33%) and Psychology (2.17%) provide important behavioral and societal perspectives, exploring how individuals perceive, engage with, and are influenced by viral content. These studies often delve into motivation, peer influence, emotional triggers, and the socio-cultural factors that affect sharing behavior (Berger & Milkman, 2012). Fields such as Arts and Humanities (2.04%), Medicine (2.55%), and Environmental Science (1.40%) reflect niche applications of viral marketing in domains like public health messaging, environmental advocacy, and digital storytelling.

The subject area distribution illustrates that viral marketing research is fundamentally interdisciplinary, blending computational, behavioral, economic, and strategic insights. This breadth enriches the academic discourse and enables a holistic understanding of how viral mechanisms operate across different platforms, audiences, and societal contexts.

Keywords Analysis

Table 3 outlines the most frequently used author keywords in the corpus of viral marketing literature, offering insights into the core themes, conceptual priorities, and evolving research directions within the field. All listed keywords appear in more than 20% of the 784 articles analyzed, indicating their centrality and recurring significance across diverse studies.

Table 3: Top Keywords

Author Keywords	Total Publications (TP)	Percentage (%)
Viral Marketing	426	54.34%
Social Networking (online)	221	28.19%
Marketing	195	24.87%
Influence Maximizations	171	21.81%

Unsurprisingly, the term “Viral Marketing” appears in 426 publications (54.34%), reaffirming its role as the anchor concept around which the research is structured. This consistent usage highlights the keyword's importance not just as a subject, but as a lens through which scholars investigate related phenomena such as consumer behavior, digital engagement, and message propagation.

The second most prominent keyword is “Social Networking (online)”, appearing in 221 publications (28.19%), which underscores the medium through which viral marketing predominantly operates. It reflects the shift from traditional word-of-mouth to digitally mediated peer-to-peer communication, particularly on platforms like Facebook, Twitter, Instagram, and TikTok (Kaplan & Haenlein, 2011). The appearance of “Marketing” in 195 articles (24.87%) reflects the broad integration of viral marketing into traditional marketing strategy

discussions. This suggests that researchers view virality as a digital tactic, a fundamental marketing mix, and a consumer outreach component. A particularly interesting cluster of keywords— "Influence Maximizations" (21.81%) points to a growing body of computational research to identify optimal strategies for maximizing message reach.

This theme is notably present in computer science and decision sciences, where researchers employ algorithms to influence spread and determine key opinion leaders (KOLs) or seed nodes within a network to initiate information transmission (Kempe et al., 2015). Together, these keywords indicate the broad scope of viral marketing, spanning theoretical, technological, and business contexts. They reveal intersecting priorities from marketing strategists, social scientists, and computational modelers, suggesting that the field has broadened in scope and disciplinary collaboration.

Citation Analysis

In the present study, citation analysis was conducted using Publish or Perish (PoP), an established bibliometric tool for evaluating the scholarly impact of publications, as described by Harzing (2013). Version 8.17.4863 of Publish or Perish was used, which is compatible with Windows operating systems. Publish or Perish retrieves citation data from various academic databases. This tool provides a range of bibliometric indicators that can be used to evaluate individual articles, authors, journals, and academic fields. Table 4 presents the dataset composed of 784 journal publications between 1999 and 2025. These metrics offer a quantitative assessment of the impact, productivity, and scholarly influence of research in this domain over 26 years.

Table 4: Citations Metrics

Metrics	Data
Publication years	1999 - 2025
Citation years	26 (1999-2025)
Papers	784
Citations	29,776
Citations/year	1145.23
Citations/paper	37.98
Citations/author	11,538.45
Papers/author	312.01
h-index	84
g-index	153

The total number of citations accumulated by the corpus stands at 29,776, which shows a measurable citation presence and implies that viral marketing is a frequently referenced subject within the broader academic community. With an average of 1,145.23 citations per year, the data shows ongoing academic interaction across disciplines, especially since the increased use of social platforms and personality-driven content in the mid-2000s and the growth in digital engagement due to global lockdowns (Gibreel et al., 2025; Puriwat & Tripopsakul, 2021). The average citations per paper, calculated at 37.98, shows citation activity per publication in this field. This figure exceeds the threshold often associated with "highly cited" research in many social science and business contexts, suggesting that most papers on viral marketing are not only being published but are also actively cited and incorporated into broader academic discourse (Donthu et al., 2021).

The citations per author metric, listed as 11,538.45, and the papers per author figure of 312.01, appear anomalously high and may indicate aggregated or cumulative values across co-authors in the dataset, rather than reflecting individual productivity or influence. These metrics should be interpreted cautiously, particularly in bibliometric databases that assign fractional authorship credits inconsistently across multi-authored works. Collectively, these metrics highlight that viral marketing has transitioned from an emerging concept in the early 2000s to a highly impactful and interdisciplinary research domain, intersecting marketing, communication, computer science, and social psychology. The robust citation figures suggest not only widespread academic interest but also real-world relevance, as marketing professionals and digital strategists continue to draw on this literature to inform practice in fast-changing online environments.

Table 5: Highly cited articles

No.	Authors	Title	Year	Cites	Cites per Year
1	J. Berger, K.L. Milkman	What makes online content viral?	2012	2136	164.31
2	J. Leskovec, L.A. Adamic, B.A. Huberman	The dynamics of viral marketing	2007	1429	79.39
3	A. De Bruyn, G.L. Lilien	A multi-stage model of word-of-mouth influence through viral marketing	2008	627	36.88
4	J.E. Phelps, R. Lewis, L. Mobilio, D. Perry, N. Raman	Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email	2004	607	28.9
5	S. Aral, D. Walker	Creating social contagion through viral product design: A randomized trial of peer influence in networks	2011	584	41.71
6	B.A. Huberman, D.M., Romero, F. Wu	Social networks that matter: Twitter under the microscope	2008	581	36.31
7	O. Hinz, B. Skiera, C. Barrot, J.U. Becker	Seeding strategies for viral marketing: An empirical comparison	2011	493	35.21
8	D. Golovin, A. Krause	Adaptive submodularity: Theory and applications in active learning and stochastic optimization	2011	446	31.86
9	D. Kempe, J. Kleinberg, É. Tardos	Maximizing the spread of influence through a social network	2015	439	43.9
10	Z. Katona, P.P. Zubcsek, M. Sarvary	Network effects and personal influences: The diffusion of an online social network	2011	438	31.29
11	A. Arora, S. Bansal, C. Kandpal, R. Aswani, Y. Dwivedi	Measuring social media influencer index- insights from Facebook, Twitter, and Instagram	2019	389	64.83
12	J.Y.C. Ho, M. Dempsey	Viral marketing: Motivations to forward online content	2010	378	25.2
13	M.A. Shareef, B. Mukerji, Y.K. Dwivedi, N.P. Rana, R. Islam	Social media marketing: Comparative effect of advertisement sources	2019	336	56
14	R. Thackeray, B.L. Neiger, C.L. Hanson, J.F. McKenzie	Enhancing promotional strategies within social marketing programs: Use of Web 2.0 social media	2008	332	19.53
15	C. Kiss, M. Bichler	Identification of influencers - Measuring influence in customer networks	2008	315	18.53
16	N. Donthu, S. Kumar, N. Pandey, A. Mishra	Mapping the electronic word-of-mouth (eWOM) research: A systematic review and bibliometric analysis	2021	308	77
17	A. Dobele, A. Lindgreen, M. Beverland, J. Vanhamme, R. van Wijk	Why pass on viral messages? Because they connect emotionally	2007	305	16.94

Table 5 presents a list of the most highly cited articles in the field of viral marketing, offering insight into the scholarly impact, thematic trends, and key contributors to the literature. These articles, spanning from 2004 to 2019, have shaped theoretical and empirical understandings of viral marketing, influencing marketing strategies, consumer behavior, and the development of computational models for information diffusion.

The most cited article in the dataset is "What makes online content viral?" by Berger and Milkman (2012), with 2,136 citations and an impressive 164.31 citations per year. This article is foundational in emotionally driven viral marketing, proposing that emotional arousal, particularly awe, humor, and anger, is crucial for content virality (Berger & Milkman, 2012). The high citation count suggests a notable influence in shaping consumer behavior theories and the psychology of sharing in digital environments. The article's continued relevance in various fields such as marketing, psychology, and media studies suggests long-term academic interest.

Another early contribution is "The dynamics of viral marketing" by Leskovec et al. (2007), which has garnered 1,429 and 79.39 citations annually. This paper integrates network theory and computational methods to model viral marketing dynamics, focusing on how information spreads across social networks and the role of influencers in promoting faster dissemination. Its mathematical and network-based approach has been used in supporting marketing studies involving network data (Leskovec et al., 2007). Other notable academic publications such as "A multi-stage model of word-of-mouth influence through viral marketing" by De Bruyn and Lilien (2008), with 627 citations and 36.88 citations per year, and "Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email" by Phelps et al. (2004), with 607 citations and 28.9 citations per year, have provided insight into the understanding of WOM and viral diffusion models. These works introduced foundational concepts for analyzing consumer motivations, message propagation mechanisms, and network effects within viral marketing (Phelps et al., 2004).

Articles by Aral and Walker (2011), Huberman et al. (2008), and Kempe et al. (2015), which all focus on influence maximization and social contagion, have been referenced in the computational and algorithmic modelling of viral marketing. Their work underscores the importance of network centrality and peer influence in designing effective viral campaigns. Aral and Walker's study on social contagion has been cited 584 times and discusses the application of peer influence in viral product design, highlighting how network-based interventions can enhance the spread of products and ideas (Aral & Walker, 2011). Further, the work by Donthu et al. (2021) on mapping electronic word-of-mouth (eWOM) research is a noteworthy recent contribution reflecting the growing importance of systematic reviews and bibliometric analyses in understanding the evolution of viral marketing as a field. This paper's 308 citations and 77 citations per year indicate its function in outlining research directions for future studies in digital marketing (Donthu et al., 2021).

Discussion

Despite its common adoption, limited research exists regarding ethical implications, the long-term effectiveness of viral campaigns, and the cultural differences in sharing behaviors. While many studies have emphasized virality's tactical and psychological elements, fewer have critically analyzed trust dynamics, false information exposure, and content control (Puriwat & Tripopsakul, 2021). Furthermore, most viral marketing research has been conducted in Western contexts, with limited attention given to other regional platforms and cultural communication styles, such as platforms like Bilibili in China and emerging short-form content trends in Indonesia (Wang et al., 2024).

Much of the existing research has concentrated primarily on Western-centric platforms and user behaviors, leaving a gap in understanding the cultural dimensions and localized practices of virality in non-Western contexts (Wang et al., 2024). For instance, platforms like TikTok in Asia, or localized influencer dynamics in region-specific influencer strategies in areas such as Southeast Asia and the Middle East, present unique models of content sharing and emotional triggers often rarely discussed in scholarly sources. While studies have frequently explored motivational components such as emotion and relevance, there are insufficient multi-year analyses of marketing outcomes of viral campaigns. Viral content may create initial reach and user interest, but its effects on brand equity, loyalty, and conversion rates remain insufficiently explored (Gibreel et al., 2025; Dobele et al., 2007). Future studies could combine qualitative and quantitative approaches or use time-based tracking to assess how viral campaigns shape consumer responses across different stages.

With the emergence of AI-driven and predictive systems in viral marketing, many ethical questions remain largely unexamined in current literature. The use of AI to personalize and amplify content raises concerns regarding consumer autonomy, as users are often unaware of the algorithms influencing their exposure to content visibility or the behavioral nudges embedded in AI-generated campaigns (Pasquale, 2015). These systems may optimize engagement or enhance interaction while reducing visibility into the process, making it

difficult for audiences to discern between organically viral content and algorithmically manufactured trends. This blurring of lines questions the authenticity of viral experiences and raises issues of consumer choice and consent (Zuboff, 2019).

Thus, the transformation of digital environments and content practices calls for a multi-disciplinary lens to viral marketing research. Integrating perspectives from communication studies, behavioral economics, data science, and media ethics might support a deeper investigation into how viral phenomena function in complex, algorithmically curated digital ecosystems. Future research should also consider establishing comparative systems across platforms that move beyond a single-platform case to capture the interconnectedness of shared messaging structures across marketing channels.

5. Conclusion

The exploration of viral marketing has provided useful perspectives into its underlying mechanisms and pervasive influence within the digital landscape. As we consolidate the findings presented herein, it becomes evident that viral phenomena represent a dynamic and complex force shaping contemporary communication and consumer engagement. In summary, while viral marketing has become a recurring element in marketing practice, future research must incorporate more geographic and methodological diversity, ethical, cultural, and technological aspects to remain relevant in a rapidly evolving digital context. Specifically, forthcoming studies should give attention to how cultural nuances and specific contextual factors influence how viral content is received and shared across regions globally. Additionally, to enhance this study, future research could prioritize documents that contribute to a more precise understanding of the results and undertake a thorough study of the patterns that govern the diffusion of viral content across various online platforms.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Knowledge Sharing Behavior among Non-Academic Staff in Malaysian Higher Education: The Role of Trust, Religiosity, Self-Efficacy and Enjoyment of Helping Others

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Abstract: In today's knowledge-driven economy, effective knowledge management is essential for organizational success, particularly in higher education institutions (HEIs) where non-academic staff play a critical role in supporting core operations. While previous research has largely focused on academic personnel, limited attention has been given to the knowledge-sharing behavior of non-academic staff. This study investigates the key factors influencing knowledge sharing among non-academic staff at the International Islamic University Malaysia (IIUM) Gombak Campus, examining the roles of trust, religiosity, self-efficacy, and enjoyment of helping others. Adopting a quantitative, non-experimental design, data were collected through structured questionnaires distributed to 102 non-academic employees across various departments. Descriptive, reliability, and multiple regression analyses were conducted using SPSS. The findings reveal that self-efficacy is the most significant predictor of knowledge sharing behavior, followed by trust, which also demonstrated a strong positive influence. In contrast, religiosity did not show a statistically significant effect, and enjoyment of helping others revealed a non-significant negative relationship. These results suggest that confidence in one's abilities and a trustworthy work environment are crucial enablers of knowledge sharing, while intrinsic altruistic motives and religious commitment may not directly drive such behavior in this context. The study provides valuable implications for higher education administrators to foster a knowledge-sharing culture by enhancing employee confidence and trust-building initiatives. It also highlights the need for further research to explore additional factors and contexts that may influence non-academic staff's knowledge-sharing practices.

Keywords: *Knowledge Sharing Behavior, Trust, Religiosity, Self-Efficacy, and Enjoyment of Helping Others.*

1. Introduction and Background

In today's knowledge-intensive economy, effective knowledge sharing is crucial for organizational competitiveness, sustainability, and growth. Knowledge sharing refers to the voluntary act of exchanging information, experiences, and expertise among individuals within an organization to enhance collective performance and decision-making (Peng, 2007; Wang & Noe, 2010). As organizations increasingly recognize knowledge as a vital strategic resource, fostering a culture of knowledge sharing becomes essential (Bogdanowicz & Bailey, 2002; Hislop et al., 2018).

In Malaysia's higher learning institutions (HLIs), knowledge sharing has attracted growing attention due to its potential to improve institutional efficiency and service quality (Chin, Yee, & Geok, 2014; Ahmad et al., 2021). The Malaysian government has introduced various initiatives to encourage knowledge-sharing practices in both public and private HLIs. However, most previous studies have focused on academic staff, leaving the knowledge sharing behavior of non-academic staff underexplored (Normala et al., 2009; Aahad & Suhaimi, 2011). Non-academic staff play vital roles in administrative, operational, and student support functions. Their work significantly contributes to institutional performance and student satisfaction. Understanding the factors that influence their knowledge-sharing behavior is critical for improving overall organizational effectiveness.

Non-academic staff in HLIs, such as at the International Islamic University Malaysia (IIUM), are involved in diverse support functions, including admissions, student affairs, residential services, transport, international cultural centers, and faculty administrative units. Each department interacts closely with students, academic

staff, and external stakeholders. As they manage student records, program administration, and institutional services, knowledge sharing among non-academic staff ensures smooth coordination, reduces redundancy, and enables efficient service delivery.

However, several barriers to knowledge sharing exist. These include the lack of trust among employees, insufficient communication across departments, and the absence of established mechanisms for sharing expertise. According to Azizah, Roziana, and Siti (2014), most studies of knowledge sharing in Malaysia have examined academic staff, failing to address the unique dynamics experienced by support staff. As each cohort of students cycles through the system, the knowledge required for administrative processes—such as enrollment, graduation, and program transfers—must be effectively passed among staff members to avoid operational delays and inefficiencies.

Trust is a critical determinant of knowledge-sharing behavior (Dirks & Ferrin, 2002; Chughtai, 2016). When staff trust their colleagues' intentions and reliability, they are more willing to share valuable knowledge without fear of negative consequences or exploitation. In contrast, a lack of trust discourages open exchange, especially when inter-departmental relationships are weak. IIUM's unique Islamic context adds another layer of complexity, as Islamic teachings strongly emphasize knowledge seeking and dissemination. The Quran and Hadith consistently encourage Muslims to pursue knowledge and share it for the benefit of others (Ali, 2010; Naresh & Raduan, 2012). Nevertheless, even within religious organizations, some employees may hesitate to share job-related knowledge due to personal or organizational factors. This raises the question of whether religiosity directly influences knowledge-sharing behavior in the workplace.

Self-efficacy also plays a significant role in determining whether individuals engage in knowledge sharing (Bandura, 1997; Lunenburg, 2011). Employees with high self-efficacy believe in their ability to contribute meaningful knowledge and often take proactive steps to assist others. They view sharing as an opportunity to support colleagues and contribute to organizational success. In IIUM's context, where non-academic staff frequently collaborate across multiple departments, self-efficacy may determine their willingness to share expertise and assist others in problem-solving.

Enjoyment of helping others, often linked to altruism, is another factor influencing knowledge sharing (Wasko & Faraj, 2005; Chou et al., 2010). Some individuals derive intrinsic satisfaction from assisting colleagues, regardless of extrinsic rewards. In collaborative work environments, this enjoyment can motivate employees to offer their knowledge voluntarily, fostering a positive knowledge-sharing culture.

The current study aims to examine these four key factors—trust, religiosity, self-efficacy, and enjoyment of helping others—and their relationships with knowledge sharing behavior among non-academic staff at IIUM. Specifically, the study seeks to answer the following research questions:

- Is there a significant relationship between trust and knowledge-sharing behavior?
- Is there a significant relationship between religiosity and knowledge-sharing behavior?
- Is there a significant relationship between self-efficacy and knowledge sharing behavior?
- Is there a significant relationship between the enjoyment of helping others and knowledge-sharing behavior?
- What is the strongest contributor that influences knowledge sharing behavior?

The objectives of this research are to analyze these relationships and identify the most influential factor promoting knowledge sharing among non-academic staff. While Noor, Normala, and Wan (2012) have applied the Theory of Planned Behavior to study knowledge sharing among academic staff, research on non-academic personnel remains scarce. Similarly, Azizah et al. (2014) discussed self-efficacy's moderating role in knowledge sharing among academics. Aahad and Suhaimi (2011) extended this research to non-academic staff in both public and private HLIs but found a need for a deeper understanding of institutional and cultural influences.

Ultimately, this study aims to provide higher education administrators with practical insights for enhancing a knowledge-sharing culture among non-academic staff. By identifying the key motivators and barriers, institutions can design interventions that promote collaboration, improve service delivery, and optimize organizational learning.

2. Literature Review

Knowledge Sharing Behavior: In Malaysia's dynamic knowledge economy, higher education institutions (HEIs) play a crucial role in producing highly skilled graduates to meet industry demands. Both public and private HEIs have expanded significantly, resulting in growing interest in knowledge sharing practices, especially among academic staff (Chin, Geok, & Yee, 2013; Ahmad et al., 2021; Lee & Wong, 2022). Knowledge sharing fosters collaboration, innovation, and organizational learning, which are essential for institutional performance and competitiveness.

Chin et al. (2013) found that private universities demonstrated stronger knowledge-sharing tendencies than public universities, attributing this to effective use of non-monetary rewards and fair performance appraisals. In contrast, public universities benefit more from monetary rewards, public recognition, and technology-supported sharing systems.

While earlier studies indicated that academic staff recognize the importance of knowledge sharing, actual sharing behavior remains inconsistent due to barriers such as time constraints and fear of knowledge misuse (Ali et al., 2022). Eugene et al. (2012) emphasized that trust and perceived enjoyment significantly influence knowledge sharing among administrative staff, though mutual reciprocity has a limited effect.

More recently, researchers have turned their attention to non-academic staff, recognizing their vital role in organizational success (Sawsan, Ibrahim, & Talib, 2015; Hassan, Abdullah, & Saad, 2022). Rahman et al. (2015) and newer studies (Mohamad et al., 2023; Abdullah & Ismail, 2023) emphasize that factors such as trust, motivation, leadership, social networks, and psychological safety significantly affect knowledge sharing among non-academic staff, especially in adapting to post-pandemic hybrid work environments.

Trust: Trust plays a central role in enabling effective knowledge sharing and fostering productive social interactions within organizations. Employees are more likely to share knowledge when they perceive their colleagues as honest, trustworthy, and reliable (Chughtai, 2016; Hisham & Sulaiman, 2015; Akram et al., 2021; Abubakar et al., 2022). High levels of trust reduce concerns about negative consequences or misuse of shared information, thereby encouraging open knowledge exchange (Eugene et al., 2012; Dirks & Ferrin, 2002; Mansoor et al., 2022).

Several dimensions of trust have been identified in previous research. Abel et al. (2007) outlined four core elements of trust: concern (benevolence), reliability (integrity), competence (ability), and openness. These dimensions align with broader psychological constructs, where benevolence reflects genuine care for others, integrity reflects honesty and consistency, and competence denotes technical skill and expertise (Le & Lei, 2023). Collectively, these elements shape individuals' willingness to engage in knowledge-sharing behaviors.

The IBM Institute for Knowledge-Based Organization (Lisa et al., 2002) further distinguished between two primary forms of trust relevant to knowledge sharing: benevolence-based trust and competence-based trust. Benevolence-based trust relates to one's belief that a knowledge source has good intentions and would not intentionally cause harm, while competence-based trust reflects confidence in the knowledge source's expertise and capability to provide accurate information.

Lisa et al. (2002) demonstrated that both forms of trust can operate independently but are most effective when combined. Recent studies continue to affirm that trust—both in terms of benevolence and competence—remains a critical factor in creating psychologically safe environments that support knowledge sharing, especially in hybrid and virtual work contexts (Nguyen et al., 2022; Khalid et al., 2023).

These findings underscore the importance of building trust-based relationships in organizations to facilitate effective knowledge sharing. Strengthening both competence and benevolence within professional relationships can significantly enhance organizational learning and performance (Wang & Noe, 2010; Chiu et al., 2006; Hassan & Ahmad, 2023).
H1: There is a significant relationship between trust and knowledge-sharing behavior.

Religiosity: Employee knowledge is one of the most valuable assets within any organization. Recognizing the importance of sharing expertise, many organizations have increasingly emphasized knowledge sharing as a strategy to promote learning, enhance decision-making, and maintain competitiveness in the global market (Wang & Noe, 2010; Hislop et al., 2018). When employees withhold their expertise, both the organization and the individual may miss opportunities for growth and innovation, weakening overall performance.

From an Islamic perspective, knowledge sharing holds significant spiritual and ethical importance. As emphasized by Aahad and Suhaimi (2011), sharing knowledge is considered an amanah (trust or responsibility), where Muslims are obligated to disseminate beneficial knowledge as part of their duty to God and society. Numerous Quranic verses and Hadiths reinforce the obligation to seek, teach, and share knowledge to benefit others and promote societal advancement (Naresh & Raduan, 2012; Mohd Nor & Mohd Noor, 2021). For example, the Quran states: "Read! In the name of your Lord Who created. Created man from a clot. Read! And your Lord is the Most Generous—Who taught by the pen—Taught man that which he knew not" (Qur'an, 96:1-5). This verse reflects the divine emphasis on the pursuit and dissemination of knowledge.

Similarly, Prophet Muhammad (PBUH) emphasized that knowledge and work are both blessed, but blessings are diminished if individuals fail to apply and share their knowledge (Ali, 2010; Naresh & Raduan, 2012). Religiosity, therefore, is seen as a motivating factor that encourages Muslims to engage in knowledge sharing not only for organizational benefit but also for spiritual fulfillment.

Although religious teachings strongly advocate for knowledge sharing, the degree to which religiosity influences actual knowledge-sharing behavior within the workplace remains an empirical question. This study aims to explore whether religiosity significantly impacts knowledge sharing among Muslim employees, particularly within Islamic institutions such as IIUM.
H2: There is a significant relationship between religiosity and knowledge-sharing behavior.

Self-efficacy: Extensive research has identified self-efficacy as a key motivational factor influencing knowledge sharing behavior within organizations (Endres, Chowdhury, & Alam, 2007; Wang & Noe, 2010; Nazir et al., 2021; Li, Huang, & Li, 2022). Self-efficacy reflects an individual's belief in their capacity to successfully perform tasks, including sharing knowledge. Employees with high self-efficacy are more confident in their expertise and more willing to share knowledge with others (Bandura, 1997; Al-Hawari, 2020; Lunenburg, 2011).

According to Bandura's (1997) social cognitive theory, self-efficacy influences individuals' choices, efforts, and persistence in learning and contributing to organizational knowledge. Employees with strong self-efficacy view knowledge sharing as valuable and are more likely to engage consistently in such behaviors (Cabrera & Cabrera, 2002; Abdullah et al., 2023). Conversely, individuals with lower self-efficacy may hesitate to share knowledge due to self-doubt or fear of providing inaccurate information (Azizah et al., 2014; Kumpikaitė-Valiūnienė et al., 2021).

Lunenburg (2011) emphasized that self-efficacy derives from four main sources: mastery experiences (past performance), vicarious experiences (observing others), verbal persuasion (encouragement), and emotional arousal (managing anxiety). These sources shape employees' confidence and influence their willingness to share knowledge. In the workplace, repeated engagement in knowledge sharing can turn the behavior into a habitual practice, fostering a culture of collaboration (Endres et al., 2007; Chen et al., 2023).

Moreover, high self-efficacy not only improves individual performance but can contribute to collective team confidence, enhancing organizational adaptability and responsiveness to competitive challenges (Li, 2013; Feng & Wang, 2022). Olowodunoye (2015) also emphasized that employees' belief in their ability to share valuable knowledge significantly impacts their participation in knowledge sharing. In this context, self-efficacy remains a crucial determinant for overcoming knowledge hoarding and promoting knowledge dissemination across organizational boundaries (Sun et al., 2023).
H3: There is a significant relationship between self-efficacy and knowledge sharing behavior.

Enjoyment of Helping Others: In this study, enjoyment of helping others is closely associated with perceived enjoyment, which refers to the intrinsic pleasure individuals experience when engaging in behaviors such as

knowledge sharing (Eugene et al., 2012; Chiu et al., 2006; Ahmad, Malik, & Rehman, 2021). This intrinsic motivation is grounded in altruism—the desire to help others without expecting tangible rewards (Purbudi & Rahab, 2013; Deci & Ryan, 2000; Valaei et al., 2021). Even without direct personal benefits, the emotional satisfaction gained from supporting colleagues becomes a strong internal driver for knowledge sharing (Nguyen & Malik, 2022; Purbudi & Rahab, 2013).

Employees often perceive solving problems for others as intellectually stimulating and emotionally fulfilling. When individuals feel rewarded by contributing to others' success, they are more likely to share their expertise and collaborate actively (Hisham & Sulaiman, 2015; Chou, Hung, & Lai, 2010; Liu, Liu, & Xu, 2022). Knowledge contributors who enjoy helping others generally display cooperative, approachable, and proactive behavior, which strengthens knowledge flows within organizations (Wang & Noe, 2010; Noor et al., 2021).

Faraj and Wasko (2000) further argued that participants in both online and organizational networks are intrinsically motivated to share knowledge because they view it as socially valuable and morally meaningful. Recent studies continue to support this notion, highlighting that enjoyment and moral obligation significantly drive knowledge sharing in modern knowledge-based organizations (Hashim & Sulaiman, 2015; Baqutayan, Majid, & Shadiya, 2012; Hsu et al., 2007; Lee, Wong, & Goh, 2023).

Thus, perceived enjoyment plays a crucial role in promoting knowledge-sharing behavior. When employees genuinely enjoy helping others, organizations benefit from stronger collaboration, deeper social connections, and a more vibrant knowledge-sharing culture (Deci & Ryan, 2000; Wang & Noe, 2010; Li, Huang, & Wang, 2023).
H4: There is a significant relationship between the enjoyment of helping others and knowledge-sharing behavior.

3. Research Methodology

This study adopts a quantitative, non-experimental research design using a structured survey to examine knowledge sharing behavior among non-academic staff. Quantitative research is widely used in business studies to measure opinions, attitudes, behaviors, and relationships (Saunders et al., 2020; Sekaran & Bougie, 2020). Specifically, this study employs a descriptive design to collect data that describe characteristics of respondents, events, and situations relevant to knowledge sharing in IIUM (Creswell & Creswell, 2022).

The target population includes 1,120 non-academic staff at IIUM Gombak Campus, selected from various administrative departments. A purposive quota sampling method was applied to ensure proportional representation of departments, including Admissions, Student Affairs, International Islamic Culture Centre, Management Services, Transport Unit, Residential Services, Mosque Department, and Curricular Activities Centre. Quota sampling allows researchers to capture sufficient variability across subgroups while focusing on the specific research population (Etikan, 2021).

A total of 110 questionnaires were distributed based on the guidelines for sample size proposed by Roscoe (Sekaran & Bougie, 2020). The questionnaire contained six sections: demographics, knowledge sharing behavior, trust, religiosity, self-efficacy, and enjoyment of helping others. Established instruments from previous studies were adapted, including scales by Bock et al. (2005), Naresh and Raduan (2012), Hisham and Sulaiman (2015), and Yu et al. (2010), which have since been widely validated and applied in recent knowledge sharing research (Nguyen et al., 2022; Hassan et al., 2023).

Data analysis was conducted using SPSS Version 20. Statistical tests included descriptive statistics, reliability analysis using Cronbach's alpha to assess internal consistency, frequency analysis for respondent profiling, and multiple regression analysis to test the relationships between independent variables (trust, religiosity, self-efficacy, and enjoyment of helping others) and the dependent variable—knowledge sharing behavior (Ali et al., 2023; Abdullah et al., 2023).

4. Findings and Analysis

Demographic Analysis: Based on Table 1 below, the frequency and percentage distribution of respondents by gender show that there are 43 male respondents (42.2%) and 59 female respondents (57.8%), totaling 102 participants. This indicates that the study is predominantly represented by female respondents. In terms of age, the smallest group consists of 14 respondents (13.7%) aged 18–27 years, while the largest group falls within the 28–37 years age range, comprising 34 respondents (33.3%). This suggests that most respondents are middle-aged employees.

Regarding job positions, most respondents are Administrative Assistants (N17) or Senior Administrative Assistants (N22), totaling 53 individuals (52.0%). This is followed by Assistant Directors (N41) and Senior Assistant Directors (N44) with 32 respondents (31.4%). The next group includes Assistant Administrative Officers (N27) and Senior Assistant Administrative Officers (N29). The least represented category is Technicians (J17) and Senior Technicians (J122) with only 1 respondent (1.0%).

In terms of years of service, the highest proportion of respondents, 31 individuals (30.4%), have served 11–19 years. This is followed by 26 respondents (25.5%) with 20 years or above of service, 24 respondents (23.5%) with 1–5 years, and 17 respondents (16.7%) with 6–10 years. The smallest group comprises 4 respondents (3.9%) with less than 1 year of service.

For educational background, the highest proportion holds a Bachelor's Degree (33.3%), followed by SPM holders (26.5%), Diploma holders (23.5%), Master's Degree holders (8.8%), and STPM holders (7.8%). This indicates that the majority of administrative staff in the sample possess a Degree qualification.

Table 1: Summary of Respondents' Demographic Profiles

Demographic Information		Frequency	Percentage (%)
Gender	Male	43	42.2
	Female	59	57.8
Age	18-27 years old	14	13.7
	28-37 years old	34	33.3
	38-47 years old	30	29.4
	48-60 years old	24	23.5
Position	N17-N22	53	52.0
	N27-N29	16	15.7
	N41-N44	32	31.4
	J17-J22	1	1.0
Working Experience	Less than a year	4	3.9
	1-5 years	24	23.5
	6-10 years	17	16.7
	11-19 years	31	30.4
	20 years and above	26	25.5
Education Level	SPM	27	26.5
	STPM	8	7.8
	Diploma	24	23.5
	Bachelor Degree	34	33.3
	Master	9	8.8

Reliability Analysis: Reliability of the measurement instrument in this study was assessed to determine both its consistency and stability. Consistency reflects how well the items collectively measure each specific construct, while stability indicates the instrument's ability to produce consistent results over time. Cronbach's alpha was employed as the reliability coefficient to evaluate the internal consistency of the variables, as recommended by Bougie and Sekaran (2013).

According to their guidelines, alpha values above 0.80 indicate good reliability, values in the 0.70 range are acceptable, and values below 0.60 are considered poor. Based on Table 2, all constructs used in this study demonstrated strong internal consistency, with Cronbach's alpha values exceeding the 0.80 threshold. The independent variable Enjoyment of Helping Others achieved the highest reliability score at 0.913, indicating excellent internal consistency among its items. This was followed by Trust (α = 0.875) and both Religiosity and Self-Efficacy, which shared identical values at 0.869, all indicating good reliability. The dependent variable, Knowledge Sharing Behavior, also showed a high reliability score of 0.887, confirming that the items used to measure this construct are sufficient and positively correlated.

Table 2: Reliability Analysis Results

Variables	No. of Items	Cronbach's Alpha	Degree of Reliability
Knowledge Sharing Behavior	7	0.887	Good
Trust	7	0.875	Good
Religiosity	7	0.869	Good
Self-Efficacy	7	0.869	Good
Enjoyment of Helping Others	7	0.913	Excellent

Descriptive Analysis: The study employed descriptive analysis to assess the mean and standard deviation of key variables using a five-point Likert scale. The interpretation scale was categorized into three levels: low (1.00–2.33), moderate (2.34–3.67), and high (3.68–5.00). The results revealed that all five variables scored within the high range, indicating strong agreement among respondents.

According to Table 3, religiosity recorded the highest mean score (mean = 4.3235, SD = 0.45970), suggesting that respondents strongly embrace religious values, which may positively influence their ethical commitment and collaborative behavior in the workplace. This was followed closely by Enjoyment of Helping Others (mean = 4.3011, SD = 0.44450), implying that non-academic staff at IIUM derive intrinsic satisfaction from assisting colleagues, which supports the development of a knowledge-sharing culture.

The dependent variable, Knowledge Sharing Behavior, also showed a high mean score of 4.0784 (SD = 0.45426), indicating that knowledge sharing is actively practiced among staff members. Self-Efficacy scored 4.0420 (SD = 0.41520), reflecting a strong sense of personal confidence and perceived competence in sharing knowledge. Trust had the lowest mean among the variables, though still in the high category, with a score of 3.9440 (SD = 0.45848). This suggests that while trust exists among staff, it may be slightly less dominant compared to other motivating factors.

Table 3: Mean and Standard Deviation for Independent Variables and Dependent Variable

Variables	Mean	Std. Deviation (SD)	Minimum	Maximum
Knowledge Sharing Behavior	4.0784	0.45426	2.86	5.00
Trust	3.9440	0.45848	2.43	5.00
Religiosity	4.3235	0.45970	3.00	5.00
Self-Efficacy	4.0420	0.41520	3.00	5.00
Enjoyment of Helping Others	4.3011	0.44450	3.00	5.00

Multiple Regression Analysis: The multiple regression analysis was conducted to investigate the impact of trust, religiosity, self-efficacy, and enjoyment of helping others on knowledge sharing behavior among non-academic staff. The model shown in Table 4 produced an R value of 0.702, indicating a strong positive relationship between the combined independent variables and knowledge sharing behavior. The R^2 value of 0.493 suggests that approximately 49.3% of the variance in knowledge sharing behavior can be explained by these four predictors. The model was statistically significant overall, as indicated by the F-statistic value of 23.547 and a significance level of p = 0.000.

Table 4: Regression Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.912	0.399		2.285	0.025
	Trust	0.326	0.082	0.329	3.968	0.000
	Religiosity	0.023	0.088	0.023	0.263	0.793
	Self-Efficacy	0.632	0.108	0.578	5.860	0.000
	Enjoyment of Helping Others	-0.180	0.096	-0.176	-0.176	0.064
	R		0.702[a]			
	R Square		0.493			
	F		23.547			
	Sig.		0.000[b]			

Dependent Variable: Knowledge Sharing Behavior
Predictors: (Constant), Trust, Religiosity, Self-Efficacy, Enjoyment of Helping Others

Discussion

Discussion of Results: Trust emerged as a statistically significant predictor of knowledge sharing behavior (β = 0.329, p = 0.000), highlighting its crucial role in fostering open and effective exchange of information among colleagues. Therefore, the H1 was accepted. Recent research by Abualoush et al. (2020) highlighted that organizational trust positively influences knowledge-sharing behaviors, which in turn enhance innovation performance. Additionally, Omerzel and Gulev (2021) observed that trust within SMEs strengthens the link between knowledge sharing and firm competitiveness.

In contrast, religiosity did not significantly influence knowledge sharing behavior (β = 0.023, p = 0.793). Therefore, H2 was rejected. While religious values may promote moral conduct, they may not directly translate into workplace behaviors—especially in contexts where other motivational drivers, such as trust or self-efficacy, are more influential (Zhang et al., 2022). This could be due to a lack of reinforcement from organizational culture or leadership, which may limit the impact of personal beliefs on professional actions (Ajmal & Helo, 2010). Moreover, the uniformly high religiosity scores among respondents may have reduced variability, making it difficult to detect a significant relationship (Hair et al., 2014). Future studies could examine religiosity as a mediating or moderating factor to gain deeper insights into its role.

When examining individual predictors, self-efficacy emerged as the most influential variable in predicting knowledge sharing behavior (β = 0.578, p = 0.000). Therefore, the H3 was accepted. This finding is consistent with recent studies demonstrating that self-efficacy significantly enhances knowledge sharing by increasing confidence in one's ability to contribute meaningfully (Islam et al., 2021; Lee et al., 2020). For example, Islam et al. (2021) found that knowledge self-efficacy positively influenced knowledge-sharing intentions among IT professionals in Bangladesh. Similarly, Lee et al. (2020) emphasized that employees with higher creative self-efficacy are more inclined to share ideas and collaborate, especially in innovation-driven settings.

Interestingly, enjoyment of helping others showed a negative beta value (β = −0.176, p = 0.064), indicating a non-significant and unexpected inverse relationship. Therefore, H4 was rejected. This aligns with recent findings by Kuo and Young (2021), who noted that intrinsic motivation such as enjoyment is more effective in promoting knowledge sharing when coupled with organizational support and a psychologically safe environment. In this study, while respondents reported a high level of enjoyment in helping others, this factor alone may not have been strong enough to influence their actual knowledge-sharing behavior. Without sufficient structural support, recognition, or a collaborative culture, intrinsic enjoyment may remain personal and not translate into action (Wasko & Faraj, 2005). Furthermore, competing workplace priorities or lack of time could suppress the positive influence of altruistic motivations (Cabrera & Cabrera, 2002).

In conclusion, the findings highlight that self-efficacy and trust are significant predictors of knowledge sharing behavior, with self-efficacy being the strongest contributor. Meanwhile, religiosity and enjoyment in helping others, though conceptually relevant, did not significantly impact knowledge sharing in this study.

5. Recommendations and Conclusion

Recommendations for the Top Management of International Islamic University Malaysia (IIUM): Based on the findings of this study, several recommendations are proposed to enhance knowledge sharing behavior among non-academic staff in higher education institutions. First, management should foster a supportive environment that encourages voluntary knowledge sharing without the need for directive or compulsory instructions. Creating such a culture empowers employees and enhances their self-efficacy, identified as the most significant predictor of knowledge sharing in this study. To further reinforce this behavior, organizations should initiate awareness campaigns and educational programs that highlight the value and benefits of knowledge sharing for both individuals and the institution.

In addition, regular seminars or workshops can be conducted to develop staff confidence and interpersonal trust, providing opportunities to learn and practice knowledge-sharing skills. These initiatives can strengthen not only individual competencies but also promote a collaborative organizational culture. Although the study found that religiosity was not a significant predictor, it is important to recognize that even institutions with strong religious foundations, such as IIUM, may face challenges in encouraging knowledge sharing. Thus, strategies should focus more on practical and psychological enablers such as trust and self-belief rather than solely on religious values.

Furthermore, organizations should ensure that sharing knowledge is convenient and accessible. This can be achieved by offering multiple knowledge-sharing platforms, including internal social networking tools, collaborative portals, and mobile-friendly applications. Making these systems user-friendly and readily available can lower barriers to participation and improve overall engagement. Collectively, these strategies aim to create a work environment where knowledge is shared freely and routinely, contributing to continuous improvement and institutional success.

Recommendations for Future Researchers: For future research, it is recommended to broaden the study by including non-academic staff from other IIUM campuses or different higher education institutions to enhance generalizability. Researchers should also explore additional factors such as organizational commitment, leadership style, and digital literacy that may influence knowledge sharing. A mixed-methods approach is encouraged to gain deeper insights, particularly to explain why some variables may show limited impact. Future studies could also examine mediating or moderating effects, such as job satisfaction or motivation. Comparing academic and non-academic staff would provide valuable perspectives on differing influences. Longitudinal studies are suggested to track behavioral changes over time. Finally, researchers should consider exploring Islamic values and spiritual leadership in greater depth to understand their role in knowledge sharing within faith-based institutions like IIUM.

Limitations: This study has several limitations. Firstly, it focused only on non-academic staff at IIUM Gombak campus, limiting the generalizability of the findings to other campuses or higher education institutions in Malaysia. Secondly, the sample size, while adequate, may not fully represent the diversity of non-academic staff roles and experiences. Additionally, since this study employed purposive quota sampling rather than random sampling, there is a potential for selection bias. The results may not fully represent the entire population of non-academic staff, and caution should be exercised when generalizing the findings beyond the sampled departments. Future research using probability sampling methods is recommended to enhance representativeness and reduce potential bias. Thirdly, the study used a quantitative, cross-sectional design, which restricts the ability to examine changes in knowledge sharing behavior over time or establish causality. Additionally, self-reported data collected through questionnaires may be subject to social desirability bias, where respondents provide answers they believe are favorable. Lastly, the study only considered four independent variables (trust, religiosity, self-efficacy, and enjoyment of helping others), excluding other potential influencing factors such as organizational culture, leadership style, and technological infrastructure.

Conclusion: This study investigated the factors influencing knowledge sharing behavior among non-academic staff at IIUM Gombak, focusing on trust, religiosity, self-efficacy, and enjoyment of helping others. The results revealed that self-efficacy and trust significantly and positively influence knowledge sharing, indicating that confidence in one's capabilities and interpersonal trust are key drivers. In contrast, religiosity and enjoyment of helping others did not show significant influence, suggesting that other contextual or organizational factors may play a greater role. Overall, the findings underscore the importance of enhancing staff confidence and fostering trustful work relationships to promote a knowledge-sharing culture. These insights are valuable for higher education administrators aiming to strengthen collaboration and performance among support staff. Further research is encouraged to address the study's limitations and explore additional variables that may impact knowledge sharing behavior.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Role of Motivational Needs in Shaping Social Entrepreneurship Activities of People with Disabilities in Malaysia

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Abstract: Despite the discrimination faced by people with disabilities (PWD) in the workforce, social entrepreneurship (SE) serves as a vital pathway to enhance their employment opportunities. SE is recognized as a driving force for addressing social issues by leveraging business activities that prioritize social outcomes, thereby supporting the efforts of non-profit organizations and government agencies to uplift economically disadvantaged communities. Successful social entrepreneurship necessitates strong motivation, particularly within underprivileged communities, to achieve social goals. When these motivational needs are unmet, it can result in decreased performance and increased organizational turnover. This study explores the relationship between motivation and social entrepreneurship activities, explicitly focusing on McClelland's theory of needs, which encompasses the need for achievement, affiliation, and power. Questionnaires were distributed to 103 individuals with disabilities, all 18 and older, registered with the Department of Social Welfare and engaged in social entrepreneurship. Data were analyzed using SPSS version 28 and SmartPLS 4. The findings indicate a significant relationship between affiliation motivation and social entrepreneurship activities. A primary motivational profile was identified, highlighting the need for affiliation first, followed by power, and then achievement. This supports prior research suggesting that people with disabilities (PWD) engage more with their communities due to shared experiences, generating economic value. This study enhances McClelland's Need Theory concerning motivation in social entrepreneurship for individuals with disabilities. Future research should investigate longitudinal data and specific dimensions of affiliation.

Keywords: *Social Entrepreneurship; People with Disability, McClelland Theory, Motivation*

1. Introduction and Background

The rise of entrepreneurship has given way to social entrepreneurship (SE), which addresses social issues within an entrepreneurial framework (Rozali et al., 2018). SE is a type of entrepreneurship that is different from other forms of entrepreneurship in that it involves profit-making, production, and sale of goods or services, and innovation. It applies conventional entrepreneurial thinking in addressing critical social problems such as unemployment, poverty, hunger, and breakdown of communities with a key belief in universal social justice (Adnan et al., 2018). The growth of SE is vast and support for it is particularly widespread in developing countries. While scholars are debating on the definition, areas and the concepts of the SE there is a consensus that this is a catalyst of change for solving social issues (Nguyen, Rossi, Vilaine & Hamieh, 2024; Betts et al., 2018; Elliott, 2019)

In this paper, the word "social entrepreneurship" describes activities that utilize social elements to create business opportunities. This is often achieved through the efforts of non-profit organizations or government agencies targeted to improve the economic conditions of disadvantaged communities. Social entrepreneurship does place less emphasis on the profit motive than traditional enterprise; rather, the emphasis is on effecting social change and striving for collective social good rather than purely personal financial gain. Academia has shown that social entrepreneurship is good for society and a necessary part of economic development, just like commercial entrepreneurship (Wahid et al., 2018). Many studies show that social entrepreneurship is doing better than commercial entrepreneurship in creating value for society with innovative solutions for social problems, whether it is carried out as a non-profit or profit-motive (Rozali et al., 2018). Recent research and publications underscore social entrepreneurship's growing importance and changing character. It is increasingly recognised as a potent agent of innovation, particularly in addressing social challenges that

conventional businesses and government sectors tend to ignore, based on the Global Innovation Index 2024. This demonstrates that social entrepreneurship has the potential to deliver substantial social impact and to drive community-led innovation (WIPO, 2024).

It should be kept in mind that social enterprise is only one of many other jobs. This is a critical milestone that can make a difference in the lives of persons with disabilities (PWD) and increase their inclusion in society. Such engagement is aligned with the general aims of the SE framework (Rozali et al., 2018). Yet not everyone will be interested in participating in social entrepreneurial exercises. As a result, motivation becomes vital as to whether an individual gets started, continues and succeeds in SE (Nawi et al., 2018). Motivation has a substantial impact on the performance and survival of an organisation (Nhemachena & Murimbika, 2018). Although employee motivation is increasingly accepted as core to the success of any business, few studies have focused on this issue in established social enterprises.

Notwithstanding the growing literature on the value of social entrepreneurship (SE) to PWD in terms of job creation and empowerment, there is a considerable lack of research on the motivational factors that drive PWD into engaging in SE. This investigation hopes to contribute meaningful ideas about such motives. More motivated people generally do better things, and make greater effort and enthusiasm, which is conducive to the achievement of better results (Kaleedy, 2018). The present study is grounded on McClelland's needs theory: achievement, affiliation, and power needs. This research would investigate the motives of people with disabilities in the Social Welfare Department of Malaysia and their participation in the social entrepreneurship programme. The purposes of this study are as follows:

- To examine the relationship between motivational factors and social entrepreneurship activities
- To investigate the most influential factor on motivation among people with disabilities (PWD).

2. Literature Review

Social Entrepreneurship

Social entrepreneurship is the innovative use and combination of resources to address social problems and needs (Mair & Rathert, 2025). It involves individuals, groups, startup companies, or entrepreneurs who develop funding and implement solutions to various social, cultural, or environmental issues. These entrepreneurs often employ individuals who are developmentally disabled, chronically mentally ill, physically challenged, impoverished, or otherwise disadvantaged. Alternatively, they may sell mission-driven products and services that address specific social problems (Boschee & McClurg, 2003). According to Suryandharu et al. (2019), social issues often arise from the inability of the public (government) and private (industry) sectors to empower civil society to tackle the problems they face. The goal of social entrepreneurship is to generate positive outcomes for both key stakeholders and disadvantaged communities. Unlike traditional businesses prioritizing profit, social entrepreneurship focuses on creating social value, positively impacting social issues (Fhiri et al., 2018; Karthik & Ramprasad, 2021). Social entrepreneurship is increasingly recognized as a vital contributor to the nation's economy (Kadir & Sarif, 2016).

People with Disabilities

According to the Department of Social Welfare Malaysia records, the number of registered PWDs in Malaysia now stands at 637,537 people as of January 2023. As compared to the total population of Malaysia, which is an estimated 32 million people, PWDs make up approximately 1.53 percent of the total population, where the numbers might be higher due to the low reachability of the rural population (Mustaffa et al., 2020). Due to social stigma, discrimination, and environmental barriers that prevent them from contributing meaningfully to society, many disabled people are "hidden" at home or assigned to specific groups (Maziriri et al., 2017) for example, a study conducted by Omar et al. (2021) revealed that hiring PWDs may delay the company's objective and mission, and this becomes an obstacle for employers who have PWDs in their organizations to continue the business (Omar et al., 2021). As PWDs face a variety of difficulties, one important aspect that determines how they deal with these difficulties is their category of disability. Seven (7) categories of PWDs can be considered for the registration of PWDs by the Social Welfare Department Malaysia: physical, learning, speech, visual, mental, hearing, and multiple disabilities. Having a disability may be a limiting factor for specific activities; however, not all types of disability imply the same difficulties, namely those related to the

entrepreneurial initiative (Salvador & Gaspar, 2019). However, the disabled population segment should not be disregarded due to their vulnerability. They also acquire a dependency relationship with the state when they are legally granted social assistance and become accustomed to their dependency status through everyday activities (Gimbuta, 2012).

McClelland's Theory of Need

Motivation is crucial for nearly everyone who engages in work or social interactions. Its impact is particularly significant in social entrepreneurship, especially when it comes to empowering people with disabilities (PWD). In other words, motivation helps people reach for the stars, find purpose, and identify along the way. This helps them deal with difficulty and develop inventive solutions that benefit them and their society. Through understanding and practicing motivation, social entrepreneurs can motivate persons with disabilities to focus on their ability to overcome challenges and make a difference in their communities. Employees who are effectively motivated to carry out work activities are more productive, more committed to their jobs, and experience a better sense of ownership of their work that can translate into better organizational performance (Nguyen et al., 2024; Osemeke & Adegboyega, 2017). McClelland found that people differ in the way that they rank needs, and have these categorized into three areas: achievement, affiliation, and power. Due to the large number of studies conducted on entrepreneurship, it is assumed that this theory is robust enough that it can be adapted and investigated within social entrepreneurship (Lai et al., 2022). McClelland's three needs are all essential to every individual, but all of them are contingent on situation, context, and time.

a) Need for Achievement

The first area is the need for achievement, which is the motive to achieve success in particular situations that require an individual's performance to be evaluated against some standard (Miron & McClelland, 1979). A study by Maran et al. (2021) also finds that the need for achievement of entrepreneurs significantly influences the discovery and taking of new opportunities. This is perhaps because the return to a venture is monetary and could involve achieving social needs, social justice in communities, or environmental objectives (Elliott, 2019). According to Liu et al. (2022), the achievement motive is foremost in students interested in entering the business world through entrepreneurship, though to varying degrees in different individuals. Therefore, the first research hypothesis of the study is:

H1: There is a positive association between the need for achievement and social entrepreneurship activity for people with disabilities.

b) Need for Affiliation

Secondly, the need for affiliation concerns a member's wish to initiate, maintain, or restore a positive relationship with another person. A study on female social entrepreneurs in the Lundu District of Sarawak revealed that their main motive behind engaging with social entrepreneurship was driven by affiliation rather than achievement or power (Lai et al., 2022). In addition, the social isolation of people with disabilities may be reinforced if they stay at home and have fewer chances to interact with others, leading to feelings of disconnection from the community (Ramdan et al., 2023). However, Maran et al. (2021) argued that the extreme value placed on the need to belong might hinder the entrepreneurial process. From these considerations, the following hypothesis can be formulated:

H2: The need for affiliation in individuals with disabilities is positively associated with social entrepreneurship activities.

c) Need for Power

The last area is the need for power, which refers to the desire to influence or control the behavior of others for personal purposes or the success of a greater good. Some people use power and authority as an incentive. This is particularly significant for entrepreneurial actors who have the intention to place their perceptions and ideas at the forefront, becoming effective leaders and positively managing their entrepreneurial activities (Ramdan et al., 2023). Disabled people, like anyone else, also have a power need, but for them, power means something else than for others. Nuwagaba and Rule (2015) lend weight to this argument, stating that the power that resides in people with certain disabilities can be situational. This diversity is shaped by the ways PWDS exercise their powers or by their types of disabilities. Based on these factors, this power can be used as motivation or demotivation. Hence, the tested hypothesis is:

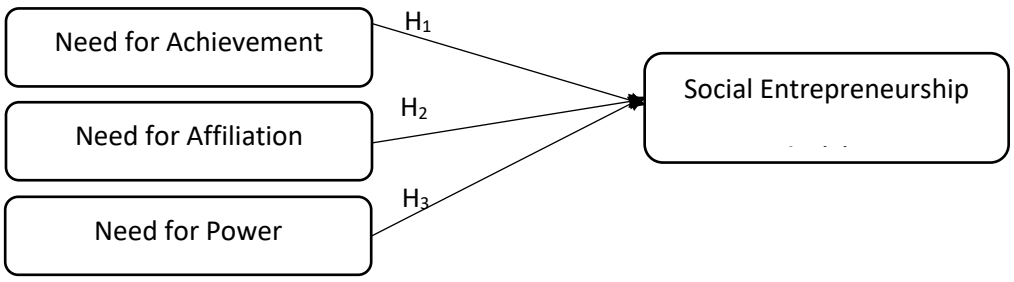
H3: There is a positive relationship between the need for power and the social entrepreneurship activities of

disabled people.

Theoretical framework

For this purpose, the researcher employed David McClelland's three needs of motivation: need for achievement (N Ach), the need for affiliation (N Aff), and the need for power (N Pow). The theory presented in Figure 1 was developed to examine the association among the three independent variables, calculated as achievement, power, and affiliation needs, and the dependent variable of social entrepreneurship activity.

Figure 1: Theoretical Framework



3. Research Methodology

The Malaysian government has set up an active social entrepreneurship program to empower people with disabilities (PWDs) who have difficulties finding employment in the formal job market. The program aims to leverage opportunities to realise the potential of PWDs and to make it inclusive for them, by enabling them with the resources and support required to excel in their professional journey. The organization is working to challenge the status quo and create a more diverse, more equal workplace through its original programs and partnerships. It is a system that allows them to work on their own.

The quantitative approach was used by the researchers in this study, using purposive sampling of PWDs who fulfil the following criteria: registered under the Social Welfare Department (JKM), 18 years old and above, actively involved in social entrepreneurship activities and can communicate using the Bahasa Malaysia language to answer the question. This strategy is in accordance with the work of Maran et al. (2021) as the inverse relationship of extant studies with a focus on quantitative methods when examining possible determinants of motivational dimensions. In addition, trained PWDs are experienced and have better and more knowledge of contemporary issues which are relevant to this study. This study used G*Power software to calculate the sample size needed for the model proposed and found that a sample size of 103 was needed for the moderation model.

Data was sampled from five agencies involved in social entrepreneurship, as recommended by the Department of Social Welfare. The institutions were Bengkel Daya Klang, ProWell Center Bangi, Pusat Dalam Komuniti Malindo Melaka, Bengkel Sampul Surat Batu Pahat Johor, and Bengkel Daya Kedah. Because of the diversity of disability types, a survey was carried out on-site. People with disabilities who answered the questions were assisted in answering the survey. The quality of the answer was improved by assisting the PWD to answer the questions with the help of supervisors or teachers or the person in charge on the site to interpret the questions into meanings close enough to be relatable to them.

The measures of variables in this study were modified from existing scales employed in earlier studies and were checked for their reliability by an academic in the Faculty of Business and Management and an officer in the Department of Social Welfare. The research instrument was divided into four sections, which were properly captioned and guided by clear instructions for easy comprehension by the respondents. Section A: Demographic characteristics of people with disabilities (PWD). There are 25 items related to Section B, which are used to measure the motivators driving PWDs to undertake the social entrepreneurship theory. The present section of questions is an adaptation of the Manifest Needs Questionnaire by Steers and Braunstein (1976) and includes further items drawn from Lai et al. (2022). Participants are required to evaluate their motivation

based on five items related to their need for achievement, need for affiliation, and need for power, which are related to their current occupation. They express their agreement with these statements on five Likert scales in which five is referring to "strongly agree" and one is referring to "strongly disagree." In section C: Social entrepreneurship activities of PWD, the respondents were asked to evaluate economically and socially PWD's contributions. This section consists of ten items derived from the research of Lai et al. (2022) and is measured using a Likert scale. Before the analysis, the data underwent the cleaning process to ensure all collected information met the established criteria. Then, the usable data were computed using SPSS version 28 for descriptive statistics and SmartPLS 4.0 to explore and examine the relationships among the variables.

4. Results

The data used in this study were obtained from Malaysian people with disabilities (PWD), registered with the Department of Social Welfare Malaysia, actively participating in social entrepreneurship activities, and aged at least 18 years old when the data were collected. The chosen institutions were those that actively carry out social entrepreneurship activities. Table 1 refers to the questionnaires collected and answered by the selected Department of Social Welfare institution.

Table 1: The retained questionnaires were set according to DSW institutions

JKM institutions	Frequency
Bengkel Daya Klang	32
ProWell Center Bangi	4
Pusat Dalam Komuniti Malindo, Melaka	5
Bengkel Sampul Surat Batu Pahat Johor	29
Bengkel Daya Kedah	34

The demographic information of the respondents is presented in Table 2. Most respondents were male, comprising 62.1% of the total participants. When examining age distribution, the largest groups were young adults, with 35.0% of respondents in the 18 to 25 age range and another 35.0% in the 26 to 34 age range. This indicates a youthful demographic, likely reflecting a dynamic perspective on the issues surveyed. In terms of education, 70.9% of participants completed secondary schooling, demonstrating a solid foundation of formal education among the respondents. Additionally, 54.4% of the individuals reported earning an income of less than RM 500, suggesting economic challenges that a considerable portion of the population faces. Moreover, it is noteworthy that individuals with learning disabilities represented the highest percentage among the respondents, making up 63.1% of the total. This highlights an important area of focus, indicating a significant number of respondents who may have specific needs and experiences that warrant further exploration and consideration in the context of the survey findings.

Table 2: Demographic Profiles of Respondents

Demographic	Frequencies	Percentage (%)
Gender		
Male	64	62.1
Female	39	37.9
Age		
18-25 years	36	35.0
26-34 years	36	35.0
35-44 years	21	20.4
45-54 years	4	3.9
> 55 years	6	5.8
Race		
Malay	95	92.2
Chinese	6	5.8
India	2	1.9
Marital Status		
Single	88	85.4

Married	15	14.6
Education Background		
Bachelor's degree and above	4	3.9
Professional Certificate/ Diploma	3	2.9
Primary school	14	13.6
Secondary school	73	70.9
No formal education	9	8.7
Gross monthly income		
Less than RM 500	56	54.4
RM 501 – RM 1,000	37	35.9
RM 1,001 – RM 1,500	3	2.9
RM 1,501 – RM 2,000	3	2.9
RM 2,001 – RM 3,000	1	1.0
RM 3,000 and above	3	2.9
Disabled Category		
Physical disability	29	28.2
Visual disability	2	1.9
Hearing disability	4	3.9
Learning disability	65	63.1
Mental disability	1	1.0
Multiple disabilities	2	1.9

Measurement Model

The present study conducts its data analysis by employing Smart PLS 4.0 based on the guidelines of Hair et al. (2018) and Ramayah et al. (2018). The results of the PLS-Path model are evaluated using two-stage analytical procedures: the measurement model (validity and reliability of the measurement model) and the structural model (testing the hypothesized relationships). Three criteria were examined when assessing the measurement model. They were consistent with internal reliability, convergence validity, and discriminant validity. The results are presented in Table 3.

Table 3: **Results Summary for Reflective Measurement Models**

Constructs	**Items**	**Outer Loadings**	**AVE**	**CR**
		>0.60	**>0.50**	**>0.7**
Need for Achievement	NAC1	0.767	0.549	0.829
	NAC2	0.803		
	NAC3	0.633		
	NAC5	0.751		
Need for Affiliation	NAF1	0.672	0.511	0.758
	NAF3	0.738		
	NAF5	0.732		
Need for Power	NPW1	0.813	0.623	0.891
	NPW2	0.718		
	NPW3	0.662		
	NPW4	0.890		
	NPW5	0.842		
Social Entrepreneurship	SENT1	0.518	0.518	0.911
	SENT2	0.690		
	SENT3	0.829		
	SENT4	0.862		
	SENT5	0.775		
	SENT6	0.898		
	SENT7	0.723		
	SENT8	0.774		
	SENT9	0.373		

SENT10	0.579

The findings indicate that each construct's composite reliability (CR) ranges from 0.758 to 0.911, which falls within the acceptable range. For a measurement to be deemed satisfactory, the CR should exceed the threshold of 0.70 but remain below 0.95 (Ramayah et al., 2018). This suggests that all constructs are reliable and demonstrate satisfactory internal consistency. Additionally, the loading items show satisfactory indicator reliability, with values ranging from 0.518 to 0.898, after removing some constructs that did not meet the acceptable average variance extracted (AVE) criteria. It is important to note that indicators with loadings lower than 0.708 can still be retained if the minimum AVE of 0.5 is achieved (Ramayah et al., 2018). To achieve convergent validity, all constructs must have at least an AVE of 0.50. An AVE larger than 0.50 indicates that the constructs explain more than 50 % of the variance in the respective items. The highest observed AVE was Need for Power, 0.623, and Need for Achievement, 0.549, followed by Social Entrepreneurship, 0.518, and Need for Affiliation, 0.511. The latter results indicate that the measurement model demonstrates convergent validity. A Heterotrait-Monotrait Ratio (HTMT) method was further performed for discriminant validity. For a construct to have discriminant validity, the HTMT for the construct should be less than the cut-off (HTMT. 85) or 0.90 (HTMT. 90). The results presented in Table 4 reveal that discriminant validity is confirmed, since the ratios fall below the recommended cutoffs (Kline, 2011). Finally, the findings also provide evidence of discriminant validity between constructs insofar as all indicators have high loadings on their proposed construct.

Table 4: HTMT Analysis

Factors	1	2	3	4
Achievement				
Affiliation	0.879			
Power	0.467	0.308		
Social Entrepreneurship	0.353	0.601	0.274	

This finding enables the research to proceed to the structural model step of hypothesis testing. Assessment of the Structural Model was performed in several stages. It is important to monitor for collinearity issues between the constructs prior to conducting latent variable analysis on the structural model. Collinearity is checked through the VIF. According to the results, it may be inferred that the exogenous constructs in this study are free from collinearity, since all the values of VIF are smaller than or equal to 3.3 (Diamantopoulos & Siguaw, 2006). The T-value for all the paths was calculated by the bootstrapping option in the software SmartPLS 4.0 as described in Table 5. In investigating the relative importance of the exogenous constructs to predict social entrepreneurship (SE), the need for affiliation (Aff = 0.336) becomes the most important predictor, followed by need for power (Pow = 0.144) and need for achievement (Ach = -0.064).

Hair et al. (2021) stated that estimated path coefficients near +1 indicate strong positive relationships, while values closer to 0 suggest weaker relationships. To evaluate these relationships, significance is considered at the 0.01 level when the t-value is greater than or equal to 2.33. In this study, the variable "Need for Affiliation" (β=0.336, t=2.669, p<0.01) meets this criterion. This indicates a significant relationship between Affiliation and Social Entrepreneurship (SE), suggesting that affiliation is the strongest motivating factor compared to the other variables studied. In contrast, "Need for Achievement" (β=-0.064, t=0.518, p<0.01) and "Need for Power" (β=0.144, t=1.419, p<0.01) do not meet the criteria, as their t-values fall below 2.33. Therefore, it can be concluded that one out of the three hypothesized relationships in this study is supported. The coefficient of determination (R^2) for the construct of social entrepreneurship is 0.317, indicating that 31.7% of the variance in social entrepreneurship activities among people with disabilities is explained by the three motivational factors: need for achievement, power, and affiliation. This suggests a moderate level of explanatory power, highlighting the importance of intrinsic motivation in shaping social entrepreneurial engagement. A summary of the structural model results is provided in Table 5.

Table 5: Results of the Significance in Structural Model Relationships

Relationship	Original Sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	Decision	P values	R^2	VIF
Ach -> SE	-0.064	-0.055	0.124	0.518	Not Supported	0.302	0.317	1.890
Aff -> SE	0.336	0.344	0.125	2.699	Supported	0.003		1.520
Pow -> SE	0.144	0.165	0.102	1.419	Not Supported	0.078		1.332

Discussion

Need for Achievement

The study found no significant relationship between the need for achievement and the involvement of people with disabilities (PWD) in social entrepreneurship (SE). These findings contradict existing research based on McClelland's Theory of Need, which consistently shows that entrepreneurs exhibit a high need for achievement (Jumbri et al., 2019; Lai et al., 2022; Yusoff et al., 2020). The findings indicate that PWD may not aspire to achieve in their SE. This does not suggest negligence or casual engagement; rather, it indicates that their motivation may come from other factors of achievement. The result emphasizes that it is pertinent to look into different points of view while investigating this issue. Furthermore, the achievement of PWD motivation can be assessed through participation in activities where success is determined by personal skill and effort. PWDs' daily responsibilities at the institution mostly consisted of standard tasks that matched their abilities. This is also confirmed by Lai et al. (2019), arguing that low need for achievement individuals may prefer less difficult tasks and prefer little feedback about their progress and achievement.

Need for Affiliation

The findings of this research evidence a strong correlation between the need for affiliation and social entrepreneurship. The findings are consistent with those of studies on the motivations of women social entrepreneurs involved in social entrepreneurship in Lundu, Sarawak (Lai et al., 2022). The need for affiliation was the strongest among different motivational measures. The present study supports that by taking part in SE, PWD can communicate and interact with others in the working process, namely visitors, teachers, coworkers, suppliers, and other entrepreneurs. There had to be a reason why they themselves would think twice about going out instead of staying home in a way that drastically limited their chances of meeting new people and leaving them isolated from the community. Moreover, SE is also seen to provide faster and higher integration in the labour market which leads to a higher social inclusion and then, quality of life (Csillag et al., 2019). Consistent with the existing literature, this research found that supportive relationships with instructors or between teachers and students are particularly beneficial for PWD with a high need for affiliation. Such relationships encourage these individuals to develop a greater interest in their tasks and engage more deeply in SE activities. This study supports earlier findings that the social support networks available to entrepreneurs continuously motivate them to strive for greater achievements (Omorede, 2014).

Need for Power

The current research indicates that the need for power is not significantly related to engagement in social entrepreneurship activities. While individuals with disabilities (PWD) can be motivated by the need for power, their understanding of this concept may differ. Ultimately, motivation for power among PWD varies based on factors such as age, education, occupation, and income, as Nuwagaba and Rule (2015) supported. Moreover, the power held by individuals or different types of disabilities is not uniform across all situations; it depends on how a particular PWD or category of PWD manages it, which can serve as either a motivator or a demotivator. PWD can take on leadership roles by instructing and guiding others in their work, allowing them to express their need for power. This is feasible because PWD often possesses extensive experience in specific skills, which helps them assess their leadership capabilities. As such, those with experience may step into leadership roles to guide and support new students in their institution, who might initially be more passive. However, the current study's findings do not align with previous research. These results are consistent with

those of Lai et al. (2022), who found that women social entrepreneurs in Lundu, Sarawak, have likely engaged with their community for an extended period. Their need for power motivates them to become social entrepreneurs, particularly when facing challenges.

5. Managerial Implications and Recommendations

This study's finding extends the understanding of the motivational factors that persist in people with disabilities in social entrepreneurship activities. Even if the goal of PWD participating in SE is to enhance their financial position and decrease dependence on government assistance, their motivation factors in other areas must also be investigated. This research added value to the contribution of McClelland's Theory of Needs by exploring the entrepreneurial motivations among people with disabilities (PWD) in SE. The study combines theory with the need for achievement, affiliation, and power to offer new insights into the internal motives that PWD may bring to their social enterprise program participation. Of the three hypotheses that were examined, only one was supported empirically, suggesting that not all motivational constructs should be expected to have an impact on this context.

SE might be an attractive employment option for PWD that offers them the opportunity to be independent and create opportunities to promote economic growth at a low rate of educational attainment. However, developing successful ways to offer advice and support to PWD can be challenging, given the wide variety of disability characteristics, such as type, severity, stability, duration, and age of onset of disability. Therefore, there is a need for the government and related agencies to restructure some of the existing programs and tailor them according to their needs. As per the current situation, it is suggested that policymakers also consider promoting social entrepreneurship among the public and organizations. "To ensure its effectiveness, public policies should be linked to inclusive education, entrepreneurship training, family awareness, empowerment, career guidance, and social recognition" (Capitán & Pilar, 2019).

The findings emphasize the importance of affiliation in driving PWD to participate in social entrepreneurship. A supportive environment, as well as the instructor, family members, and the disabled community, should be the main focus to promote SE in this field. The findings contribute insight into the motivational sources of PWD; however, the study also has some limitations. One major limitation is the limited sample size which might have caused a bias in the measurements of social entrepreneurship. In addition, not all PWDs may have been capable of filling in the questionnaire, since disabilities vary in severity, and language may be difficult to understand for some. Moreover, there could be a bias related to how people were approached, besides how clearly the researcher explained or presented the questionnaire.

Conclusion

In conclusion, the potential for further research in social entrepreneurship (SE) is vast, particularly in its capacity to uplift marginalized communities, especially those with disabilities. Unfortunately, the current situation highlights a significant lack of empirical data regarding the actual lived experiences and daily realities of people with disabilities (PWDs) in Malaysia. This gap is an important problem that needs attention. Longitudinal data are also essential to address this problem most effectively. This data could provide researchers with a picture of the dynamic and developing nature of motivation that changes over time (Braga et al., 2014). Therefore, future research needs to expand upon this model by incorporating more psychological and interpersonal components, for example, social comparison, focused attention, emotional support, and positive stimulation that are emphasized in Hill's (1987) Interpersonal Orientation Scale (IOS). When adding these variables to the future study, investigators enrich the specificity and context of their findings. In addition, comparing across different disability types may provide deeper insights. Different impairments can distinctly influence individual capabilities, motivations, and support needs within social entrepreneurship. Exploring these variations will provide a more nuanced understanding of supporting and empowering PWDs effectively, ultimately enhancing the impact of social entrepreneurship initiatives in these communities.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Islamic-Oriented Customer Service Management: Challenges and Opportunities

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Abstract: This paper explores Customer Service Management (CSM) from an Islamic perspective, emphasizing the integration of ethical values such as honesty (ṣidq), trustworthiness (amānah), justice (‘adl), and excellence in character (ḥusn al-khuluq). Unlike conventional CSM, which focuses on speed and efficiency, Islamic-based CSM frames service as a moral responsibility and a form of worship. The study highlights the opportunities of this approach, including increased customer loyalty, access to the halal market, and enhanced brand reputation, while addressing challenges such as ethical-profitable conflicts, a lack of staff training, and policy ambiguity. The paper identifies critical gaps in research, including the absence of a unified Islamic CSM framework and the limited number of cross-sector and empirical studies. It concludes with practical managerial implications and future research directions aimed at developing comprehensive, Shariah-compliant service models. This paper contributes to academic discourse and practical business strategies by offering a faith-based approach to ethical and sustainable customer service.

Keywords: *Customer Service Management, Islamic Perspective, Ethical Values*

1. Introduction and Background

Customer Service Management (CSM) is a systematic process that involves planning, delivering, and evaluating all interactions between a business and its customers to ensure satisfaction, loyalty, and long-term engagement (Payne & Frow, 2005). The origin of customer service management can be traced back to the earliest forms of trade and commerce, where face-to-face interactions between merchants and customers laid the foundation for customer relations (Buttle & Maklan, 2019). However, the formal development of customer service as we know it today began with the Industrial Revolution in the 1760s (Tien, 2012). This period saw the emergence of factories and an increase in manufacturing, leading to the creation of the first dedicated customer service teams to address growing consumer demands.

From an Islamic perspective, CSM is not only a functional business activity but also a moral obligation rooted in principles such as ṣidq (honesty), amānah (trustworthiness), ‘adl (justice), and ḥusn al-khuluq (excellence in character). It emphasizes not merely fulfilling customer expectations, but doing so with ethical conduct, spiritual accountability, and social responsibility (Beekun & Badawi, 2005). Islamic-based CSM's objectives are to serve creation (khidmat Khalq) as a form of worship (‘ibādah), promote trust, fairness, and mutual respect in all transactions (mu‘āmalāt), and ensure that economic activities contribute to human dignity and social justice (Ali et al., 2024). In terms of service aspects, conventional CSM ensures service quality in terms of speed, accuracy, and responsiveness. Islam-based CSM also includes ihsān (excellence) and sincerity (Khan, 2019). In addition, conventional CSM resolves complaints through conflict management and cost minimization. Meanwhile, Islamic-based CRM upholds adl (fairness) when finding solutions (Abbas et al., 2020).

Islam-based CSM offers various opportunities and benefits for organizations implementing these principles. The benefits include greater access to the halal market, higher customer retention and loyalty, increased reputation, differentiation in a saturated market, and more substantial financial support from various Islamic funds (Abbas et al., 2020; Polas et al., 2018). However, some companies are reluctant to implement the Islamic principles in their operations for various reasons, including conflict between profits and ethics, lack of employee readiness, cultural and religious misinterpretations, ambiguous business policies, inadequate complaint resolution systems, customers' misuse of the company’s leniency, and time and cost constraints (Ali & Al-Aali, 2014).

Research on Islamic customer service remains limited, with few studies examining how Islamic principles like ṣidq (truthfulness), amānah (trustworthiness), and ‘adl (justice) influence customer satisfaction, loyalty, or brand perception (Ahmad et al., 2015; Amin, 2013; Dusuki & Abdullah, 2007). Consequently, discussions on the benefits of Islamic service ethics often rely on theory or anecdotal evidence (Gümüsay et al., 2020). Additionally, there is no unified, standardized framework that defines Islamic customer service principles across industries, leaving a gap in its systematic application (Alserhan, 2010; Hati et al., 2022). Businesses and scholars frequently depend on fragmented interpretations or broad ethical principles. Additionally, research on Islamic customer service tends to be sector-specific, with most studies concentrating on Islamic banking while neglecting retail, hospitality, healthcare, and e-commerce (Orhan, 2013). As a result, the diverse industry needs within Islamic customer service remain largely unaddressed.

There is a lack of in-depth studies on Muslim customers’ expectations and perceptions of Islamic customer service values (Hati et al., 2022). Businesses may not align practices with what customers perceive as “Islamic” service. Lastly, a few comparative studies explore how Islamic customer service principles are interpreted or implemented across Muslim-majority and minority contexts. This phenomenon creates missed insights into the adaptability and universality of Islamic brand and service ethics (Alserhan, 2010). Therefore, a comprehensive study of Islamic-based customer service is required.

This paper offers insights into how Islamic principles can be integrated into conventional customer service, providing greater business opportunities. This paper will also discuss the possible challenges businesses face in implementing Islamic-based customer service. The paper ends with managerial and research implications for companies and academicians interested in pursuing this subject matter.

2. Literature Review

Customer Service Management

Customer service management (CSM) is the strategic and operational process of designing, delivering, monitoring, and improving a business's support and services to its customers before, during, and after a purchase, to ensure customer satisfaction, loyalty, and long-term value (Zeithaml et al., 2020). Service management scholars have determined the key components of CSM, including service strategy development, customer communication, service quality monitoring, customer data analysis, complaint handling and resolutions, customer relationship management, staff training and development, and process improvements (Fitzsimmons & Fitzsimmons, 2014; Grönroos, 2015; Kaplan & Norton, 2016).

The first component of CSM is service strategy development, where top management defines its direction by setting objectives, values, and performance standards. This includes allocating a budget for CSM initiatives and forming a dedicated committee to oversee planning and implementation (Sheth et al., 2023). The second component is customer communication, which requires organizations to establish multiple channels, such as in-person interactions, phone, email, chat, and social media, to enhance both customer engagement and organizational engagement.

The third component, service quality monitoring, requires organizations to continuously assess service delivery through the use of balanced scorecards and field surveys (Kaplan & Norton, 2016). This feedback helps measure customer satisfaction, loyalty, and willingness to advocate for the organization’s products or services. Key metrics for analysis include customer satisfaction (CSAT), loyalty (retention), net promoter score (NPS), customer effort score (CES), first contact resolution rate (FCR), average response and resolution time, and service quality audits (Buttle & Maklan, 2019; Lemon & Verhoef, 2016).

The next component, complaint handling and resolution, involves a structured approach to addressing customer concerns and using feedback for continuous improvement. Organizations must effectively resolve complaints and ensure customer satisfaction, as positive outcomes enhance customer retention, while unresolved issues can damage their reputation (Zeithaml et al., 2020). Additionally, customer relationship management fosters long-term connections through initiatives like membership and loyalty programs, encouraging sustained engagement.

Effective customer service programs rely on employees who are well-trained, skilled, and committed to delivering excellence. Without their readiness, implementation becomes challenging. The final component, process improvement, emphasizes continuous refinement through benchmarking, mystery shopper programs, customer feedback, complaints, and service quality audits. These initiatives enhance customer satisfaction, foster long-term loyalty, align service delivery with brand values and business goals, and create a distinctive customer experience that sets the business apart in the market (Grönroos, 2015).

Customer Service Management (CSM) and Islamic Ethical Integration

Customer Service Management (CSM) is a strategic process that aims to plan, deliver, and continually improve the service experience provided to customers before, during, and after a transaction (Payne & Frow, 2005). Its primary goals include fostering customer satisfaction, loyalty, and long-term engagement through various components such as communication, complaint resolution, service quality monitoring, and employee training (Grönroos, 2007; Zeithaml et al., 2020).

While conventional CSM emphasizes efficiency, responsiveness, and profitability, Islamic-based CSM integrates ethical dimensions rooted in the Qur'an and Hadith. Principles such as ṣidq (honesty), amānah (trustworthiness), 'adl (justice), and ḥusn al-khuluq (excellence in character) form the backbone of ethical service conduct. These values are not only spiritual imperatives but also practical guidelines for building trust, transparency, and fairness in customer interactions (Beekun, 1997; Dusuki & Abdullah, 2007).

The integration of Islamic ethics into CSM is increasingly evident in sectors such as Islamic banking, halal tourism, Islamic retail, and e-commerce. In Islamic banking, for instance, customers perceive service providers who embody Islamic ethical principles as more trustworthy, resulting in greater satisfaction and loyalty (Amin, 2013). Similarly, halal tourism operators emphasizing transparency, integrity, and customer dignity experience higher levels of repeat patronage and brand loyalty (Battour et al., 2014).

Despite the growing discourse, academic research in this area remains fragmented. Many studies focus on conceptual discussions or are limited to sector-specific case studies, primarily within the financial services sector. The absence of a unified framework across industries and insufficient empirical research on customer perceptions limit the practical application and scalability of Islamic-based CSM models (Ali et al., 2024).

Nevertheless, existing literature suggests that incorporating Islamic ethical values into CSM strategies has a positive impact on various service outcomes, including customer trust, retention, satisfaction, and brand differentiation. Table 1 below summarizes key studies that illustrate these relationships across selected sectors.

Table 1: Summary of studies on Islamic principles and customer service outcomes

Author(s)	Industry	Islamic principle(s) applied	Service outcomes	Methodology	Key findings
Amin (2013)	Islamic Banking	Amānah, Ṣidq, 'Adl	Customer trust and loyalty	Quantitative survey (n=450)	Ethical compliance in Islamic banks significantly boosts loyalty.
Battour et al. (2014)	Halal Tourism	Ihsān, Bayān, Shukr	Customer satisfaction, revisit intention	SEM with tourist data	Islamic hospitality values strongly influence satisfaction and intention.
Dusuki & Abdullah (2007)	Islamic Finance	Justice ('Adl), Trustworthiness (Amānah)	Customer confidence, ethical perception	Theoretical/conceptual	Ethical dimensions are central to Islamic customer service expectations.
Lada et al.	Retail (Halal	Transparency	Purchase	Theory of Reasoned	Islamic values

Author(s)	Industry	Islamic principle(s) applied	Service outcomes	Methodology	Key findings
(2009)	Products)	(Bayān), Honesty (Ṣidq)	intention	Action	positively influence halal product acceptance and purchase.
Tieman et al. (2013)	Logistics (Halal Supply Chain)	Avoidance of harm (Darar), Contract fulfillment (Wafā' bil-'Uqūd)	Service integrity and brand trust	Case study (Malaysia)	Halal logistics providers gain customer confidence via ethical compliance.
Alserhan (2010)	Islamic Branding	Honesty (Ṣidq), Courtesy (Ḥusn al-Khuluq)	Brand credibility, emotional connection	Conceptual analysis	Islamic ethical branding enhances emotional bonds with customers.
Othman & Owen (2001)	Islamic Banking	Fair dealing ('Adl), Transparency (Bayān)	Perceived service quality	SERVQUAL adaptation	Islamic values embedded in SERVQUAL enhance perceived service quality.
Haniffa & Hudaib (2007)	Islamic Financial Reporting	Trust (Amānah), Transparency (Bayān)	Stakeholder confidence	Qualitative case analysis	Transparent ethical reporting fosters greater stakeholder trust.
Ahmad et al. (2015)	E-commerce	Honesty (Ṣidq), Trustworthiness (Amānah)	Online trust, reduced transaction risk	Mixed-methods (Malaysia)	Applying Islamic ethics in e-commerce improves user trust and retention.

Source: Compiled by the authors.

3. Islamic Principles in Customer Service Management

Islamic principles emphasize the importance of strong ethical conduct in all dealings, including customer service. The foundational values are rooted in the Qur'an, Hadith (the sayings of the Prophet Muhammad ﷺ), and Shariah (Islamic law). The relevant Islamic principles that inform customer service practices include honesty, trustworthiness, justice and fair dealing, kindness and courtesy, fulfilling contracts and promises, avoiding haram, transparency, gratitude, and customer appreciation.

Islamic Customer Service Management (CSM) is grounded in ethical values derived from the Qur'an, Hadith, and the broader framework of Shariah. These principles not only guide individual moral conduct but also form a strategic foundation for business operations, particularly in the delivery of services. Eight key principles can be identified and operationalized within customer service practices:

Honesty (Ṣidq)
Businesses must communicate truthfully about their products, pricing, and service terms. Honesty fosters trust and eliminates deceptive practices that could harm customer interests. Honesty or Sidq requires the organization and its employees to be truthful in all aspects of business, including advertising, sales, and communication (Abbas et al., 2020; Weir, 2008). When dealing with customers, the organization and its employees must state materials used, sizing details, and delivery times on their website. They must avoid claiming a garment is "100% cotton" if it includes synthetic fibers. Prophet Muhammad ﷺ said:

"*The truthful and trustworthy merchant is with the Prophets, the truthful, and the martyrs*."

(Tirmidhi)

Trustworthiness (Amānah)

Organizations must fulfill all promises and obligations, such as delivering products on time or honoring warranties. Trustworthiness enhances customer confidence and strengthens long-term relationships. Trustworthiness (Amānah) refers to upholding commitments and responsibilities toward customers and delivering products or services as promised (Dusuki & Abdullah, 2007; Haniffa & Hudaib, 2007). For example, the organization must package items securely and ship on time. If a customer pays for express shipping, the organization must ensure the parcel leaves the warehouse on the same day. They should not delay the delivery without a valid reason. The Qur'an commands:

"*Indeed, Allah commands you to render trusts to whom they are due...*"

(Surah An-Nisa 4:58)

Justice and Fair Dealing ('Adl and Ihsān)

Fairness must govern all business transactions. This includes resolving customer complaints equitably and avoiding exploitation, such as inflating prices during peak seasons or denying legitimate claims. Justice and fair dealing ('Adl and Ihsān) relate to avoiding exploitation, fraud, or deceptive practices, and ensuring fair pricing and value (Abbas et al., 2020; Hassan & Hippler, 2014). Businesses must handle disputes reasonably, without bias toward their own gain. If a customer receives a defective product, offer a refund or replacement without unnecessary delay or denial. The Qur'an commands:

"Give full measure and weight in justice."

(Surah Al-An'am 6:152)

Kindness and Courtesy (Husn al-Khuluq)

Frontline employees are encouraged to approach customer interactions with patience, kindness, and respect, shifting service from a mere transaction to a moral engagement. Kindness and courtesy (Husn al-Khuluq) emphasize treating customers with patience, respect, and good manners (Alserhan, 2010). For example, service providers use polite and empathetic language in emails or chats, even when dealing with demanding customers. A Muslim employee might respond to a frustrated customer by saying, "*We sincerely apologize for the inconvenience. Let us resolve this together, inshā'Allāh*." Employees should remain non-defensive when addressing concerns, following the example of the Prophet ﷺ, who demonstrated exceptional character even in the face of harsh treatment.

Fulfilling Contracts (Wafā' bil-'Uqūd)

Islamic teachings uphold the sanctity of contracts, requiring organizations to strictly adhere to their stated policies, such as return terms, guarantees, and service-level commitments (Tieman et al., 2013). Wafā' bil-'Uqūd emphasizes the importance of honoring service agreements and promises, ensuring that policies, such as a 30-day return period, are upheld precisely as advertised. As the Qur'an states:

"*O you who believe! Fulfill [all] contracts.*"

(Surah Al-Ma'idah 5:1)

This principle fosters trust and integrity in business practices.

Avoidance of Harm (Darar)

Businesses must proactively prevent physical, emotional, or financial harm to customers. This includes ensuring product safety, avoiding misleading claims, and not sourcing from unethical supply chains. The avoidance of *Harm* (Darar) dictates that an organization's products and services should be certified as *halal* across the supply chain and do not physically, financially, or emotionally harm customers (Tieman et al., 2013). This includes prompt customer care when things go wrong. For example, companies might initiate product recalls to replace faulty parts without considering the associated costs. Moreover, businesses must ensure products are safe, ethically sourced, and environmentally friendly (Supriyadi et al., 2024). This *darar* concept may explain how ethical conduct in business operations contributes to societal well-being and justice.

Transparency (Bayān)

Full disclosure of all relevant information—such as additional fees, terms, or limitations—is essential. Clear and open communication prevents misunderstandings and supports informed customer decisions. Transparency (Bayān) reflects clear communication about prices, policies, or potential issues (Weir, 2008). For

example, during checkout, customers are informed of the hidden costs (such as international customs duties) involved in the transaction. By clearly declaring these obscured charges and indirect fees, customers understand the charges and are happy to pay the price without any doubts about the costs. The Prophet ﷺ condemned those who hide defects in goods.

Gratitude and customer appreciation (Shukr)

Expressing appreciation to customers is a moral and strategic act. Whether through thank-you notes or accommodating service gestures, this value reinforces customer loyalty and positive brand sentiment. Gratitude and customer appreciation (Shukr) refer to valuing the customer's role and loyalty (Battour et al., 2014). Expressing gratitude aligns with the Islamic value of showing appreciation. Some small gestures may yield larger positive implications, such as hand-written thank-you notes in packaging. Additionally, the organization should foster a culture of grace and flexibility in resolving disputes, demonstrating its appreciation for customers. The Prophet ﷺ said:

"*May Allah have mercy on a man who is lenient when he sells, buys, and demands his right*."

(Bukhari)

These principles are summarized in Table 2 below, which maps each ethical value to corresponding customer service actions and provides practical implementation examples.

Table 2: Aligning Islamic principles with customer service practices

Islamic principle	Meaning	Corresponding customer service action	Practical example
1. Honesty (Ṣidq)	Truthfulness in communication and representation	Provide accurate, transparent product and service information	Do not label synthetic-blended fabric as "100% cotton."
2. Trustworthiness (Amānah)	Fulfilling obligations and being dependable	Honor promises on delivery, warranties, and terms	Ensure express-shipped items leave the warehouse the same day
3. Justice ('Adl)	Fairness in all dealings	Offer equitable complaint resolution and unbiased handling of disputes	Refund or replace defective items without unnecessary hurdles
4. Kindness and courtesy (Ḥusn al-Khuluq)	Politeness, patience, and ethical behavior	Show empathy, courtesy, and respect, even under challenging situations	Respond to customer complaints with politeness and a cooperative attitude
5. Fulfilling Contracts (Wafā' bil-'Uqūd)	Keeping one's promises and agreements	Uphold return/refund policies, loyalty rewards, and service guarantees	Accept a return made on the last valid day if the policy permits 30-day returns
6. Avoidance of Harm (Darar)	Preventing physical, financial, or emotional harm	Ensure product safety, ethical sourcing, and fair pricing	Recall faulty items; avoid harmful ingredients or exploitative labor
7. Transparency (Bayān)	Clarity and openness in transactions	Disclose all relevant charges, policies, and terms to customers	Inform buyers of potential customs duties for international deliveries
8. Gratitude and Customer Appreciation (Shukr)	Showing appreciation and valuing customers	Express thanks and offer lenient, respectful service experiences	Include handwritten thank-you notes or flexibility in resolving minor disputes

Source: Compiled by the authors.

4. Challenges in Practicing Islamic-Oriented Customer Service

Conflict between Profit Motives and Ethics

Businesses may have values like honesty, transparency, or fairness to guide their practices. However, in practice, they may overcharge customers for high-demand products or conceal product defects, which violates the principles of ṣidq and adl for the sake of high profit (Miller, 2021). For example, companies repackage and

sell local products as if they were imported to maximize profits. Some businesses increase the price of their products during festive seasons because of high customer demand. All these practices make implementing Islamic-based customer service impossible if the organizations do not fully embrace the established values.

Lack of Training or Awareness

Employees may be unaware of Islamic customer service values and how to apply them in practice. They receive inadequate training on this aspect and less encouragement or motivation to put the Islamic principles into practice (Othman & Owen, 2001). Since the return from implementing the values is less visible, companies are reluctant to invest in staff training. Most companies focus on the quantifiable training expense, where the return from the investment is obvious. As a result, this phenomenon will lead to inconsistent service quality and ethical blind spots. Therefore, staff must be trained to serve customers in accordance with Islamic principles.

Cultural vs. Religious Misinterpretations

Local customs might be mistakenly assumed to be Islamic, leading to misinterpreted service behavior. In some cultures, harshness or indifference toward complaints may be considered normal, but it contradicts ḥusn al-khuluq (good character) (Metters, 2022). Employees might be reluctant to take immediate action, assuming that customers complain not because of service defects, but due to their tendency to complain unnecessarily about trivial matters. Some employees might even blame customers when something goes wrong during the service delivery. All this must be avoided, and the good character principle must be put forward.

Ambiguous Business Policies

Some businesses lack clear service policies regarding product returns, refunds, or other issues with products or services (Frei et al., 2020). If this happens, the companies tend to undermine amānāh (trust) and wafā' bil-'uqūd (fulfillment of contracts) for their advantage. Some companies intentionally create vague service policies so that they can escape liability if something goes wrong. They will deny customers the right to return a defective product or get a refund because they do not want to incur additional costs. These may lead to customer dissatisfaction and ethical compromises. In the long run, the companies will lose customers as they choose to deal with other companies.

Inadequate Complaint Resolution Systems

Poor responsiveness or defensiveness during disputes clashes with the Islamic emphasis on justice and mercy (Keshavjee., 2016). Some businesses ignore customer voices, assuming the issue will subside as customers forget about it over time. Delaying responses or denying legitimate claims violates the Prophet's guidance on being just in trade. Businesses establish a proper resolution system where affected customers will receive their rights to compensation (distributive). Not only that, but they should also be given the right to air their dissatisfaction (interactional), the right to receive feedback (procedural), and the right to restoration (restorative). These are the key components of justice that businesses should strive to practice.

Compromising Transparency for Competitive Edge

Businesses may hide charges or service limitations to attract more sales and to gain a competitive edge. This unethical practice violates bayān (clarity) and erodes long-term customer trust (Sadiqe Ali Mohsen, 2023). The urge to maximize profit can cause businesses to overlook what is right and wrong. Although they are aware that their products have limitations, they keep this information to themselves. They will focus only on the strengths of their products to cover the weaknesses. Customers who buy the products will discover these shortcomings after using them. As a result, they will lose trust in the product and the company and will probably turn to competitors for future dealings.

Global Supply Chain Challenges

Ensuring all products are ethically sourced is difficult in modern supply chains (Esan et al., 2024). Using unethical suppliers contradicts the principle of not causing harm (darar), even if it is done unknowingly. For example, getting the materials for production from countries where child labor is practiced is unethical. Using materials that contain harmful ingredients and that will affect consumer well-being is unethical. Another example is obtaining materials unlawfully, which also contradicts the Islamic principle. Organizations must strive to ensure that their sources of materials adhere to the ethical principle of not causing harm to people,

other creatures, and the environment.

Customer Misuses the Company's Leniency

Some customers may exploit lenient policies or misuse Islamic ethics (e.g., expecting free service). Irresponsible customers tend to take advantage of the company's leniency by saying that the company must help its fellow Muslim customers who are in dire need of products or services (Saeed et al., 2001). This makes companies reluctant to implement leniency in their customer service practices, as it may encourage customers to take advantage. That is why Islam allows companies to set fair boundaries while maintaining kindness and justice, ensuring that both parties receive fair treatment and are satisfied with the business dealings.

Time and Cost Constraints

Upholding high service standards, for example, replacing a defective product at no cost, may strain small businesses. Every penny is counted, especially for small businesses, as they strive to survive in a competitive business environment (Bressler, 2012). Therefore, creative and balanced solutions that honor Islamic ethics without compromising business viability are required. For example, a company can establish a timeline for customers to return defective products and have them replaced with new ones. A company can offer after-sales service, where faulty products are repaired without risking the loss of sales or customers. This will create a win-win situation for both the company and customers.

Opportunities in Practicing Islamic-Oriented Customer Service

Access to the Growing Halal Market

Companies offering Shariah-compliant services build credibility in the halal economy, covering food, finance, tourism, and fashion (Rosli et al., 2024). Islamic service values can differentiate a halal restaurant or travel agency by ensuring trust, courtesy, and transparency, as customers value (Lada et al., 2009). This enhances competitiveness in a market projected to exceed $3 trillion globally. Therefore, companies must seize this opportunity to incorporate Islamic principles into their operations, including customer service practices.

Customer Loyalty and Retention

Customers are more likely to stay with businesses that reflect their values (Weinstein, 2012), such as fairness (ʻadl), honesty (ṣidq), and trustworthiness (amānah). As a result, the company will experience lower churn rates and higher customer lifetime value. Some companies must invest a significant amount to organize loyalty and retention programs to retain their customers. Companies that practice these values spend much less for the same purpose because customers feel appreciated when dealing with them (Heskett et al., 2010).

Reputation as an Ethical Brand

Islamic ethics appeal not only to Muslims but also to consumers who value corporate integrity and responsible business (Beekun & Badawi, 2005). It is a universal truth that no one can tolerate unfair treatment or cheating in business dealings. Non-Muslims may also be drawn to companies known for their fair treatment and respectful service. This will strengthen the company's image and attract diverse customer segments, critical for business survival.

Differentiation in Competitive Markets

Ethical service based on Islamic principles offers a unique value proposition in saturated markets. This will differentiate the company from its competitors, which is crucial for survival in the market (Ullah et al., 2023). For example, a financial institution offering "service with integrity" as part of its Islamic values stands apart from profit-driven competitors. Customers will choose this financial institution over its competitors because of its unique value proposition.

Expansion into Muslim-Majority Markets

The Muslim market is projected to exceed $3 trillion globally. Businesses offering Islamic-based services gain a competitive advantage by achieving easier cultural and ethical alignment when expanding into Muslim countries, such as Malaysia, Indonesia, Saudi Arabia, or the UAE (Karia & Deng., 2025). As a result, the company will experience faster market penetration and stronger local partnerships than those that do not offer Islamic-based customer services.

Certification and Niche Branding Opportunities
Companies can pursue Shariah-compliant service certifications or Islamic ethical business seals as evidence for their practices (Asif & Akhlaq, 2024), such as Halal certifications by JAKIM (Malaysia), MUI (Indonesia), ESMA (UAE), and IFANCA (USA), or Islamic finance certifications issued by Shariah Advisory Councils (e.g., Malaysia's SAC of Bank Negara or SC), AAOIFI (Accounting and Auditing Organization for Islamic Financial Institutions), and IFSB (Islamic Financial Services Board). This action will boost credibility and appeal to conscious consumers and investors.

Workforce Alignment and Morale
Muslim employees may feel more motivated and committed when the workplace culture reflects Islamic values, such as respect, justice, and excellence (Abdelwahed et al., 2025). As a result, the company can enjoy better staff performance, lower turnover, and improved internal service quality. Remember that customer engagement starts when employees are engaged. Engaged employees are willing to exert extra effort to go beyond their comfort zone to meet customers' needs.

Strategic Partnerships with Islamic Institutions
Ethically aligned service organizations may become preferred partners for Islamic banks, waqf bodies, NGOs, or zakat agencies (Zain et al., 2023). These Islamic organizations are willing to establish mutually beneficial business relationships with those who share similar values and practices. This will create B2B opportunities and access to religious community networks. As a result, the organizations will experience strong support, which is critical for business survival and success.

Inclusion in Ethical Investment Portfolios
Businesses practicing Islamic principles and ethics may meet ESG (Environmental, Social, and Governance) and Shariah-compliant investment criteria (Wahab et al., 2024). As a result, these businesses can attract investors from Islamic funds and ethical venture capital, such as the HSBC Islamic Global Equity Index Fund, Wahed Invest, Franklin Global Sukuk Fund, Principal Islamic Asia Pacific Dynamic Equity Fund, and Al Meezan Mutual Funds. These funds invest in Shariah-compliant equities, sukuk (Islamic bonds), and tangible assets, thereby avoiding businesses that are involved in unethical practices.

Resilience in Crisis Management
Ethical service practices (e.g., fair refund policies, compassionate customer support) during crises (like pandemics or disasters) build goodwill and brand resilience (He & Harris, 2020). For example, during the COVID-19 pandemic, customers bought their necessities via online platforms. Companies rely on customer trust to operate, and those who win trust can preserve their reputation and thrive in volatile conditions due to a strong customer base and support system.

5. Managerial Implications

Managers can integrate Islamic principles into customer service by aligning policies with key ethical values like honesty (ṣidq), trustworthiness (amānah), justice (‘adl), and good character (ḥusn al-khuluq). Training programs should incorporate Islamic ethical frameworks to enhance staff awareness and ensure consistent, principled service delivery. Employee performance assessments should also reflect these values (Weir, 2008).

Clear communication and fairness are crucial in building trust with customers. Policies on refunds, returns, and dispute resolution should be guided by transparency (bayān) and contract fulfillment (wafā’ bil-‘uqūd) to prevent misunderstandings and conflicts. Organizations must avoid vague policies and ensure that all promises made in service agreements are realistic and achievable, reinforcing their reputation and competitive standing. Ethical business practices may involve higher initial costs, but they foster long-term customer loyalty (Beekun & Badawi, 2005). Decision-makers should consider innovative approaches, such as conditional leniency policies, that prevent misuse while maintaining fairness. When customers feel they are treated fairly, they are less likely to manipulate systems and more likely to trust the business.

Islamic principles can also serve as a brand differentiator, allowing businesses to stand out in competitive markets by emphasizing their commitment to justice, fairness, and customer appreciation (Orhan, 2013). This

approach appeals to both Muslim and non-Muslim consumers, helping companies strengthen their market position. As competition intensifies, an Islamic-based customer intimacy strategy can enhance a company's unique value proposition, ensuring sustained customer engagement.

Justice-based complaint handling is another key factor in ethical service practices. Organizations must establish clear policies and procedures for managing complaints, ensuring a fair resolution process that considers distributive, procedural, interactional, and restorative justice. Customers who feel heard and respected during complaint resolution are more likely to remain loyal and share positive experiences, thereby reinforcing the company's reputation and credibility (Sheth et al., 2023). By incorporating Islamic values into customer service strategies, businesses can foster trust, loyalty, and brand differentiation while securing a long-term competitive advantage in the marketplace (Ali & Al-Aali, 2014).

Suggestions for Future Research

Some suggestions for future research are also highlighted. First, since a comprehensive, standardized framework that defines Islamic CSM principles is lacking, future studies should aim to construct one across various industries. The current work is insufficient for this purpose and requires further effort. This will help unify the understanding and implementation of Islamic values in service management, thereby enhancing the quality of customer service provided by multiple organizations across various industries in the country.

Second, research should empirically investigate how principles like ṣidq (honesty), amānah (trust), and 'adl (justice) affect customer satisfaction, loyalty, trust, word-of-mouth promotion, and brand perception. Quantitative and qualitative methods can be used to validate theoretical claims. The qualitative method will set the foundation for quantitative research by constructing a comprehensive framework, while the quantitative method will confirm the interrelationship among the variables involved.

Third, existing research is heavily focused on Islamic banking. Customer service is critical not only for the banking sector but also required by customers in other sectors. Therefore, future research should investigate how Islamic service principles are applied in various sectors, including retail, hospitality, e-commerce, healthcare, and public services. Specific sectors are well-known for their high service levels; therefore, tailoring service practices to meet the specific needs of those sectors can enhance customer service within those sectors. Consequently, this will enhance the public's perception of this sector.

Fourth, studies should examine how Islamic customer service is interpreted and practiced across different cultural settings, particularly comparing Muslim-majority vs. Muslim-minority countries. Muslim-majority countries include those in the Middle East and North Africa, Sub-Saharan Africa, South Asia, Southeast Asia, and Central Asia. The rest are Muslim minority countries. This would reveal whether Islamic service ethics are universal or context-dependent.

Fifth, in-depth research on Muslim customers' expectations, interpretations, and satisfaction with "Islamic" customer service is needed. The Quran and Hadith provide general guidelines for governing ethical customer service management. Researchers, especially those experts in the Quran, Hadith, and customer service knowledge and practices, should further explore specific contextual applications of customer service. Misalignments between organizational practices and customer values should be addressed appropriately.

Conclusion

Customer Service Management (CSM), grounded in Islamic principles, offers a holistic, ethical, and value-driven approach to business-customer relationships. Unlike conventional models that focus primarily on efficiency and profit, Islamic-based CSM emphasizes honesty (ṣidq), trustworthiness (amānah), justice ('adl), and excellence in character (ḥusn al-khuluq), framing customer service as both a commercial and spiritual duty. This model fosters customer satisfaction and loyalty, aligning business operations with ethical and moral standards derived from the Qur'an and Hadith. Despite its benefits, including access to the halal market, enhanced reputation, and stronger customer relationships, implementation remains limited due to conflicts between ethics and profit, inadequate training, cultural misinterpretations, and vague policies. Addressing these obstacles requires strategic managerial commitment, ethical leadership, and systemic integration of Islamic values into service frameworks. Furthermore, future research must bridge current knowledge gaps by

developing unified models, conducting empirical studies across industries, and exploring customer perceptions in diverse contexts. Embracing Islamic principles in CSM can lead to sustainable business success, stronger community ties, and a marketplace defined by fairness and integrity. This approach respects Islamic teachings and contributes positively to global standards of ethical and responsible customer service.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Factors Affecting the Willingness to Purchase on TikTok Live Streaming Among Pensioners

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Abstract: The popularity of TikTok live streaming among pensioners has been gaining momentum lately. During live streaming, TikTok has been drawing viewers with live videos that are interactive and engaging, allowing consumers to interact in real time. It is well understood that the willingness to purchase on TikTok live streaming has been dominant among the younger generation. However, there has been a lack of understanding of the popular use of TikTok among pensioners from a different generation. Therefore, this study aims to understand pensioners' willingness to purchase on TikTok live streaming using the extended Theory of Planned Behavior (TPB). The extended TPB factors that have been considered in this study are subjective norms, perceived behavioral control, attitude, and trust to break down the relationships with willingness to purchase during TikTok live streaming. As Malaysia is entering an ageing population, this study is very much relevant to assist marketers in implementing the right marketing strategies. The study intends to utilize a self-administered online survey via Google Forms. Sampling techniques to use are convenience and snowball sampling techniques, and the target demographic is pensioners who are using the TikTok app. The statistical methods to apply are Structural Equation Modelling (SEM)-SmartPLS 4, and the Statistical Package for the Social Sciences (SPSS). The results of the study would help marketers to develop targeted marketing strategies that resonate with the unique characteristics and preferences of pensioners engaging with live stream platforms. At the same time, the study would help businesses to improve their outreach and effectiveness in turning viewer engagement into purchase decisions.

Keywords: *TikTok live streaming, pensioners, willingness to purchase, Theory of Planned Behavior.*

1. Introduction and Background

A significant movement towards more engagement among a variety of demographic groups, including pensioners who may have been less engaged in the past, was marked by the spike in social media usage during events like the COVID-19 pandemic (Ayub & Bakar, 2021). Many people have been using TikTok as an entertainment platform as well as a channel to connect with their peers. Thus, TikTok has the potential to be used as a platform to reduce the feeling of isolation, which is common among pensioners (Ayub & Bakar, 2021). Social networking has numerous effects on Malaysia's pensioners where they tend to use it for social interaction, educational and business purposes as well as to get support or shared learning experiences (Hassan et al., 2021). The pensioners' increasing use of social media can be seen as a large cultural change that shows even people who are typically less tech-savvy are willingly adopting the emerging technologies. Malaysia's pensioners have a dynamic demographic profile that is characterized by a range of experiences that affect how they connect with social media sites like TikTok. Social media has served as a connecting tool for this group of people, and it also acts as a platform for a broader cultural engagement in a growing digital age.

TikTok has become an important medium for live streaming businesses in the modern digital landscape, attracting viewers with engaging and interactive approaches. The interactive and engaging approaches are very useful among certain population categories like the elderly folks with unique limits and reasons influencing their buying behavior during live streams. It is important for marketers to understand this demographic's readiness to buy through the Theory of Planned Behavior (TPB) to effectively customize their strategies. The TPB suggests that behavioral intentions are guided by three primary factors namely attitude, subjective norms, and perceived behavioral control, where each of these factors influences the probability of exhibiting a specific behavior in online purchases like on TikTok live streams. The social (family and friends) influence on a person's decision-making process is reflected in subjective norms. This is especially important for older people who prioritize community and family advice in their purchasing behavior (Gallardo et al., 2024; Kumar &

Permatasari, 2021). Empirical study shows that subjective norms have a big impact on older populations' intentions to use new technology and services thus accentuating the need to take social factors into consideration while examining their online purchasing behavior (Ajzen, 2020; Wu & Gong, 2023; Kumar & Permatasari, 2021).

Attitude towards behavior inclusive of an individual's positive or negative evaluation of purchasing during a TikTok live stream. According to research, older individuals' behavioral intention is heavily influenced by their positive attitude (Ajzen, 2020; Mawar & Adiati, 2024; Yang et al., 2022). A pensioner's tendency to buy may be increased when there is a positive assessment of the exciting and interactive nature of TikTok live streams, especially if they believe that the purchases will increase their social involvement or provide them with value (Ajzen, 2020; Putri, 2021).

In an online context, trust plays a significant role in shaping attitudes. The older people regularly demonstrate greater levels of trust when interacting with well-known platforms or influencers (Gallardo et al., 2024; Kumar & Permatasari, 2021; Mawar & Adiati, 2024). Transparent communication about product quality, and authenticity helps to build trust, and it directly affects consumers' purchase intentions during live streams, as shown in studies that highlight the role of trust in online shopping behavior (Gallardo et al., 2024; Kumar & Permatasari, 2021).

Perceived behavioral control (PBC), which is a person's assessment of their ability to carry out their behavior has a significant influence on purchase intentions. PBC could influence a person's confidence level and financial ability to make purchases on TikTok's platform. The older people may be hampered by concerns about their computer literacy. Thus, enhancing digital literacy or streamlining the purchasing process may have a positive impact on their participation in live shopping (Wu & Gong, 2023; Chang & Chen, 2022; Thi & Duong, 2022).

TPB factors (subjective norms, attitudes, and perceived behavioral control) are essential determinants in pensioners' willingness to buy from TikTok livestreams. This study has added the dimension of trust, which substantially helped improve our understanding of older adults' purchase intention on TikTok live streaming. Acknowledging and addressing these interrelated elements will be important for firms that want to attract the older demographic to create marketing strategies that meet their expectations and spending patterns.

2. Literature Review

The overview of TikTok livestream content

TikTok Live streaming's rise has revolutionized internet marketing strategies by giving consumers and brands access to an engaging and participatory platform. TikTok live streaming improves the buying experience by enabling real-time communication and enabling customers to ask questions about products directly (Safitri & Marsasi, 2023; Asmoro & Rofiah, 2024). In addition to offering immediate feedback, this feature helps firms build stronger bonds with customers, which is in line with contemporary marketing ideas like Marketing Strategy 5.0, which places a strong emphasis on customer cooperation and involvement (Asmoro & Rofiah, 2024).

Hence, the consumers' buying inclinations are increased by TikTok Live's dynamic nature. The consumers' trust in sellers is positively impacted by persuasive live streaming content, which in turn influences their purchasing decisions (Elsholiha et al., 2023; Susanti & Adha, 2023). Pongratte et al. (2023) state that a sizeable portion of users have shown an increased interest in buying apparel products because live streaming facilitates successful word-of-mouth communication. Furthermore, the immersive experience provided by live streaming improves consumer trust and perceived value, two important elements that influence purchases (Oktaviani et al., 2024; Susanti & Adha, 2023).

Several elements, such as the influence of live hosts and TikTok Live's capacity to showcase products entertainingly, contribute to its efficacy as a commercial tool. Consumer confidence is greatly influenced by the streamers' presentation style and the genuineness of the content during live interactions. According to a few studies, high-quality streaming promotes sales, and it is linked to greater consumer trust (Oktaviani et al., 2024; Cynthia, 2024). Furthermore, the entertainment and the interactive components of streaming have been

impactful on viewers' impulsive purchasing habits, allowing brands to gain profit from these elements (Dwitya & Hartono, 2023; Harahap & Wahyuni, 2024).

Additionally, the TikTok Live platform helps small retailers to increase their brand awareness. Influencer collaborations and strategic marketing initiatives do help businesses to effectively reach their target market while preserving authenticity, which is a key component in customer engagement (Sabila & Andni, 2023; Khotijah et al., 2024). Combining hedonistic values with utilitarian marketing elements has vastly increased the likelihood of repeat purchases, which is mediated by streamers' trust (Shaadiqiin & Sari, 2024). The systematic use of influencers and the interactive aspects of live streaming presented as a strong marketing approach, which combined entertainment and commerce which has a big impact on consumer behavior (Haryani et al., 2023; Widiani & Maradona, 2024).

In conclusion, TikTok Live streaming has become a powerful instrument in digital marketing, allowing for real-time communication that increases consumer trust and purchase intent. Live streaming's interactive features, when paired with clever marketing techniques, revolutionize traditional e-commerce by giving customers a distinctively interesting purchasing experience and promoting impulsive purchases.

Pensioners' Willingness to Purchase on TikTok Live Streaming

Age, cultural beliefs, and socioeconomic considerations have all had a considerable impact on Malaysia's pensioner demographic profiles. The Malaysian Department of Statistics has projected that Malaysia's elderly population is expected to increase significantly by 2030, where approximately 15% of the country's total population will be 60 years of age or older, signalling the country's transition to an ageing nation (Ismail et al., 2023).

The demographic profile of pensioners in Malaysia is diverse, encompassing a range of age groups, educational levels, and socioeconomic statuses would have a big impact on how they interact with digital platforms, particularly on social networking sites like TikTok. The younger generation tends to use social media more frequently than their older counterpart (Bakar et al., 2022). Though the pensioners are older, their degree of social media activity may vary based on their level of computer proficiency (Rosman et al., 2022). Educational backgrounds are equally important determinants as people with higher education levels are more likely to embrace and use social media for numerous objectives such as commercial and personal connections (Hassan et al., 2015).

The association between demographic profiles and social media usage reflects broader Malaysian socio-cultural trends. Various social media usage patterns are influenced by age and ethnicity, where younger demographics are more likely to favour TikTok for its more contemporary and viral content, while older users might favour content that echoes with their experiences (Ayub & Bakar, 2021). Rosman et al. (2022) find that digital literacy among Malaysian users indicates that digital competency and demographic backgrounds are positively correlated, which affects how effectively the users navigate platforms like TikTok. Thus, understanding how pensioners adopt virtual spaces is essential in designing meaningful interactions and potential business engagements through social media.

Consumer behaviour, particularly among pensioners, has changed dramatically with the arrival of TikTok as a focal live streaming platform. This literature review synthesises existing research on the factors influencing the purchase intention of pensioners within the context of TikTok live streaming. TikTok's live streaming is known for using social interaction and influencer credibility to effectively increase consumer engagement and buying intent (Pongratte et al., 2023; Chandra et al., 2023). According to Pongratte et al.(2023), there is a significant influence of word-of-mouth communication through TikTok's features, emphasising that a rise in the persuasiveness of the content offered can directly improve consumers' decisions to buy. Chandra et al. (2023) also echo the same note, where they found that influencer credibility also encourages hedonic buying motives, leading to impulsive purchases during live streaming. This is important to attract pensioners who might react positively to relatable influencers (Chandra et al., 2023). When users are successfully engaged by live streaming's immersive experience and engaging qualities, this will enhance their sense of connection to the content and thus raise the intent to purchase (Sim et al., 2023).

According to Ping et al.(2022), purchase intentions are greatly influenced by streamers' professionalism and the parasocial bonds that streamers build with their audience, especially when pensioners can relate to the streamers. This reflects the broader tendency for older consumers to derive satisfaction from personal connections within the marketplace, encouraging them to participate in live shopping environments.

Perceived values are very closely linked to the psychological processes behind purchasing intentions. Fan and Zheng (2021) describe how perceived luxury value improves customer engagement and directly influences buying intentions during live streaming shopping sessions. This is consistent with research by Qing and Jin (2022), who highlight how consumers' trust is increased by perceived information quality and engagement, which in turn encourages them to make purchases. In the context of pensioners, these aspects are particularly relevant as pensioners may prioritise trust and quality when making purchase decisions (Zhou et.al., 2024).

The live streaming interactive aspects allow its users to explore their purchasing experiences easily. According to Liu et al. (2022), experience flow, namely the feeling of being absorbed in an activity and trust mediate purchase intentions in the live streaming context. The captivating format of live streaming that creates a safer and more pleasurable shopping experience might draw pensioners who at the beginning reluctant to purchase online (Liu et al., 2022).

Ultimately, social connection, influencer impact, perceived value, and overall user experience do play a part in pensioners' TikTok live streaming purchasing behaviour. The interaction of these elements emphasises how important it is for marketers to modify their strategies while keeping in mind the particular preferences and driving forces of this particular consumer group. Brands could think about using relatable influencers and creating genuine relationships with pensioners to increase their entire buying experience and thus encourage successful participation on platforms such as TikTok.

In conclusion, understanding the dynamics that influence pensioners' purchase intentions on TikTok live streaming is vital for marketers aiming to tap into this demographic. Future research should focus on exploring the specific needs and preferences of pensioners to develop effective communication strategies within live streaming contexts.

Subjective Norm and Willingness to Purchase

The growth of social media sites like TikTok in recent years has changed how customers connect with brands and their decisions on what to buy, especially among certain demographics like senior citizens. This literature review investigates the relationship between subjective norms and willingness to purchase on TikTok live streaming among pensioners. The Theory of Planned Behavior (TPB) indicates that the intention to engage in buying behavior is strongly influenced by attitudes, perceived behavioral control and subjective norms (Ajzen, 1985).

According to Ajzen (1985), subjective norms have a significant influence on purchase decisions. Subjective norms refer to people's sense of social pressure to engage in a behavior (Ajzen, 1985). Studies have suggested that subjective norms may increase the tendency to purchase when consumers' social surroundings (like family, friends or colleagues) support a product purchase. Hung et al. (2022) study shows that a significant correlation between subjective norms and the inclination to buy healthy foods during the COVID-19 pandemic. Yu et al. (2021) discovered the usefulness of TPB in many situations where subjective norms have a favorable impact on contractors' willingness to purchase environmentally friendly products.

As peer involvement and social connections are important parts of TikTok's setting, this setting indicates the importance of subjective norms in TikTok ecology. Febriandika et al. (2023) investigate how TikTok shop generates space where users may display things through live streaming that inspires peer approval and easier to perform impulse purchases. However, not every group of consumers may experience the same effects from the subjective norms. This is proven by Liu et al. (2022), where in their study found that different social groups can have a varying degree of influence on consumer purchases. It can be concluded that it is important to consider context when analyzing how subjective norms affect consumers' intentions to buy.

Additionally, age-related factors may moderate the influence of subjective norms. The consumption patterns

and social interactions of an older person may be different from younger individuals. Thus, for older people, their peers and family impact on their purchase intentions will be different if compared to younger people (Saut & Saing, 2021). Therefore, it is understandable that older adults tend to react differently to subjective norms when they make decisions about what to buy on TikTok live streams.

Though subjective norm is essential, individual attitudes towards the product and perceived behavioral control (PBC) often outweigh it. This has been proven by Jain (2020) where in his study found that though subjective norms are important, they are more impactful when attitudes are neutral or unfavorable towards a product. The closeness of attitudes and subjective norms raises questions about the degree to which older adults prioritize social validation over personal preferences while engaging in live-streaming purchases.

From the above discussions, though subjective norms are important in influencing consumers' purchase intention on social media sites like TikTok, elements like attitudes, perceived behavioral control (PBC) and demographic traits like age should be considered to get a complete picture. The differences between various demographic groups indicated the need for focused marketing tactics that include both societal effects and unique consumer behavior.

In conclusion, an interesting direction for future research is to understand the dynamics of subjective norms and how they affect older consumers' propensity to buy on TikTok live streaming. Researchers and marketers need to remain vigilant of the various factors that influence customer behavior in digital spaces as the online purchasing landscape changes. Hence,
H1: Subjective norm has a significant positive effect on pensioners' willingness to purchase on TikTok live streams

Perceived Behavioral Control (PBC) and Willingness to Purchase
One of the constructs in the TPB framework is perceived behavioral control (PBC) which was formulated by Ajzen (2002). It is defined as a person's belief in their capacity to perform a certain action (Ajzen, 2002). The concept states that an individual's intention to engage in a behavior and the actual behavioral outcomes depend on internal and external variables (Ajzen, 2002).

In today's rapid and evolving digital marketplace, the major force behind the changing consumer behavior particularly among pensioners is live streaming shopping on sites such as TikTok. Thus, marketers need to get a good understanding of perceived behavioral control (PBC) to comprehend its impact on buyer purchase intention. According to Ajzen (2002), PBC represents a person's confidence in executing an action necessary to obtain a particular result.

As demonstrated by Li et al. (2019), a higher tendency to purchase is closely correlated with an increase in PBC. Consumers with higher PBC are more likely to buy energy-efficient equipment which is vastly influenced by their prior experience and resource availability (Li et al., 2019). The same analogy can be applied in TikTok live streaming situations where pensioners with higher PBC might feel more secure about their purchases given their prior experience and availability of resources.

Sun (2023) discovered that in live-stream shopping situations, customer satisfaction completely mediated the relationship between enabling conditions and usage behavior. This suggests that elements like user interface, perceived benefits, and trust can support PBC. These elements are essential given the situation where pensioners might be reluctant to make purchases online as they are unfamiliar with technology (Sun, 2023).

The effect of live streaming on customer attitudes and actions is an important element to consider. Men et al. (2023) study highlights how observational learning and the social dynamics that are present in live-streaming situations tend to increase credibility and reduce viewers' doubt. Therefore, when pensioners are engaged in live streaming and when they watch how others interact online, it may help them to feel more confident in their purchases. User behavior patterns while in live streaming have a major impact on their purchase timing and decisions, which will in turn affect their PBC (Wang & Liu, 2024).

An empirical study on various customer demographics suggests that PBC does influence purchase intentions.

Hasim et al. (2023) state that during live-stream situations, Malaysian consumers' purchase intentions were highly influenced by subjective norms and PBC. This suggests that social networks and societal expectations may also have an impact on pensioners who join live-streams on TikTok. Additionally, Iisnawati et al. (2022) suggest that the trust element which exists during live-stream interactions has a major impact on consumers' decisions, which then are related to their PBC.

The psychological influence on pensioners is another factor to consider in this study. Widodo (2023) states that elements like "fear of missing out" (FOMO) and promotional offers make it hard to resist the urge to impulse on live streaming. Marketers who want to effectively engage with the pensioners need to understand how they manage these effects since emotional reaction may conflict with logical decision-making processes.

While Lin et al. (2022) highlight the sensory stimuli that influence impulse purchase intentions. Their research offers some insights into the S-O-R (Stimulus-Organism-Response) model during live streaming purchase behavior. Therefore, due to the combination of various stimulating stimuli, pensioners' PBC and purchase intent may be impacted.

In conclusion, a variety of factors combined to shape the willingness to purchase during TikTok live streaming among pensioners. Purchase decisions are greatly aided by elevated perceived behavioral control (PBC), which is bolstered by enabling circumstances, social influences, and emotional inputs. Subsequent studies must concentrate on more thorough demographic assessments and customize marketing plans that can be created to particularly address the requirements of the older generation. Therefore,
H2: Perceived behavioral control (PBC) has a significant positive effect on pensioners' willingness to purchase on TikTok live streams.

Attitude And Willingness to Purchase

The emergence of TikTok's live streaming on e-commerce platforms has altered how consumers make purchases particularly among the pensioners and other generations. This review of the literature highlights the elements that affect the pensioners' purchasing decisions while synthesizing several studies that address attitudes and readiness to buy during TikTok live broadcasting.

The growth of live streaming e-commerce on sites like TikTok has greatly influenced customers' opinions and purchase intentions. Studies have shown that TikTok live streaming's interactive features do promote trust and raise the perceived credibility of sellers and their goods. According to Elsholiha et al. (2023), live streaming viewers' trust in the vendor is positively correlated which will generate a better attitude on purchase intentions. On the same note, Saktiawan et al. (2023) report that emotional trust and perceived risk significantly influence consumers' purchase intentions on TikTok. Susanti and Adha (2023) report that live streaming content authenticity also has a significant role in developing customer trust and consequently will promote buying behaviors.

Another aspect to consider is TikTok live broadcast displays and interaction which serve as an important factor that influences consumers' intent to purchase. In their study, Pongratte et al. (2023) highlight the presentation style during live streaming which can boost consumer purchasing decisions. They also note that word-of-mouth promotion can improve purchase intentions. In support of this, Hendriana et al. (2022) found that entertaining and personalized video advertisements can develop a positive attitude towards purchases. The key element for this situation is user engagement which plays a significant role in influencing consumer behavior.

Live streaming events do create a unique opportunity for impulse purchases. According to Harahap and Wahyuni (2024), customers who watch live streams may make impulse buys due to frequent spontaneous exchanges and promotional offers. Marketers can intentionally use features like visual appeals and interactive elements to maximize their marketing effectiveness on impulse buying (Fajar & Otok, 2024).

According to Asmoro & Rofiah (2024), for firms to improve the whole purchasing experience, they need to adjust their products in real time based on viewer input because successful marketing tactics used on TikTok live streaming allow immediate customer interactivity and personalization. This kind of response is consistent with contemporary consumer trends where accessibility and urgency are important when making a judgment

regarding what to buy.

In conclusion, TikTok live streaming can encourage an atmosphere that leads to positive consumer attitudes and increase purchasing intentions. The relevance of interactive and genuine content on TikTok live streaming in influencing consumer behavior in the fiercely competitive world of social commerce is emphasized by this study. Thus,
H3: Attitude has a significant positive effect on pensioners' willingness to purchase on TikTok live streams.

Trust And Willingness to Purchase
TikTok's live streaming function has been crucial in changing consumer interactions as the platform continues to rule the social media scene, especially when it comes to older demographics like pensioners. During live streaming, trust in the seller has a significant impact on purchase intentions. There are several studies that highlight trust and how it affects consumers' tendency to purchase on TikTok live streaming.

Trust is one of the important factors that influence consumer buying behavior. This is especially crucial for online purchase settings because consumers do not have the chance to engage with sellers. An authentic presentation during live streaming and viewer interaction are important to build customer trust, which will directly connect to enhanced purchase decisions (Susanti & Adha, 2023). Additionally, Elsholiha et al. (2023) state that the authenticity perceived during live streaming sessions is a main positive factor that influences purchase intentions which in turn drives trust in sellers.

The interaction during the live streaming session enabled the prospective customers to communicate with sellers by asking questions directly and get updated product information. The customer participation during live streaming has allowed transparency to be present. Transparency is a crucial element in developing trust. Rinanda et al. (2024) have mentioned that increased seller trust is positively related to purchase intentions in live streaming sessions. Also, trust mechanisms are shaped by TikTok's unique features where the platform has emphasized personality and presentation style (Rinanda et al., 2024). Orlando and Fachira (2023) mention that consumer trust is positively influenced by visual attractiveness, humor of the live host and interaction quality.

Pensioners may have different purchasing patterns and psychological blocks than the younger consumers and they may need personalized trust-building strategies. Considering the importance of direct engagement and credibility in fostering trust, marketers should examine information authenticity and broadcast style that fits the tastes of the target viewers (Pongratte et al., 2023; Priambodo, 2023). Thus, TikTok live streaming interactive elements act as an engagement platform where personable interactions can build trust that enables to connect with older viewers.

Features like the quality of live stream and the perceived value of the products offered for sale are vital in enhancing customer trust. High-quality live broadcast is necessary considering it has a big effect on customer trust and perceived product value which leads to purchase intention (Oktaviani et al., 2024). Hence, these features might be more attractive to pensioners who would prefer simplicity and value over flashiness.

Viewer loyalty can be increased from live streaming because it creates stronger rhetorical ties which are important to retain older customers (Asmoro and Rofiah, 2024). Furthermore, word-of-mouth recommendations among customers developed in live streaming events increase the chance of a purchase decision (Pongratte et al. 2023).

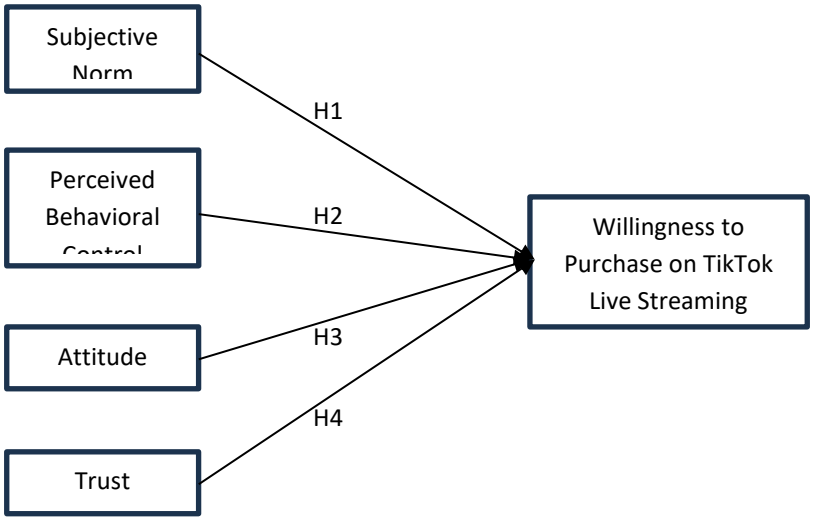
Live streaming marketing permits real-time interaction and helps develop a sense of urgency among viewers which may make them buy on impulse (Agistiani et al., 2023). Furthermore, Agistiani et al. (2023) add that trust can alleviate the pensioners' barriers to online purchasing which then will increase the likelihood of making impulse purchases.

Further research on the relationship between trust and purchase intention among pensioners during TikTok live streaming is extremely encouraging. Enhancing purchase intentions requires establishing client trust via genuine participation and excellent interactions. In addition to better serving older audiences, the possibility of tailored marketing strategies that make use of these data will also increase live streaming's overall

effectiveness as a commercial marketing tool.

Marketers must continue to be mindful of how trust affects consumer behavior as TikTok and related platforms develop and modify their strategies to suit the needs of consumers, especially those in older generations who may be more dubious but are just as valuable in the rapidly changing digital economy. Thus,
H4: Trust has a significant positive effect on pensioners' willingness to purchase on TikTok live streams.

Figure 1: Proposed Conceptual Framework



3. Methodology

A self-administered (voluntary) online survey or e-questionnaire via Google Forms is being used for the investigation. Using convenience and snowball sampling techniques, the target demographic is pensioners who are using the TikTok app. The circulation of the survey website's hyperlink is through the social media platforms, namely Facebook, TikTok, and WhatsApp Messenger. There are two sections to the questionnaire. The personal data or demographic profiles of the respondents are the focus of Section A. It includes general enquiries as well as more focused ones about how often they buy from TikTok live streaming, how much they spend overall on social media, and so on. To ascertain how customer attributes (such as age or wealth) affect the connection between these constructs and intention to buy, it will also be crucial to include demographic variables (Mardhiana, 2022).

The purpose of the questions in Section B is to collect responses about the dependent construct (willingness to purchase) and the independent variables (subjective norm, perceived behavioral control, attitude, and trust). Validated scales from the body of existing TPB literature should be used in the questionnaire's construction. Wong et al. (2018), for instance, investigate the direct correlation between attitudes and purchase intentions, offering valuable information that may guide the development of the attitude scales.

Every item in the survey will include one of the following response categories: 1 (strongly disagree) to 5 (strongly agree). The study will be using a five-point Likert scale to measure all variables. The pilot test will include 25 pensioner participants. The statistical methods used in the study are Structural Equation Modelling (SEM), SmartPLS 4, and the Statistical Package for the Social Sciences (SPSS). The most effective analytical tool for assessing human behavior is SEM (via SmartPLS 4) (Limpanitgul, 2009).

4. Conclusion

In summary, various psychological and social elements, particularly attitude, subjective norms, perceived behavioral control (PBC), and trust, have a substantial impact on pensioners' readiness to use TikTok live streaming for purchasing choices. Consumers, especially the pensioners, have higher purchase intentions when they have favorable opinions about the effectiveness and validity of live streaming content. Live streaming that is engaging added with the seller's credibility tends to form positive attitudes among its viewers (Elsholiha et al., 2023; Kakar et al., 2024).

Subjective norms that represent the perceived social pressure to engage in purchasing behaviors that are influenced by peer recommendations or influencer endorsements help shape the pensioners' perception of their purchase decisions (Pongratte et al., 2023; Ping et al., 2022). TikTok live broadcasting that comes with interactive features and real-time feedback helps to promote community participation which is important for people who need approval on their purchase decisions (Asmoro & Rofiah, 2024).

Additionally, a basic purchasing decision that comes along with live streams' promotions or discounts can improve perceived behavioral control which is the perceived ease or difficulty of executing a behavior (Harahap & Wahyuni, 2024; Febriah & Febriyantoro, 2023). Direct communication with sellers has empowered the pensioners' confidence to execute their purchase plans and thus increase their control over the purchasing process (Cynthia, 2024).

Finally, trust acts as the main factor in judging what to buy in an online setting. When genuine relationships between live streaming hosts and their followers are built, these relationships help to create and increase trust in a seller and its products which helps change a positive attitude into actual buying behavior (Sari et al., 2023). Purchasing on social media sites like TikTok represents a dynamic landscape where all the elements like subjective norms, perceived behavioral control (PBC), attitude and trust will interact and thus influence willingness to purchase. The digital platform must adapt to distinct buying preferences, engagement patterns and actions of the target market, in this case the pensioners.

The objective of the study is to provide information about the purchase behavior of pensioners on TikTok live streaming. The information is essential for marketers as there is a vast elderly population that is ready to enter social media live streaming scenes to buy goods online. This category of the population is a valuable market as they represent the population with wealth and spending power. Thus, a better understanding of their buying behavior can help marketers, brand owners, and market researchers to formulate the right marketing strategies for their products.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Effect of Service Quality and Health and Safety Practices on Visitors' Return Intention: A Study Among Event Management Students

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Abstract: Service quality assessments, together with health and safety standards, directly affect how often visitors return to event facilities. Research on these factors has not been sufficiently explored among students studying event management at UiTM Puncak Alam. This research examines the impact of service quality and health and safety protocols on visitor return behavior during student-run events. The study used a quantitative approach to survey 147 event management students who were selected through convenience sampling. The research investigates three essential variables, including employee behavior, site cleanliness, and emergency preparedness, to determine their effect on visitor retention. The research used Pearson correlation analysis to determine the direction and strength of relationships between the studied variables. The research shows that both service quality and health and safety practices directly affect visitors' willingness to return. The research demonstrates that better management systems should be implemented to improve operational performance and visitor satisfaction within event environments. The research provides actionable recommendations that enhance the quality and safety standards of student-led events to boost attendee loyalty and repeat attendance. Event organizers who actively work on service quality and safety matters will develop secure, efficient appealing environments that promote sustained visitor engagement.

Keywords: *Event Management, Service Quality, Health and Safety Practices, Visitors' Return Intention*

1. Introduction

Event management students at UiTM Puncak Alam are increasingly involved in organising large-scale events ranging from academic conferences to cultural festivals. In planning an event, three elements need to be considered: 1) Health and safety protocols, 2) service delivery, and how to stimulate repeat visits (Smith & Johnson, 2020). In recent years, health and safety concerns have taken precedence, requiring students to create strong crowd management plans, optimise crowd movement, and apply thorough risk mitigation techniques (Tarlow, 2002). Simultaneously, maintaining great service quality is crucial. Students should prioritise developing professional standards that improve visitor experiences by streamlining registration, improving communication, and providing responsive support services (Lamberz & Litfin, 2021). By focusing on visitor comfort and engagement, students can learn to analyse and implement crowd management strategies that protect participant safety and enhance participant experiences. Event management students at UiTM Puncak Alam can create sustainable campus events that foster long-term relationships with their target audiences while enhancing the university's reputation for well-organised and successful events (Simasathiansophon, 2021). This real-world experience will also help students to achieve industry standards (Rashid et al., 2023).

The growing popularity of student organization events at UiTM Puncak Alam requires proper campus event management with effective crowd control measures. Event management students need to create detailed emergency response plans that combine visual crowd flow optimization techniques (Zolkifly & Bade, 2020) to reduce risks according to health and safety standards. The safety measures include both venue capacity control and medical station placement and emergency exit positioning to protect participants and maintain their peace of mind. The cost-effectiveness of attracting previous visitors surpasses the expense of acquiring new attendees, according to Đurađević et al. (2022), so service quality stands as a vital factor. Students need to provide outstanding experiences that surpass attendee expectations through efficient registration processes and clear communication and responsive support to build revisit intentions. A successful event requires both strong health and safety measures and superior service delivery. Students need to master the art of balancing operational elements while handling various operational issues, including volunteer coordination and

unexpected situations. The organization of academic conferences and cultural festivals on campus provides students with essential real-world experience through diverse event management challenges (Jasmis et al., 2021; Lamberz & Litfin, 2021; Talib et al., 2024). Students develop event management skills through practical experience and theoretical knowledge and industry best practices to deliver safe high-quality events that attract and retain participants (Brown & Green, 2020). The understanding and enhancement of visitor return intentions stands as a vital factor. Students can determine essential factors for repeat attendance by studying participant feedback and behavior while focusing on accessibility (Đurađević et al., 2022).

The growth of student-organized events at UiTM Puncak Alam creates escalating difficulties for maintaining suitable health and safety standards. The lack of complete training and experience with proper safety protocols among student organizers creates potential risks when they organize large gatherings. The main safety problems stem from insufficient emergency response plans and insufficient crowd management systems, and insufficient knowledge about managing event capacities. The gap between theoretical understanding and practical implementation remains substantial because students normally do not receive formal training for real-world event management (Brown et al., 2020). Event planners remain uncertain about best practices because there are no standardized protocols designed for student-organized campus events (Jones & Lee, 2019). The absence of experience with monitoring tools and crew training and risk assessment procedures creates a significant gap that makes it challenging for students to handle large-scale events safely (Cvent, 2024). Student organizers face difficulties in creating safe environments for all participants at campus events because they lack proper health and safety guidelines. Student-organized events face service quality delivery challenges because of poor resource distribution and coordination systems (Kim & Anderson, 2021). Event organizers must address these health and safety concerns because repeat visitation represents a vital factor for event success and sustainability through revisit intention.

Inefficient event management procedures often result in registration bottlenecks, unclear communication, and delayed response times to participant needs (Holistique Training, 2024). The service quality problems emerge because of restricted infrastructure capacity and insufficient customer service training and inadequate participant flow management systems during events (Martinez & White, 2023). Event organizers face difficulties in measuring and enhancing event management performance because they lack standardized service quality indicators, which results in ongoing inefficiencies that negatively impact participant satisfaction (Williams, 2022). The combination of health and safety and service quality gaps leads participants to become dissatisfied, which reduces their likelihood of returning to future campus events (Clark et al., 2020). The failure to properly manage crowds leads to a decrease in the number of visitor return intentions according to Đurađević et al. (2022). The organizers struggle to determine what affects attendee return decisions because they lack systematic feedback collection and analysis systems (Nguyen & Taylor, 2018). The absence of data-driven participant preferences and expectations information prevents organizations from improving event quality and building enduring attendance patterns. Thus, it is important for event organizers to gather participant feedback for better satisfaction rates and higher revisit intentions (Tsai, 2020).

2. Literature Review

The relationship between service quality and health and safety practices and their influence on visitor return intentions among event management students at UiTM Puncak Alam is crucial to explore. The understanding of this relationship is essential for the development of successful and sustainable events, especially since repeat visitors are more cost-effective than new ones, as indicated in the editor's document. Return intentions are essential in assessing the overall impact and success of an event, and this concept is in line with the Expectancy-Disconfirmation Theory (Oliver, 1980), where perceived quality and satisfaction influence future decisions. For event management students, understanding these relationships is important. Their training enables them to evaluate how service access, including factors such as the accessibility of the venue and the ease of participation, significantly affects visitor experiences. The accessibility of the event venue and its basic features are perceived as of major importance for the participants; thus, it is reasonable to expect that it will influence repeated participation at the event (Đurađević et al., 2022). Thus, health and safety aspects are also important in building trust and confidence, especially after the global health crisis (Jasmis et al., 2021).

Return Intentions: The success of future events at UiTM Puncak Alam depends on return intentions because

they measure participant satisfaction and trust, and loyalty levels. The research by Calabuig-Moreno et al. (2016) shows that repeat visitation proves more economical than the process of obtaining new visitors. The visitor-provider relationship duration becomes evident through return intentions, which function as customer loyalty indicators (Menezes et al., 2020). Visitors base their return intentions on their evaluations of service quality and health and safety measures, which directly impact their event experience (Calabuig-Moreno et al., 2016). The alignment of service quality and safety measures with visitor expectations stands as a critical factor. Event organizers who deliver safe and high-quality experiences gain visitor loyalty through trust, which strengthens their relationship with attendees (Rashid et al., 2023). The service quality perception stands as a vital factor because it shows how well the event meets or surpasses visitor expectations, which leads to satisfaction.

The delivery of promised services and high service quality helps visitors feel assured about an event's professional and dependable nature (Calabuig-Moreno et al., 2016). Visitors now place health and safety above all else because they want events that maintain cleanliness standards and enforce public health guidelines and control crowd numbers (Jasmis et al., 2021). Visitors who experience a safe environment will develop trust, which directly affects their decision to return (Rashid et al., 2023). Visitors will feel confident about their health safety when event staff properly execute safety protocols, which results in positive, memorable experiences. The research evaluates return intentions as the outcome variable, which includes service quality and health and safety practices. The study investigates these relationships to deliver practical knowledge that helps UiTM Puncak Alam event management students create high-quality and safe events that build visitor satisfaction and loyalty (Đurađević et al., 2022). The conditions at the beginning and end of an event serve as essential factors that influence visitor intentions to return (Đurađević et al., 2022). Efficient quality management, in the service sector especially, becomes a competitive advantage in today's business environment (Calabuig-Moreno et al., 2016).

Service Quality: Event management service quality describes how well delivered services match up to or surpass visitor expectations. Professionalism, along with reliability and efficiency and interpersonal interactions, form the foundation of service quality. Event organizers should prioritize service quality because it creates an exceptional experience for visitors, which leads to positive return intentions (Mohamed & Ali, 2019). Five dimensions of service quality exist: tangible and assurance and empathy and responsiveness and reliability. Jiewanto et al. (2012) describe tangible elements as the visible appearance of event facilities and equipment and materials. Clean, aesthetically pleasing venues, organized setups, and professional branding leave a lasting impression. The starting and concluding conditions of an event hold significant importance (Đurađević et al., 2022). The assurance dimension relies on staff competence and courtesy to establish trust and confidence (Jiewanto et al., 2012). Event staff and volunteers must provide visitors with a feeling of safety and importance during their interactions (Rashid et al., 2023). Visitors remain sensitive to hygiene and trust factors, so assurance and tangibles have become vital elements during the post-pandemic period (Kim & Lee, 2023). Visitors receive help from staff members who demonstrate responsiveness according to Jiewanto et al. (2012). Staff members need to handle visitor inquiries efficiently while resolving complaints and providing event updates. Jiewanto et al. (2012) state that empathy consists of offering individualized attention while understanding visitor requirements. The event requires attention to various attendee needs through diverse facility options while promoting inclusive environments. The importance of empathy and responsiveness in events has grown because event apps and social media enable real-time personalized communication (Wang et al., 2024). The definition of reliability, according to Jiewanto et al. (2012), means delivering consistent results that match what has been promised. Event organizations that meet their promises and maintain their scheduled programming will attract more repeat visitors, according to Nguyen et al. (2023).

The consistent delivery of these dimensions leads to positive experiences and satisfaction while building trust that affects visitor return rates. Visitors who experience professional event execution combined with attentive service will feel valued, which increases their chances of revisiting the event and sharing it with others. Event management students who master these dimensions will be able to make their events stand out in competitive markets. The study has developed the following hypothesis:
H1: There is a positive effect of service quality on the return intention among students in UiTM Puncak Alam.

Health and Safety Practices: The post-COVID-19 event management sector depends on health and safety

practices to determine visitor return intentions. These measures do not directly affect revisit decisions, but they improve visitor satisfaction, which acts as a mediator between satisfaction and revisit behavior (Hasan, Islam, & Rahman, 2024). The combination of well-managed crowd control with strict sanitation and visible staff competence in enforcing safety standards develops trust while reducing health concerns and providing safety to attendees (López-Catalán, Gómez-Carmona, & López-Guzmán, 2022). Transparent communication of safety protocols before and during events helps to control visitor expectations and decrease health-related worries. The trust in safety protocols functions as a moderating factor that strengthens the connection between event motivation and return intention, which leads to better visitor loyalty and higher chances of repeat attendance and recommendation (Zhang, Wang, & Li, 2024).

The implementation of health and safety practices includes various protective measures that protect the physical and mental health of participants during events. The practices for crowd management, along with sanitation standards and emergency preparedness and legal compliance, form part of these measures according to Yüksel & Yüksel (2001) and Niharika & Rao (2022). Practical health and safety implementation requires maintaining orderly entry and exit while stopping overcrowding and performing regular disinfection activities, and delivering safe food and sufficient sanitation facilities. Professional incident management requires emergency preparedness through trained personnel deployment, with first-aid equipment availability and clear response protocols.

The development of health and safety competencies stands as both an academic requirement and an essential professional capability for event management students at UiTM Puncak Alam. Future industry practitioners who implement strong safety strategies will determine the quality and credibility and long-term success of the events they manage. Safe and well-organized events establish trust among attendees while enhancing their total experience and encouraging long-term engagement, particularly in educational environments where student involvement matters (Johnson, 2023). The health-conscious public depends on the visible and consistent safety measures and their effectiveness to rebuild and sustain public trust. Schönefeld, Wilmes, & Purves (2024) confirm that event attendees build trust through clear communication alongside consistent enforcement and active compliance with safety protocols in secure environments. The study has developed the following hypothesis:
H2: There is a positive effect of health and safety practices on return intentions among students in UiTM Puncak Alam.

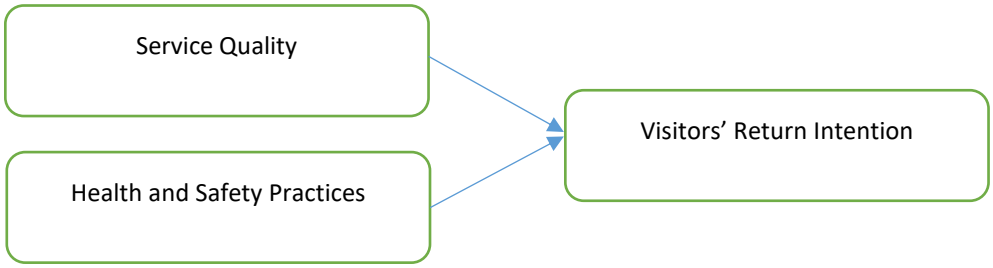
3. Methodology

The research design of this study uses correlation analysis to evaluate service quality and health and safety practices through the framework developed by Al-Qurashi, Al-Qahtani, Abdulaziz, & Abu Habra (2023). Data were collected through convenience sampling from event management students at UiTM Puncak Alam. The final sample comprised 147 participants, deemed statistically sufficient based on Krejcie and Morgan's (1970) table for a population of 230 students. The survey instrument consisted of a questionnaire that participants completed through an online Google form. The research instrument used in this study was based on Al-Qurashi et. al. (2023) and supported by a current literature review. The questionnaire contained four (4) sections, which included demographic profile information, independent variables 1) service quality and 2) health and safety practices and the dependent variable consisted of visitors' return intention. The research instrument used ordinal and nominal scales to measure demographic information, while the Likert scale assessed the constructs. The data analysis used linear regression statistical tests in SPSS for the study.

Research Framework

The research framework of this study investigates the relationship between service quality, health and safety practices, and visitors' return intentions among event management students at UiTM Puncak Alam. The framework investigates how service quality and health and safety practices function as independent variables (IVs) to affect visitors' return intentions, which are measured by the probability of attendees returning to future events as the dependent variable (DV).

Figure 1: Research Framework



Based on the framework above, the hypothesis is tested as follows:

H1: There is a positive effect of service quality and visitor return intention among event students in UiTM Puncak Alam.

H2: There is a positive effect of health and safety measures, and visitor return intention among event students in UiTM Puncak Alam.

4. Findings and Discussion

Table 1: Demographic Profile of the Respondents

	Factors	N	%
Gender	Male	30	20.5
	Female	117	79.5
Age Group	18-20	23	15.6
	21-23	107	72.7
	24-26	16	10.8
	27 and above	1	0.7
Semester	Semester 1	23	15.6
	Semester 2	26	17.7
	Semester 3	28	19.0
	Semester 4	24	16.3
	Semester 5	33	22.4
	Semester 6	13	8.8

Table 1 presents the demographic profile of the 147 participants in this study. The majority of respondents were female (79.5%), while males comprised 20.5% of the sample. The dominant age group in our sample was 21-23 years old (72.7%), with smaller proportions of respondents aged 18-20 (15.9%) and 24-26 (10.8%). The respondents who were Semester 5 students made up 22.4% of the total, while Semester 3 students comprised 19.0% of the participants, indicating that students from different academic levels took part in the study.

Descriptive Statistics: Table 2 shows the descriptive statistics of the study variables. A 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used to assess each variable. The results show that service quality had the highest mean (4.17, SD = 0.568), followed by health and safety practices (Mean = 4.03, SD = 0.482). The dependent variable, visitors' return intention, had a mean of 4.25 and a standard deviation of 0.522. These findings indicate that respondents generally perceive service quality and health and safety practices as important aspects of their event experience, which in turn affects their intention to revisit (Al-Qurashi et al., 2023). Revisit intention is important for event organizers since attracting previous visitors is cheaper than acquiring new ones. The relatively high mean values for service quality and health and safety indicate that they can enhance visitor satisfaction and loyalty (Al-Qurashi et al., 2023). These results are in line with previous studies that show that service quality dimensions have a significant impact on visitors' experiences and revisit intentions (Bayang et al., 2022).

Table 2: Descriptive Statistics

Construct	N	Mean	Std. Deviation
Service Quality	147	4.17	0.568
Health and Safety Practices	147	4.22	0.508
Visitor Return Intention	147	4.25	0.522

Reliability Statistics: The assessment of measurement accuracy depends on reliability, which measures how consistently and stably a measurement instrument remains throughout time. Cronbach's alpha served as the statistical tool to assess the internal consistency of items that belonged to each construct. The statistical method assesses how well items in a scale correlate positively to measure the same underlying concept reliably. Table 2 presents the reliability statistics for each variable examined in this study.

Table 3: Reliability Statistics

Construct	Mean	No. of Items	Cronbach Alpha
Service Quality	4.17	8	0.898
Health and Safety Practices	4.22	6	0.842
Visitor Return Intention	4.25	5	0.808

Table 3 shows the details on each dimension used in this study. Cronbach's alpha coefficient was used to measure the internal consistency of survey items. As shown in Table 3, the Cronbach's Alpha is 0.842, 0.808 and 0.898. According to Salkind (2014), a Cronbach's alpha that is greater than .6 is questionable, .7 is acceptable, .8 is good, and .9 is excellent. Therefore, all constructs are accepted as being reliable for this research.

Correlation: The purpose of correlation analysis is to determine the strength and direction of relationships between variables. The research used correlation analysis to study the connections between service quality and health and safety practices and visitor return intentions. The analysis shows the direction of variable relationships as well as their statistical significance. The research results show how service quality and health and safety practices affect visitor return intentions.

Table 4: Correlations

		Service Quality	Health and Safety Practices	Visitor Return Intention
Service Quality	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	147		
Health and Safety Practices	Pearson Correlation	.286**	1	
	Sig. (2-tailed)	<.001		
	N	147	151	
Visitors' Return Intention	Pearson Correlation	.230**	.476**	1
	Sig. (2-tailed)	.005	<.001	
	N	147	147	147

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

The table above presents a correlation analysis between service quality and safe practices, which affect visitors' return intention. The interpretation of the correlation result for this study is based on Hair et. al. (2006). The result shows health and safety practices ($r=476$, $p<0.001$) have a moderate and positive relationship. The moderate correlation, as defined by Hair et al. (2006), indicates that safety practices have a greater effect on visitors' return intention than service quality. Meanwhile, service quality is positively and weakly correlated with visitors' return intention ($r=0.230$, $p=.005$). Based on Hair et al. (2006), this indicates a weak but statistically significant association, indicating that improvements in service quality are modestly associated

with an increase in participants' intentions to attend future events. Therefore, the researchers accept all the hypotheses, affirming that service quality and health and safety practices positively affect the visitors' return intention.

Regression Analysis: The research used regression analysis to determine how one or more independent variables affect the dependent variable. The analysis served to validate the study's hypotheses while assessing the predictive power of the proposed model. This section explains the coefficient of determination (R^2), which shows the amount of dependent variable variance that independent variables can explain. The beta coefficient (β) shows the standardized effect size of each independent variable in the regression model. The following table shows the findings from the regression analysis.

Table 5: Regression between Service Quality and Health and Safety Practices on Visitors' Return Intention.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.486[a]	.236	.225	.460	1.835

Based on the R-squared value, only 23.6% of the variance in the dependent variable can be explained by the independent variable. This indicates that the remaining 76.4% is influenced by other factors not included in this study, which may also significantly impact the outcome.

Table 6: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	1.920	0.374		5.126	<.001	
Service Quality	.094	.070	.102	1.340	.182	H1 not supported
Health and Safety Practices	.459	.078	.447	5.878	<.001	H2 supported

The multiple linear regression analysis in Table 6 shows the relationship between Service Quality and Health and Safety Practices. The analysis shows that Health and Safety Practices have a statistically significant positive effect on the dependent variable (β = 0.447, p <.001). Therefore, H2 was accepted. The variable Service Quality does not show a statistically significant relationship with the Result (β = 0.102, p =.182). The positive coefficient is not statistically meaningful in this model since the p-value exceeds the conventional threshold of 0.05. Therefore, H1 was rejected. These findings suggest that Health and Safety Practices play a critical role in influencing the outcome, whereas Service Quality does not significantly predict the dependent variable within the context of this model. The study confirms that health and safety practices directly influence visitor return intentions according to event management literature. The research produced an unexpected result, which showed that service quality did not impact return intention in this specific situation. Visitors seem to value safety and security more than service quality dimensions because health concerns remain dominant in the post-pandemic period.

5. Conclusion and Recommendations

The way visitors perceive health and safety at events determines their willingness to return because these elements create fundamental trust and emotional bonds (Al-Qurashi et.al., 2023). The combination of transparent health and safety protocols with efficient crowd control systems and accessible medical support, and secure venues effectively minimizes event-related concerns while maintaining attendee safety from start to finish. According to Al-Qurashi et al. (2023), effective crowd management leads to better visitor satisfaction while avoiding overcrowding and long wait times that would discourage people from returning. Visitors who trust the event's risk management systems tend to experience higher satisfaction, which increases their

possibility of planning future visits (Hasan, Islam, & Rahman, 2024). Poor health and safety measures that are not properly implemented result in negative visitor experiences, which reduce the probability of visitors returning. The implementation of complete health and safety measures, which include crowd control and emergency services and strict sanitation protocols, leads to better satisfaction levels and improved security perceptions (Wang, Zhang, & Chen, 2024).

Event organizers suggested collecting participant feedback to discover improvement opportunities, which leads to satisfied visitors who will return to future events (Tsai, 2020). Event safety measures communicated openly before and during events help visitors feel confident while potential participants make better decisions about event attendance (Hoffman, 2021). The safety and well-being of attendees at events lead to positive experiences, which drive future attendance (Kim, Lee, & Lee, 2023). The cost-effectiveness of retaining previous visitors makes revisit intention an essential success for events. The decision to return as a visitor depends heavily on venue accessibility, which demonstrates why event locations need to be inclusive and convenient (Đurađević, Petrović, & Jovanović, 2022).

Future event organizers are recommended to prepare themselves by taking event management courses which include detailed modules on health and safety protocols, crowd management and effective communication methods. Educational programs that include these essential topics enable students to learn practical skills that they can use to implement best practices and control risks while building visitor trust and satisfaction in actual event settings.

In conclusion, prioritizing health and safety, effective crowd management, transparent communication, and accessible venues collectively foster visitor satisfaction and loyalty, which leads to sustainable event management success. Stakeholders who invest strategically in these areas are more likely to create memorable, secure, and enjoyable experiences that encourage repeat attendance and positive word-of-mouth.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Factors Influencing the Intention to Use E-Wallet Among Students

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Abstract: E-wallets have become an important component of modern financial transactions, offering users a convenient and secure method of conducting payments in both online and physical settings. This digital payment platform allows individuals to perform financial transactions through electronic devices, reflecting a global shift away from traditional cash-based transactions. Despite their growing popularity, several challenges, such as accessibility issues and security concerns, remain a barrier to their broad adoption especially among young adults. This study aims to examine the factors influencing the intention to use e-wallets among students at UiTM Puncak Alam. Guided by the Technology Acceptance Model (TAM), the research investigates eight key factors: perceived ease of use, social influence, perceived risk, perceived usefulness, facilitating conditions, reward, perceived security, and attitude. Understanding these factors is crucial, as students represent a tech-savvy demographic likely to embrace digital payment technologies. The findings of this study are expected to provide meaningful insights for e-wallet providers, policymakers, and educational institutions by identifying key drivers that encourage or hinder e-wallet adoption. Additionally, the study highlights the importance of creating user-friendly, secure, and rewarding digital payment experiences to increase adoption rates. Ultimately, this research supports the broader effort of promoting digital financial literacy and fostering the growth of a cashless society, particularly among younger generations.

Keywords: *Intention to use, E-wallet, The Technology Acceptance Model (TAM), Student, Malaysia*

1. Introduction

E-wallets have become an essential part of modern financial transactions, allowing individuals to make payments for goods and services online. This digital payment method involves the transfer of electronic financial instruments between buyers and sellers over an online network (Hassan et al., 2021). As technology advances and times change, cash transactions have become less practical. This shift has driven the growing adoption of electronic money. Despite the growing adoption of e-wallets globally and in Malaysia, gaps remain in understanding the behavioral factors influencing students' intentions to adopt such technologies. Previous studies often overlook student perspectives, show inconsistent findings on factors such as reward and security, and lack contextual relevance to Malaysian higher education settings. This underscores the need for new variables in the conceptual framework to capture the full spectrum of influences on students' behavioral intentions. This study applies and extends the Technology Acceptance Model (TAM) to include additional constructs such as social influence, facilitating conditions, reward, perceived risk, and perceived security to better understand students' intention to use e-wallets. These additions aim to address existing theoretical gaps and align the model more closely with the technological and socio-cultural context of Malaysian students.

This intention is shaped by several factors, such as students' previous experiences with technology, their perception of the benefits e-wallets offer over traditional payment methods, and the extent to which they believe these technologies are easy to use and useful in their daily lives. Electronic transactions are now necessary for a variety of activities, such as bill payment, shopping, and money transfers, due to the significant changes in people's financial behavior brought about by the internet. With increased convenience, speed, and efficiency, this change has completely transformed traditional financial procedures. Due to their crucial position in modern e-commerce, electronic payment systems have attracted a great deal of attention throughout the past twenty years. These platforms have accelerated the development of digital marketplaces, made financial services more accessible, and enabled smooth online transactions (Hassan et al., 2021).

They now play a crucial role in both daily business dealings and more extensive economic activities. The use of e-wallets is widespread in both developed and developing countries, with Malaysia being a notable example. The COVID-19 pandemic has accelerated the use of e-wallets in Malaysia, leading to a surge in transactions.

Based on an October 2022 survey by Rakuten Insight, nearly all e-payment users in Malaysia which is around 92%, indicated they used Touch 'n Go for their digital transactions. Additionally, the total value of e-money transactions had climbed to close to 70 billion Malaysian ringgit (Statista Research Department, 2023). Additionally, a survey conducted by Seraj (2024) revealed that people aged 18 to 25 are using online bank transfers and e-wallets at rates of 34%, with the study being carried out during the last three months of 2023. Given these trends, it is crucial to stay updated on the latest advancements in e-wallet technology and understand how these changes might affect usage patterns over time due to cultural, economic, and technological factors. Continual study is essential for comprehending these evolving trends. From the introduction, several research objectives were developed:

RO1: To examine the relationship between perceived ease of use and the intention to use ewallet among students.
RO2: To examine the relationship between social influence and the intention to use e-wallet among students.
RO3: To examine the relationship between perceived risk and the intention to use e-wallet among students.
RO4: To examine the relationship between perceived usefulness and the intention to use e-wallet among students.
RO5: To examine the relationship between facilitating conditions and the intention to use e-wallet among students.
RO6: To examine the relationship between reward and the intention to use e-wallet among students.
RO7: To examine the relationship between perceived security and the intention to use e-wallet among students.
RO8: To examine the relationship between attitude and the intention to use e-wallet among students.
RO9: To examine the most significant factors that influence the intention to use e-wallet among students.

2. Literature Review

Intention to use e-wallet

The intention to use an e-wallet refers to a person's decision or willingness to adopt and actively use e-wallet technology for making digital payments and managing financial transactions. According to Truc (2024), an e-wallet is a type of electronic money payment system that uses smart-card technology integrated into mobile devices, offering a modern alternative to traditional cash transactions. To understand the factors that shape students' intention to use e-wallets, the Technology Acceptance Model (TAM) can be applied. TAM focuses on two main elements, which are perceived usefulness and perceived ease of use. These factors directly influence a person's attitude toward a technology and ultimately affect their intention to adopt it. For students, the perceived usefulness of e-wallets is crucial. If they see e-wallets as helpful in making payments faster and more efficiently, they are more likely to use them. Students, especially those familiar with digital technology, may find e-wallets beneficial because they simplify tasks like paying for food or managing transport costs. Research by Razif et al. (2020) highlights those young adults who are more comfortable with digital tools are especially inclined to adopt e-wallets for these reasons. Similarly, perceived ease of use also plays a significant role. If students believe that using e-wallets is simple and doesn't require much effort, they will be more likely to use them.

E-wallets that are easy to navigate, with clear interfaces and simple setup processes, encourage adoption. This aligns with Davis' (1989) theory that the easier a technology is to use, the stronger the intention to adopt it. The rise of e-wallets also coincides with societal shifts, such as the growing preference for cashless transactions during the COVID-19 pandemic. People are more willing to adopt digital payment methods to avoid physical contact. The pandemic accelerated the shift toward e-wallets, particularly among young people, who value the convenience and security offered by digital payments (Daragmeh et al., 2021). 21 In conclusion, students' intention to use e-wallets is influenced by how useful and easy they perceive the technology to be. The more students find e-wallets helpful in managing their financial transactions and easier to use, the more likely they are to use them. As e-wallets become more integrated into daily life, especially with the increased focus on cashless payments, understanding these factors is essential for predicting their widespread use. TAM is widely acknowledged for its ability to predict user acceptance of new technologies. Its core constructs—perceived ease of use and perceived usefulness—are robust predictors of technology adoption. However, its original form may not fully capture contextual influences and behavioral nuances in specific populations such as Malaysian students. Therefore, this study extends TAM by incorporating variables like reward, perceived risk, security,

social influence, facilitating conditions, and attitude to enhance explanatory power and contextual relevance.

Perceived Ease of Use

According to Davis (1989), perceived ease of use reflects a person's belief that engaging with a technology or system will be straightforward and not demanding in terms of effort. In essence, a system should not be excessively complicated but rather straightforward and user-friendly, as highlighted by Mustafa et al. (2022). Moreover, ease of use is essentially a measure of the speed and simplicity with which a device can be operated, emphasizing the seamless execution of electronic procedures and processes (Mustafa et al., 2022). Several previous studies have shown a positive relationship between perceived ease of use and e-wallet utilization. Yang et al. (2021) found that users' perception of how easy an e-wallet is to use has a strong influence on their intention to adopt it. The study advised e-wallet providers, such as banks and online retailers, to invest in innovative technologies that enable quick and hassle-free transactions. The study recommended that entities providing e-wallet services, like banks and online merchants, should focus on advanced technology that allows consumers to make fast and easy payments. Furthermore, Yang et al. (2021) emphasized the importance of perceived ease of use in influencing consumers' intentions to use e-wallets. Earlier research has also shown that people's attitudes toward using online banking are shaped by the perception of how easy it is to use. Furthermore, research by Chawla and Joshi (2019) and Nawi et al. (2022) found that perceived ease of use significantly and positively influences the intention to use e-wallets. According to Visakha and Keni (2022), in general, a better perception of ease of use correlates with higher levels of consumer satisfaction with electronic services. The more people think a system is simple to use and navigate, the more satisfied they are. This association emphasizes the importance of user-friendly experiences in creating positive feedback and fulfillment among customers who engage with electronic platforms.

On the other hand, the relation between ease of use and intention to use is e-wallet continuance intention. Phuong et al. (2020), in their research, clarified that when users find a technology easy to use, it strongly impacts their intention to continue using it. In simpler terms, if users perceive a high level of ease in using a technology, they are more likely to use it again. Stated to Olivia and Marchyta (2022), continuance intention comes after the initial acceptance phase, where a customer shapes their view based on the first-time experience with the system. If customers find the system beneficial and are satisfied with the service it delivers, it will encourage them to continue using it.

H1: There is a significant relationship between perceived ease of use and intention to use e-wallet.

Social Influence

Some of the past studies stated that social influence has a positive influence on the intention to use e-wallets. As stated by Jin et al. (2020), few studies have also shown a significant relationship between social influence and the intention to use it in several nations, including Malaysia, and others. On the other hand, the government is actively encouraging the use and implementation of e-wallets (Esawe, 2022). These initiatives are meant to support financial inclusion, improve the infrastructure for digital payments, and stimulate the economy. They also analyzed how the current media landscape affects this government decision. Previous research by Yang et al. (2021) showed that social influence had a substantial impact on people's intentions to use e-wallets. Ming et al. (2022) further explored the elements that affect e-wallet usage and found that social influence plays a major role in shaping users' decisions. It proves that there is a positive relationship between social influence and consumers' intention to use. Finally, Yang et al. (2021) stated that customers' attitudes toward using new innovative items through technological services are influenced by social factors like family and friends. Therefore, social influence is one of the important influencers of consumer intentions in persuading people to use e-wallets.

H2: There is a significant relationship between social influence and intention to use an e-wallet.

Perceived Risk

Perceived risk refers to the hesitation users feel when considering a service and the potential negative outcomes that might follow, such as issues or losses in business transactions (Malik & Annuar, 2021). This uncertainty arises because outcomes, such as payment errors, data breaches, or fraud, are often beyond users' control (Prasetya et al., 2023). A study by the same author emphasizes that such concerns discourage the adoption of new technologies. The fear of losing sensitive data, encountering unauthorized access, or facing unreliable systems causes hesitation, as users prioritize safety and trust over innovation. When it comes to

mobile wallets, risk plays a significant role in shaping user decisions. Many users evaluate the safety and reliability of these technologies before adopting them. A study by Malik and Annuar (2021) stated that there is a positive relationship between intention to use e-wallets and perceived risk. Hence, ensuring secure transactions and building user trust through robust safety measures is critical.
H3: There is a significant relationship between perceived risk and intention to use e-wallet

Perceived Usefulness
To begin with, consumers are more likely to use e-wallets for financial transactions if they believe the technology will simplify their financial transactions, manage their finances more efficiently, or provide added convenience compared to traditional payment methods. Prior studies show that there is a positive correlation between intention to use and perceived usefulness (Marchyta & Olivia, 2022). Effendy et al. (2021) discovered that when individuals perceived a technology as useful, they tended to develop a positive attitude toward using it. This positive attitude substantially raised the chances of them adopting the technology. This is because if people believe that a system or tool will improve their lives or enhance their performance, they are more likely to accept and use it. This is by research conducted by Bakar et al. (2022), where there is positive relationship between perceived usefulness and the intention to use e-wallet Furthermore, when customers consider technology as useful, it can contribute to satisfaction by increasing productivity or efficiency, whether it improves their productivity or saves them money and time (Phuong et al., 2020). The sense of fulfilment generated from the benefits gained through the use of e-wallet applications significantly increases the possibility that users will return and reuse the technology application. In other words, when consumers sense significant benefits from using an e-wallet, their satisfaction levels rise, creating a stronger desire to connect with the technology again. Hence, based on these previous studies, it shows there is a significant relationship between perceived usefulness and the intention to use e-wallet.
H4: There is a significant relationship between perceived usefulness and the intention to use an e-wallet.

Facilitating Conditions
The intention to use an e-wallet is strongly influenced by the presence of facilitating conditions. When the right conditions, such as ease of use, accessibility, and trust in the technology, are available, young adults are more likely to use and actively use e-wallets for their financial transactions. Previous studies have revealed many factors that promote technology adoption, including previous experiences with technology and computers, as well as knowledge-influenced definitions towards online banking (Anwar et al., 2024). According to the author, facilitating conditions are important in easing use because they remove barriers to acceptance and ensure long-term usage (Anwar et al., 2024). This is because the intention can be limited if environmental variables create barriers or facilitating conditions make it harder to engage with the technology. A study by Trinh et al. (2022) found a positive correlation between facilitating conditions and e-wallet usage. Their findings indicated that higher facilitating conditions led to higher intention to do cashless transactions using available applications. When the right conditions, such as ease of use, accessibility, and trust in the technology, are available, users are more likely to have the intention to use e-wallets for their financial transactions. Similarly, another study by Laywilla et al. (2020) shows that facilitating conditions is the second strongest impact on people wanting to use e-wallets. The author explained that when there is faster and simpler access to necessary resources to complete functions and services, more people are likely to start using them successfully. Hence, based on prior studies, there is a positive relationship between facilitating conditions and intention to use an e-wallet.
H5: There is a significant relationship between facilitating conditions and intention to use e-wallet

Reward
Users are more likely to have the intention to use an e-wallet when they receive a reward. A study by Malik and Annuar (2021) found that rewards positively influence the intention to engage in social commerce. Rewards, such as discounts or incentives, effectively attract social network users to make online purchases. These benefits encourage more people to explore and adopt social commerce platforms. The study highlights that providing appealing rewards not only drives current user engagement but also persuades potential users to transition to online transactions, ultimately boosting the popularity and adoption of social commerce platforms (Malik & Annuar, 2021). Furthermore, Prasad and Arivazhagan (2024), reward programs are designed to offer incentives to customers based on how often or how much they spend. These programs attract and retain customers by providing rewards, discounts, and other special offers. In this study, there is a significant relationship between reward and intention to use an e-wallet. Research by Prasad and Arivazhagan (2024)

found that financial incentives, such as cashback, reward points, and discounts, play a significant role in encouraging individuals to switch from cash payments to using technology. A study by Ming et al. (2020) revealed that rewards significantly influence consumers' intention to use e-wallets. The findings suggest that rewards are an effective way to attract users and encourage them to use e-wallet applications. Over recent years, promotional offers such as cashback and discounts have become popular strategies to persuade consumers to choose mobile payment methods, offering added value and incentives for digital transactions over traditional cash payments (Prasad, 2024).

H6: There is a significant relationship between reward and intention to use an e-wallet.

Perceived Security

A previous study by Visakha and Keni (2022) has proved that perceived security has a positive impact on intention to use e-wallets. According to them, due to the current state of the digital world, where people spend a lot of time online, businesses should prioritize implementing strong security measures. The correlation between improved security measures and increased customer satisfaction highlights the significance of security as a top priority in the linked digital world of today. Moreover, customers' opinions on the intention to use technology and systems are greatly impacted by how secure they believe it to be (Mustafa et al., 2022). It can be explained that users are more likely to accept and use new systems and technologies when they believe that security is high. Their desire to interact with digital platforms and services increases as a result of this view, which serves as a motivator. Therefore, when companies and service providers prioritize and successfully communicate strong security measures, they acquire the benefits of increased levels of customer acceptability and engagement. On the other hand, people will not use a technology readily if they lack confidence in security. Mustafa et al. (2022) said the consumers' confidence in e-wallets and related systems is especially damaged by security breach incidents. It is therefore even more crucial that businesses always put security and privacy first when introducing new technologies like online banking. This is because users may lose trust and stop using these services as a result of any security breach. In order to gain the trust and encourage the broad use of digital payment systems, it is crucial to maintain strong security protocols.

H7: There is a significant relationship between perceived security and intention to use e-wallet.

Attitude

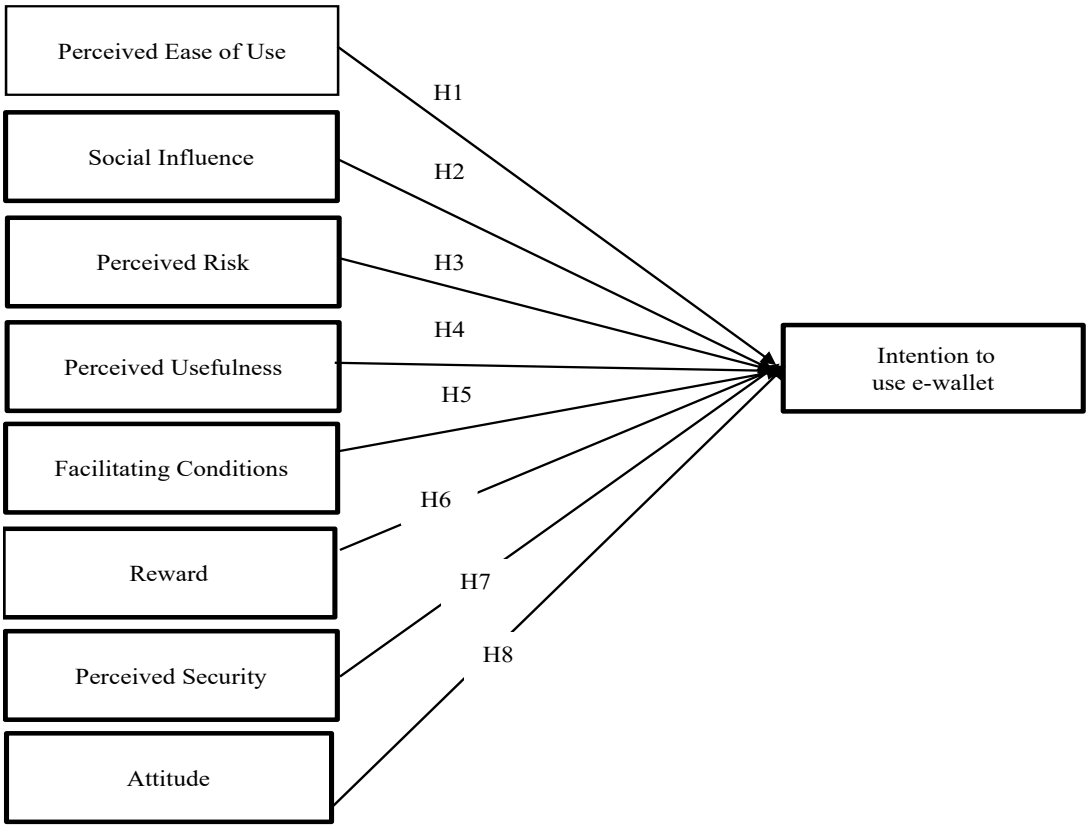
The relationship between attitude and intention to use an e-wallet is significant. Attitude here refers to how positively or negatively users feel about using e-wallets. Research by Akter et al. (2023) indicates that people's perceptions of the advantages of technology have a significant impact on their attitudes towards adopting and using it. Or in other words, it affects the intention to use it. Their opinions on using e-wallets to conduct financial transactions while on vacation are where this is most evident. Most studies show a positive relation between attitude and intention to use e-wallet (Khiong et al., 2022; Trinh et al., 2022). According to Lee and Thoo (2022), in studies focusing on the use of e-wallets, researchers consistently find a strong connection between individuals' attitudes and their intentions to use these technologies, which has been supported by the Technology Acceptance Model (TAM). Daragmeh et al. (2021) added further findings, claiming that having a positive attitude greatly increased the desire to use digital wallets, particularly during the COVID-19 epidemic. Their findings emphasized the importance of attitude in pushing people to use digital payment solutions, showing how positive impressions of technology may drive behavioral intentions, even during times of global crises, like as the COVID-19 pandemic. The intention to use e-wallets is heavily influenced by users' attitudes toward these digital payment methods. A positive attitude toward e-wallets often leads to a greater intention to use them, while a negative attitude can reduce the likelihood of adoption. Thus, fostering a favorable attitude can be key to encouraging wider acceptance and use of e-wallet technology.

H8: There is a significant relationship between attitude and intention to use e-wallet.

Research Framework

This research, the dependent variable (DV), is e-wallet utilization among young adults. Meanwhile, the independent variables (IVs) are perceived ease of use, social influence, perceived risk, perceived usefulness, facilitating conditions, reward, perceived security, and attitude. Figure 1 shows the theoretical framework for this study.

Figure 1: Theoretical Framework



3. The Research Design

In this study, quantitative research or numerical data will be used to examine the relationship between the dependent and the independent. In addition, survey research observations will be cross-sectional or longitudinal. In the present study, cross-sectional research will be conducted to collect all of the data at once. Data will be collected using questionnaires to generalize the results to a larger population.

Pre-test

Before the main study, a pre-test will be conducted to confirm the questionnaire's effectiveness and comprehensibility for potential respondents. This entails testing the questionnaire among both experts and a representative sample of the intended respondents. An expert in the field will review the questionnaire to verify its alignment with the study's objectives. Simultaneously, the pre-test will involve individuals who represent a segment of the intended study population. This step is crucial to validate the credibility, quality, and comprehensibility of the questionnaire, ensuring its finalization is appropriate for the study.

Reliability of Instrument

Reliability refers to the consistency of outcomes and Cronbach's alpha, as well as factor analysis, are two prominent reliability tests used to analyze scales' internal consistency, which measures how similar groups of items behave (Rozali et al., 2022). Moreover, according to Rozali et al. (2022), Cronbach's alpha is based on the number of items and their average correlation. As a result, a high Cronbach's alpha may indicate good dependability. However, it is possible that earlier responses impact responses, resulting in consistency. In contrast, a low score may signify poor reliability, showing a lack of measurement consistency among constructs. In this study, the independent and dependent variables will be evaluated using Cronbach's alpha model, which produces a reliability coefficient ranging from 0 to 1. This coefficient reveals how reliable or consistent the measurements are. According to Sekaran and Bougie (2016), values below 0.5 are considered unreliable, while

coefficients below 0.6 are considered poor. Furthermore, values ranging from 0.7 are acceptable and those exceeding 0.8 are considered good.

Data Collection Procedure

This study will target students enrolled in the Department of International Business and Management Studies at UiTM Puncak Alam who are current users of e-wallets. A self-administered questionnaire using a 5-point Likert scale will be distributed online via WhatsApp and Telegram. The sampling technique employed is convenience sampling due to ease of access and time constraints. A minimum sample size of 150 respondents is justified based on G*Power analysis for detecting medium effect sizes with acceptable statistical power.

Plans for Data Analysis

Data will be analyzed using IBM SPSS and SmartPLS software. SPSS will be used for data screening, descriptive statistics, and initial data cleaning. PLS-SEM will be employed to validate both the measurement model (assessing the reliability and validity of constructs) and the structural model (examining the relationships between variables). This method is suitable for complex models with multiple constructs and is robust with smaller sample sizes.

4. Conclusion

This study aims to examine the intention to use e-wallets among students at UiTM Puncak Alam through an extended Technology Acceptance Model. The research explores how various factors, including social influence, perceived risk, perceived ease of use, perceived usefulness, reward, security, attitude, and facilitating conditions affect students' behavioral intentions. The conceptual framework not only reinforces the predictive strengths of TAM but also extends it by addressing variables more relevant in the Malaysian student context. One of the main limitations is that the study lacks empirical validation at this stage. Future researchers can empirically test the framework, explore mediation or moderation effects, and replicate the study across different populations or geographical areas for broader generalizability.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Psychological Contract and Student Retention: A Framework for Sustainable Engagement in Higher Education

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Abstract: Malaysia is among the leading developing countries in higher education. Although many efforts have been implemented and planned to make Malaysia one of the top countries in education systems, there are still a few problems that have not been completely solved. One key challenge is student retention in higher education institutions. The purpose of this study is to investigate the relationship between psychological contract and student retention. This study adopts a quantitative research design, employing probability sampling. The development of research questions has been made using the theory of psychological contract (relational contract, balanced contract, transactional contract, transitional contract) and student retention. These 4 types of psychological contract are crucial in understanding student retention as they reflect the nature of students' perceived relationship with the institution, influencing their level of engagement, satisfaction and likelihood to persist or withdraw. The collected data were analysed using various statistical methods to examine the determinants influencing student retention decisions. This research offers valuable insights for academic staff and faculty members aiming to enhance student retention strategies and promote sustained engagement in higher education. Preliminary findings indicate a significant relationship between psychological contracts and student retention, specifically in public higher education institutions in Malaysia.

Keywords*: Psychological contract, student retention, university student*

1. Introduction and Background

Student retention reflects an institution's capacity to facilitate students' completion of academic programs, contributing to educational success and national economic development. Higher education may help students achieve workforce readiness, critical thinking skills, and overall community development (Beenen & Arbaugh, 2019). However, student retention has become an escalating concern in Malaysia, exacerbated by disruptions from the COVID-19 pandemic, which led to increased student withdrawals. The pandemic has significantly changed educational settings, as the shift to online learning has affected student participation in class and retention in their study programs. The social integration between students has been disrupted which is an important element in student retention resulting in dissatisfaction that led students to withdraw from their academic programs (Pather & Booi, 2019). In Japan, the Ministry of Education indicated that 11,852 students departed from the university in 2021, with 701 of them citing the pandemic as the main reason for their withdrawal decision (Kakuchi, 2021). Similarly, a study involving 1,500 students at Arizona State University revealed that 11% had dropped out of classes due to challenges they were facing with online learning (Aucejo et al., 2020).

Student retention has become an issue in Malaysia especially in the post-pandemic era, Statistics showed a rising number of students' withdrawal especially at the tertiary education level. Public universities in Malaysia contributed more than 30,000 students who withdrew between 2020 and 2021, with UiTM being one of the most impacted institutions (Kementerian Pendidikan Tinggi, 2021). Even with the return to face-to-face classes, retention rates still haven't bounced back to their original number which underscoring retention issues in student involvement. Studies indicate that work-related stress and a lack of social integration play a role in students' choices to withdraw from the university (Haverila et al., 2020; Verulava & Jorbenadze, 2022). Previous studies on student retention have primarily centered on academic achievement, institutional assistance, and financial support (Nidzam et al., 2022). Yet, few studies have investigated student retention from the perspective of psychological contract theory.

Considering the limited number of studies regarding psychological contracts and student retention, this study seeks to examine how psychological contracts can affect student retention at UiTM. Institutions can create strategies to improve retention and students' academic achievement by comprehending how students'

expectations match with their university experiences. Psychological contract refers to a person's perception of reciprocal responsibilities between one party and another party (Rousseau, 1989). It shows underlying expectations between students and the institutions that are essential in influencing student involvement and dedication. In the higher education context, the psychological contract encompasses students' expectations of their academic journey which includes effective instruction, social interaction, and their readiness for careers (Itzkovich, 2021). When these expectations are not fulfilled such as having insufficient instructor assistance for their study, minimal classroom engagement between them and academic staff, or the absence of job prospects, students might experience disconnection and ultimately withdraw from the institution (Azmat & Ahmad, 2022; Mathew & Chung, 2020).

Typically, a psychological contract signifies the shared expectations between workers and employers, whereby incentives like job stability and equitable pay establish responsibilities for employees to show commitment, loyalty, and dedication (Battisti et al., 2007). This corresponds with social exchange theory, suggesting that favorable employee attitudes and actions arise from mutual relationships (Gorde, 2019). Psychological contracts rely on unspoken agreements, which makes them vulnerable to violations and differing interpretations (Chaudhry & Tekleab, 2013; Herriot et al., 1997). Though traditionally applied to workplaces, psychological contract theory is increasingly relevant in educational settings. Students develop expectations regarding faculty commitment, lesson quality, and institutional support. (Itzkovich, 2021; Yucel-Aybat et al., 2018). Student retention is associated with the satisfaction of psychological contracts, as unfulfilled expectations may result in students disengaging from their studies (Barnhill et al., 2013; Bordia et al., 2019). Faculty play a crucial role in promoting student satisfaction by making sure that institutional commitments meet students' expectations. Organizations that emphasize meeting psychological contracts can boost student trust, involvement, and foster enduring retention. A breach of the psychological contract can happen when these expectations are not fulfilled, impacting student engagement and satisfaction (Robinson & Morrison, 2000). There is a scarcity of studies on psychological contracts within higher education, indicating a deficiency in the literature (Koskina, 2013).

2. Literature Review

Student retention and psychological contract: The phenomenon of student retention has been extensively researched at various educational tiers (Aljohani, 2016; Boyd et al., 2022; Chen et al., 2010; Christian et al., 2020). Higher education, especially community colleges, has encountered ongoing difficulties in keeping students enrolled (Monaghan & Sommers, 2022). Data from the National Student Clearinghouse Research Center (2021) show variations in retention rates across the years, highlighting significant drops in community colleges. The shift to online learning poses during further challenge to student retention (Coman et al., 2020; Fan et al., 2023; Glazier, 2020; Pham et al., 2021). Many students struggled due to limited interaction with faculty and peers, leading to lower retention rates compared to face-to-face learning. (Glazier & Harris, 2021). Effective communication and faculty support were identified as critical factors in promoting student retention. (Alawamleh et al., 2022; Haverila et al., 2020; Sümer & Yüner, 2021).

Tinto's (1975) model of student retention highlights the importance of academic and social integration in determining whether students retain or withdraw. Academic integration is measured by grades and intellectual development, while social integration includes peer interactions and faculty engagement. A lack of integration can lead to disengagement and eventual withdrawal (Nicoletti, 2019; Samoila & Vrabie, 2023). While extensively studied in workplace settings (Gulzar et al., 2021; Ngobeni et al., 2022; Yu, 2022) Little research has explored its role in student retention. In educational contexts, students form psychological contracts based on expectations of faculty engagement, instructional quality and institutional support. When faculty members fail to meet students' expectations, dissatisfaction increases, negatively impacting retention. (Ericksen, 2022; Henry, 2020). Conversely, fulfilling students' psychological contracts by ensuring clear communication, academic support, and engagement can enhance retention (James, 2022; Lobos et al., 2022).

Existing literature, such as Barnhill et al. (2013), Bordia et al. (2019), Haski-Leventhal et al. (2020), Itzkovich (2021), and Koskina (2013), emphasizes that psychological contracts in educational settings are just as critical as those in organizational environments. This is because students, much like employees, seek the fulfillment of their expectations by the institution they are part of. The psychological contract in education is typically formed

based on students' perceptions of what they are owed by academic staff and the institution, be it academic support, guidance, feedback, or fairness in teaching and assessment. Barnhill et al. (2013) validated the presence of such contracts, showing that students perceive their interactions with academic staff as reciprocal relationships based on the fulfilment of certain academic and relational expectations.

When these expectations are not fulfilled, the psychological contract is viewed as violated, potentially leading to a loss of trust between students and faculty. This violation impacts not only the emotional ties students have with the institution but can also affect their motivation and dedication to academics, potentially resulting in their departure. As noted by various scholars, the violation of the psychological contract reduces students' confidence in instructors and can lead to feelings of isolation or disconnection. (Itzkovich, 2021; Robinson & Morrison, 2000). Consequently, student retention is closely linked to how effectively the institution meets its psychological commitments. Faculty members, specifically, are crucial in influencing these views by providing ongoing support, being responsive, and employing inclusive teaching methods. A healthy and positive psychological contract can enhance student satisfaction, encourage a greater sense of belonging, and elevate the chances of students persisting in their academic path at the same institution.

Psychological contract in educational settings: The idea of the psychological contract was initially introduced by Argyris (1960) in the work environment, yet it has slowly gained significance in educational settings too. The psychological contract was originally used to examine relationships between employees and employers; nonetheless, scholars have recently broadened its application to investigate the expectations between students and faculty in higher education settings. (Itzkovich, 2021). Students frequently arrive at university with unspoken expectations, including organized lesson presentation, reciprocal respect, and individualized assistance. When these expectations are fulfilled, students establish a psychological agreement that leads them to commit more to their academic duties, while academic staff, in turn, are expected to maintain teaching quality and interact genuinely with them. (Liao, 2013). In this context, psychological contracts represent students' views on the commitments made by institutions in return for their effort and financial investment in tuition. (Yucel-Aybat et al., 2018). This interaction necessitates reciprocal comprehension and collaboration to preserve equilibrium, particularly in substantial organizations where individualization may be difficult. (Bordia et al., 2010).

But, if students feel that their academic expectations are unmet—like insufficient engagement or disregard from faculty—they might encounter a violation of the psychological contract, resulting in feelings of disappointment or distrust. (Itzkovich, 2021). Robinson and Morrison (2000) characterize this breach as not merely a failure of institutional duties but also as an emotional infringement that impacts student motivation. Although psychological contracts have been extensively investigated in organizational and military settings (Kiili, 2016; Soares & Mosquera, 2019) and are gradually receiving attention in healthcare and service industries (Grama, 2020; Welander et al., 2020), a significant gap persists in research related to higher education. For example, existing studies have focused on conducting research regarding the psychological contract in educational settings among student volunteers. (Haski-Leventhal et al., 2020), international students (Bordia et al., 2019), and student-athletes (Barnhill & Turner, 2015); however, only a few and limited studies examined psychological contracts concerning student retention (Barnhill et al., 2013). This research addresses this gap by highlighting how breaches of students' psychological contracts can lower their trust and further raise withdrawal risks. Meeting these psychological expectations is essential for enhancing retention. Academic personnel have an essential role, and their ongoing dedication to connect and address student needs can greatly enhance institutional commitment and satisfaction.

Social exchange theory and psychological contract: In a psychological contract, the rewards offered by employers—such as job security, fair compensation, and career growth—establish expectations from employees to reciprocate with loyalty, commitment, and consistent performance. This mutual understanding is not formalized in a written contract but exists as a set of perceived obligations between both parties. The existence of such expectations creates additional responsibility for employers to provide a supportive and fair working environment (Battisti et al., 2007). When these expectations are met, it fosters a positive working relationship, contributing to organizational success through enhanced employee satisfaction, engagement, and productivity (Gorde, 2019). Chaudhry and Tekleab (2013) describe the psychological contract as a foundation of reciprocal obligations that bind the employer and employee in a continuous cycle of expectations and

contributions. However, because psychological contracts are subjective and vary from person to person, they carry the risk of being unintentionally violated, potentially resulting in disappointment, reduced motivation, or even withdrawal (Herriot et al., 1997). Understanding and managing these perceptions is therefore essential to maintaining a positive and sustainable exchange relationship.

The psychological contract is grounded in Social Exchange Theory, introduced by Blau (1964), posits that human relationships are formed and maintained through reciprocal exchanges of benefits, where individuals seek to maximize rewards and minimize costs. In a psychological contract, the rewards offered by employers—such as job security, fair compensation, and career growth—establish expectations from employees to reciprocate with loyalty, commitment, and consistent performance. This shared understanding exists as a perceived obligation between the two parties but is not documented in a written contract. To foster employee satisfaction, engagement, and productivity, such expectations create additional responsibilities on employers to ensure a supportive and fair working environment (Battisti et al., 2007; Gorde, 2019).

In educational settings, social exchange theory has become more significant for understanding student retention. At the higher education level, students perceive the institution as a collaborator, anticipating faculty assistance, timely feedback, and academic advice in return for their commitment and involvement. (Cook et al., 2013). Trust is essential for the fulfilment of the psychological contract. When the faculty is unresponsive or unreachable for students, they might believe this commitment is not reciprocated which can result in decreased retention rates (Liao, 2013). Students tend to develop a sense of commitment and persist within the institution when this interaction is viewed as fair and balanced. In return, they are expected to commit to the learning program by following academic standards and supporting a constructive learning environment. On the other hand, they might feel disconnected and potentially raise the chances of academic disengagement and withdrawal when they encounter a breach in the psychological contract like insufficient support, unresponsiveness from faculty, or unfulfilled academic needs (Jansson & Wiklund, 2019).

Thus, the perceived fairness and fulfilment of mutual expectations between students and institutions can be explained by social exchange theory which provides a useful framework that can significantly influence students' decisions to stay or leave. Building strong student-institution relationships based on mutual trust and consistent support can therefore enhance retention rates. Student retention can be improved by aligning support systems with student expectations and institutions that recognize the role of the psychological contract in shaping students' academic experience can improve and foster stronger academic integration.

3. Methodology

Quantitative research approach was employed in this study to measure and analyse the relationship between variables. A correlational research design is specifically used to investigate the relationship between the independent variable (psychological contract) and the dependent variable (student retention) without altering the variables. (Cherry, 2023). This study was conducted in an outdoor setting to collect data from students at Universiti Teknologi MARA (UiTM) from various branches in Malaysia to have a genuine interaction. The unit of analysis is on individual students who enrolled in Bachelor's degree programs at UiTM. (DiscoverPhDs, 2020). A cross-sectional study design was used to collect data from a large number of participants at a single point in time. (Thomas, 2020).

A stratified random sampling approach ensures representativeness by dividing participants into subgroups based on key attributes, thereby minimizing selection bias. This method divides the population into subgroups based on relevant attributes, ensuring diversity within the sample. (Fleetwood, 2023; Taherdoost, 2016). The target population consists of UiTM students from five regional divisions:

- Northern (Perak, Perlis, Pulau Pinang, Kedah)
- Central (Selangor)
- Southern (Johor, Melaka, Negeri Sembilan)
- East Coast (Kelantan, Terengganu, Pahang)
- East Malaysia (Sabah, Sarawak)

The sample size represents a subset of the target population selected to ensure meaningful and generalizable findings. A pilot study with university students outside the target population refined research instruments and procedures (Lowe, 2019). Ethical approval from the UiTM Research Ethics Committee was obtained before data collection.

Data collection and data analysis

This study integrates primary and secondary data sources to ensure a comprehensive approach. Structured surveys were distributed via Google Forms, disseminated through UiTM's corporate email, WhatsApp, and other digital platforms. The questionnaire comprised three sections (A, B, and C), designed to assess independent and dependent variables. (Ajayi, 2017).

Data analysis was conducted using SPSS version 29, applying the following statistical methods:

- Descriptive statistics summarized key trends (Kaur et al., 2018).
- Cronbach's Alpha assessed internal consistency and survey reliability (Bonett & Wright, 2015).
- Pearson's correlation coefficient measured the strength and direction of relationships between variables (Schober & Schwarte, 2018).
- Multiple Regression Analysis (MRA) employed to predict the relationship between psychological contracts and student retention (Hair et al., 2010).
- P-values evaluated statistical significance of results, with findings shown in regression tables (Kazuhisa, 2021).

This methodological framework ensures a rigorous analysis, supporting meaningful conclusions about psychological contracts and student retention.

4. Results and Discussion

With the support given from Majlis Perwakilan Pelajar (MPP), this research successfully collected a remarkable valid response (n=352) yielding to 92.15% response rate from UiTM Selangor Branch campuses—Puncak Alam, Shah Alam, and Puncak Perdana. The data collection process took over three months encountering challenges in encouraging student involvement. Despite the initially low participation however, MPP's engagement had significantly contributed to improving respondent involvement and increasing study visibility to take part in the study. Google Forms was chosen as the survey platform because of its user-friendliness, accessibility, and capability to effectively reach respondents. This web-based platform enabled participants to complete the survey at their leisure, leading to an increased response rate

Demographic analysis: The sample consists of 352 respondents, where female participants represent the majority of the respondents (73.0%, n=257)**,** and male respondents only make up 27.0% (n=95)**.** The gender imbalance indicates higher female participation, potentially reflecting broader demographic trends or engagement patterns at UiTM Selangor. The largest age group represented is 21–25 years (64.2%, n=226), followed by 18–20 years (34.1%, n=120). Only 1.7% (n=6) of respondents belong to the 26–30 age category. This distribution suggests that students aged 21–25 were the most engaged, while older students (26–30) had minimal representation, possibly due to academic priorities or time constraints. Regarding campus participation, UiTM Shah Alam contributed the highest responses (48.0%, n=169), followed by UiTM Puncak Alam (41.5%, n=146) and UiTM Puncak Perdana (10.5%, n=37). The variation in response rates across campuses suggests differences in student engagement, accessibility, or institutional outreach efforts.

The sample includes students from 16 faculties, with Applied Sciences and Accountancy yielding the highest participation (each 10.8%, n=38). Lower participation was observed in Dentistry (0.6%, n=2) and Sports Science and Recreation (1.4%, n=5). Early-year students had the highest participation (Part 1: 24.7%, n=87), whereas upper-level students exhibited lower engagement, possibly due to academic workload or survey fatigue.

Reliability analysis: In this study, Cronbach's Alpha was used to assess the internal consistency of the variables, following the guidelines established by Sekaran and Bougie (2016**)**. Cronbach's Alpha is a reliability coefficient that assesses the internal consistency of items within a construct, ensuring that they measure the

intended concept cohesively. A Cronbach's Alpha value of 0.70 or greater is considered acceptable, while values near 0.80 or higher suggest strong reliability. The results of the reliability analysis of this study indicate that every variable shows strong reliability, with one variable reflecting an exceptionally high Cronbach's Alpha value of 0.969, indicating excellent internal consistency. The other variables like student retention (0.876), relational contract (0.867), transactional contract (0.825), and transitional contract (0.861) also show high reliability, verifying the internal consistency of the questionnaire items. The findings confirm the reliability of all survey items, validating their suitability for assessing student retention and psychological contracts. Consequently, the instrument used in this study can be deemed statistically sound, ensuring the accuracy and validity of the data collected.

Descriptive analysis: Descriptive statistics were employed in this study to summarize the dataset, primarily through the calculation of means and standard deviations. The mean represents the average numerical value of the responses, while the standard deviation measures the degree of variability from the mean. The higher mean values for relational and balanced contracts suggest that respondents generally agree with or hold positive perception**s** of these contract types, assuming a Likert scale from 1 to 5. In contrast, the lower mean value for transactional contracts suggests a more neutral stance among respondents. The standard deviation values provide insights into response consistency: Relational (SD=0.66) and balanced contracts (SD=0.69) show moderate variability, suggesting consistent responses among participants. Transactional contract exhibits the highest variability (SD=0.97), indicating diverse perspectives among respondents regarding its role in student retention. Transitional contract and student retention show moderate variability, SD=0.70 and SD=0.74, respectively, indicating that perceptions of these constructs are relatively consistent but not as strong as those for relational and balanced contracts.

Normality test: The skewness values for all dependent and independent variables were within the range of -1 and +1. The skewness values for student retention, relational contract, balance contract, transactional contract and transitional contract were -0.226, -1.032, -0.894, 0.051 and -0.109, respectively. According to Hair et al. (2010), a skewness value between -1 and +1 is considered excellent for normality. All skewness values fall within the acceptable range (-1 to +1), confirming that the data distribution is approximately normal. The kurtosis values for all dependent and independent variables were also within the acceptable range of ±7 for student retention, relational contract, balance contract, transactional contract and transitional contract were 0.206, 3.438, 2.399, -0.419, and 0.538, respectively. Kurtosis values remain within the acceptable ±7 range, ensuring the dataset does not display extreme skew or flat distributions. Kurtosis values within the range of ±7 are deemed acceptable. (Hair et al., 2010).

Correlation analysis: Correlation analysis evaluates the strength and direction of relationships between variables. In this study, Pearson correlation analysis was conducted to examine associations between the independent variables (psychological contract types: relational, balanced, transactional, and transitional) and the dependent variable (student retention).

As illustrated in Table 1, the results indicate that the transitional contract ($r = 0.628$, $p < 0.01$) exhibits the strongest positive correlation, suggesting a moderate to strong association with student retention. The transactional contract ($r = 0.514$, $p < 0.01$) also shows a moderate positive correlation, though weaker than the transitional contract.

In contrast, the relational contract ($r = 0.455$, $p < 0.01$) and balanced contract ($r = 0.452$, $p < 0.01$) demonstrate weak positive correlations, implying a relatively lower influence on student retention. These findings suggest that transitional and transactional contracts play a more significant role in influencing student retention than relational and balanced contracts.

Table 1: Correlational analysis

Variables	*1*	*2*	*3*	*4*	*5*
Dependent variable:					
Student retention	1				
Independent variable:					
Relational contract	.455**	1			
Balanced contract	.452**	.747**	1		
Transactional contract	.514**	.316**	.336**	1	
Transitional contract	.628**	.535**	.535**	.478**	1

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

Multiple regression analysis: Table 2 portrays the result of the multiple regression analysis. The R^2 value of 0.470 suggests that 47% of the variability in student retention is accounted for by the four psychological contract types. Among them, transactional and transitional contracts exhibit significant positive effects on student retention ($p < .001$), with the transitional contract demonstrating the strongest influence ($\beta = 0.412$). Conversely, relational and balanced contracts show no statistically significant effect on student retention ($p > 0.05$), indicating their limited role in influencing student retention outcomes. These results highlight that while transactional and transitional contracts are crucial factors, relational and balanced contracts exert minimal influence in academic retention contexts.

Table 2: Multiple regression analysis results

	Unstandardized coefficient		Standardized coefficient		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	.729	.200		3.642	<.001
Relational contract	.114	.068	.101	1.672	.095
Balanced contract	.073	.066	.068	1.112	.267
Transactional contract	.202	.034	.263	5.871	<.001
Transitional contract	.435	.054	.412	8.049	<.001
F value	76.935				
Sig.	<.0001b				
Adjusted R	.464				
R^2	.470				
Regression df	4				
Residual df	347				

Note: Dependent Variable: Student Retention; *p < 0.05

Hypothesis Testing

H1: There is a significant relationship between relational contract and student retention.
Multiple regression analysis was conducted to test H1. The p-value (0.095) exceeded the 0.05 threshold, indicating no significant relationship between relational contract and student retention ($\beta = 0.101$, $p > 0.05$). Thus, H1 was not supported. Relational contracts, which emphasize loyalty and long-term commitment, are beneficial in workplace environments (Liu et al., 2020; van Gilst et al., 2020). However, findings suggest that students do not prioritize these contracts in their educational experiences. Despite past research linking stability to positive student outcomes (Felsten, 2004; Gagani et al., 2021; Kumaravelu, 2018), modern students favour flexibility and autonomy over institutional loyalty.

While academic and administrative support fosters student retention (Latif et al., 2021; Sabo, 2022)Students increasingly prioritize factors such as facilities, teaching quality, and support systems. Traditional relational contracts may feel restrictive, as students view education as a means to achieving specific goals rather than forming long-term institutional ties. Additionally, cultural shifts emphasize adaptability over stability, and students may perceive relational contracts as one-sided, leading to disengagement.

H2: There is a significant relationship between balanced contracts and student retention.
Multiple regression analysis was used to test Hypothesis 2, which proposed a significant relationship between balanced contracts and student retention. The findings indicated no significant correlation ($\beta = 0.068$, $p > 0.05$), implying that H2 was not supported. A balanced contract that consists of external employability, internal advancement, and dynamic performance is appreciated in the workplace, yet it might not attract students in an educational setting. External employability may create pressure, causing students to prioritize more on job preparation over academic progress which could negatively affect retention in their studies. Internal advancement, although fostering academic growth but can create an unrealistic expectation that leads students to even more stress and withdrawal. Similarly, dynamic performance might emphasize results instead of individual learning which can increase academic stress. Students might perceive the balanced contract as misaligned with their priorities, regarding it as excessively corporate or focused on performance instead of fostering their academic experience. Cultural and generational changes also contribute because students prefer flexibility and comprehensive education instead of systematic progress. This misalignment could lead to disengagement, stress, and an increased risk of dropping out.

H3: There is a significant relationship between transactional contracts and student retention.
Multiple regression analysis was used to evaluate Hypothesis 3, which suggested that there is a significant relationship between transactional contracts and student retention. The findings supported this relationship ($\beta = 0.263$, $p < 0.05$), indicating that H3 was supported. In contrast to the workplace, where transactional contracts emphasize brief exchanges between employers and employees, higher education students perceive transactional contracts differently. Students prioritize immediate advantages like timely feedback, availability of academic resources, and effective administrative support. Participating in organized activities, like student clubs can improve their educational experience by providing opportunities to develop skills outside of traditional learning.

Transactional contracts meet students' expectations by highlighting straightforward, results-oriented exchanges, like receiving academic services in exchange for tuition and finishing coursework. This method encourages a feeling of inclusion and confidence in the institution, resulting in improved retention rates, Transactional contracts are seen as an effective and favoured approach in academic environments as students perceive education as a valuable investment that yields real benefits,

H4: There is a significant relationship between transitional contract and student retention.
A multiple regression analysis was conducted to test Hypothesis 4, which suggested that there is a significant relationship between transitional contract and student retention. The findings showed a statistically significant correlation between transitional contract and student retention ($\beta = 0.412$, $p < 0.05$), indicating that H4 is supported. Transitional contracts frequently bring uncertainty and mistrust in organizational settings but, they influence differently among students in academic settings where uncertainty and mistrust may foster greater student involvement even though uncertainty and mistrust are generally viewed negatively. Research indicates that when students feel uncertain about institutional expectations they might engage more actively in moulding their educational journey. (Cavanagh et al., 2018). For example, to increase engagement and enhance retention, they might request clarification, interact with faculty, and champion their academic needs.

Torgersen (2023) emphasizes that managing uncertainty equips students to confront academic and social challenges. This can also serve as a driving force that encourages students to pursue institutional support like academic advising and counselling although uncertainty may lead to stress (Haverila et al., 2020; Koskina, 2013; Saleem et al., 2022; Tuiloma, 2022). Students' feelings of sense of belonging which is vital for student retention can be enhanced if the institutions respond to student issues effectively during these times. However, strict assessment methods can erode trust, leading to disengagement. (Azmat & Ahmad, 2022). A flexible and adaptive strategy in transitional contracts encourages trust cultivates a supportive academic environment. (Hui et al., 2004). Students are more likely to seek assistance when they perceive a lack of connection or feel worn down by institutional demand. Student retention rates can be improved and trust may be rebuilt if institutions offer customized interventions, individual support, and adaptability. (Demirkasimoğlu, 2014).

Students often prefer transitional contracts because they offer flexibility that aligns with their evolving academic and career goals. Unlike relational contracts, which emphasize long-term loyalty, or balanced

contracts, which require mutual long-term commitment, transitional contracts focus on short-term adaptability. This flexibility helps students navigate academic, social, and financial pressures more effectively, allowing them to stay engaged without being constrained by strict institutional demands.

5. Conclusion and Recommendations

Relational contract: Finding indicates that there is no significant relationship, suggesting that stability and loyalty which are the key elements of relational contracts do not significantly impact students' decision to remain in the institution. This could result from the students' focus on short-term goals rather than long-term dedication to the institution because of the temporary nature of academic settings. The effectiveness of relational contract relies on institutions offering fair resources and assistance can improve retention by building trust and loyalty. Nonetheless, frequent changes in academic staff and classmates might obstruct the establishment of strong relational connections. To address this, institutions can implement mentorship programs, academic advising, and community-building activities to enhance student engagement and improve loyalty. Encouraging community engagement via peer mentoring, campus events, and collaborative learning can further improve retention. Also, enhancing satisfaction and dedication to the institution can be increased by getting timely feedback and participation in co-curricular activities. Regular assessment of relational contract effectiveness via surveys and retention analysis can assist in improving strategies can ensuring the alignment with student needs and fostering academic and personal success.

Balanced contract: The findings of this study indicate no significant relationship between balanced contract and student retention suggesting that opportunities for employment, internal advancement, and dynamic performance might not be major elements in affecting students' decision to retain in educational institutions. Balanced contracts focusing on long-term advantages like career growth and skill enhancement but students prioritize immediate academic goals over these broader opportunities. Uneven allocation of opportunities for advancement might be one of the possible reasons for the disconnect of this variable. Students might perceive that these advantages are exclusive to top performers only makes them lose interest. Moreover, students underestimate the significance of balanced agreements because of a lack of awareness regarding employability initiatives (Abas-Mastura et al., 2013). To address this, institutions need to encourage inclusiveness and ensure all students can utilize these advantages by providing career workshops, leadership initiatives, and skill development integrated into the curriculum. Also, institutions can boost student involvement by cultivating and engaging a learning environment through activity-based and problem-solving educational programs. Self-learning experiences, like teamwork, can enhance students' readiness for practical challenges. Enhancing career services through mentorship initiatives, job placements, and networking can improve students' employability. Giving consistent evaluation through student feedback and retention data can assist institutions in enhancing strategies to address changing student requirements. Implementing this measure of a comprehensive support system that consists of counselling, peer mentoring, and stress management workshops by the institution can effectively boost student retention rates while ensuring academic and professional success.

Transactional contract: This research investigates the relationship between transactional contracts and student retention among UiTM students. The findings indicate a positive correlation, supporting the hypothesis that students appreciate well-defined, immediate interactions with their institution. Transactional contracts align with students' expectations, which focus on short-term commitments and a clear administrative process, increasing their likelihood to retain when the academic and administrative needs are efficiently met (She et al., 2020). The success of transactional contracts in retaining clients depends on their capacity to offer prompt academic feedback, readily available resources, and efficient administrative services. Students' contentment grows and strengthens their loyalty to the institution when the students recognize fairness in assessments, transparent guidelines, and effective procedures. In course registration, fee payment, or access to educational resources can enhance this connection, making institutional effectiveness vital for student retention. Institutions should simplify administrative procedures, ensuring minimal obstacles in enrolment, financial transactions, and access to resources to improve student retention. When universities clearly explain their academic policies and grading standards, it helps build trust with students and regularly checking in on how satisfied students are can also help institutions spot areas that need improvement. By enhancing these aspects,

institutions can improve student retention through clear, short-term agreements, while also encouraging long-term engagement that supports student success.

Transitional contract: The findings of this study showed that there is a significant relationship between transitional contract and student retention at UiTM Selangor Branch. This finding supports the study's hypothesis that students valued the transitional contract. The finding shows that factors like uncertainty, mistrust and adaptation to change play a big role in how committed students feel to their studies. Transitional contracts can provide a sense of flexibility as they might perceive transitional contracts as a structure for resilience and flexibility, assisting them in navigating their academic journey. During significant changes, like transitioning from high school to college, advancing through academic achievements, or getting ready for employment, transitional contracts in tertiary education help students get through this journey. These highlight the organized direction and institutional assistance that can improve retention by providing clear pathways and resources. Their success relies on the institution's capability to anticipate student requirements and cultivate an inclusive atmosphere. Students might find it hard to adjust in the absence of proactive actions resulting in disengagement and decreased retention rates. Institutions ought to establish thorough onboarding programs, bridging courses, and mentorship schemes to enhance the connection between transitional contracts and retention. Offering organized academic and social assistance, including career advice, skill-development workshops, and peer mentoring, can facilitate transitions. Additionally, promoting emotional well-being through mental health resources and social integration efforts can help students feel secure and engaged. Regular monitoring through surveys and performance data will ensure programs remain relevant and responsive. By implementing these strategies, institutions can create robust transitional contracts that support student success academically, socially, and professionally.

Conclusion: The findings of this study have demonstrated the relationship between psychological contract (relational, balanced, transactional and transitional) and student retention. Based on this finding, several key recommendations are proposed from the analysis and discussion of this study's outcomes to enhance student retention as well as improve academic success that arose. Enhancing the psychological contract requires a diverse strategy at the institutional level. Firstly, institutions should establish a detailed onboarding program to define a clear academic path. These programs may include thorough orientations, mentorship pairing with senior students, and early academic guidance to assist students in confidently navigate themselves in new surroundings. Moreover, promoting transparent dialogue by giving consistent feedback can guarantee that students feel acknowledged and supported. Also, institutions should promote the encouragement of collaboration among students, faculty, and industry professionals. Facilitating workshops, networking events, and mentorship programs can offer students essential professional perspectives and relationships that can enhance their academic growth. Furthermore, the student participation in extracurricular activities and community activities can be increased if provided with some incentives like certificates, scholarships, or honours for leadership roles and volunteer work. Institutions can establish a supportive and dynamic educational environment that can strengthen the psychological contract, promote student involvement, and enhance overall retention through the implementation of these strategies.

Research Limitation: One significant limitation while conducting this study was the time constraints during the data collection process and analysis. The short timeline had limited the depth of the investigation and the opportunity to collect a larger dataset that might have provided additional insight into the study. Given more time, the study could have been reinforced by having a larger sample size, subsequent interviews, and improved methodological strategies, such as testing surveys or employing advanced statistical methods. Consequently, despite being useful, the results might not entirely reflect the complexity of the research issue. Other challenges were the reliance on an online platform to collect data from respondents. Although it was easy access and convenience, the slower response rates from the respondents and some delays due to conflicting priorities or technical issues affected data-collection efficiency. Moreover, bias in responses could have arisen if late respondents held a different opinion compared to early participants, potentially affecting the reliability of the data.

Sampling and participants' behaviour also contributed to the limitations of this study. Despite efforts being made to gather a large group of participants, a self-selection participant might have affected the results as individuals with a stronger interest in the topic were more likely to participate and take part in the survey. To

get a strong engagement from the participants, a small incentive was offered but this may have attracted the participants who were more interested in the reward than the survey itself which raised concerns regarding the response quality. Considering these limitations, the findings of this study should be interpreted with caution, Future research with longer timelines, a larger and more diverse sample and participant involvement could provide more comprehensive and generalizable insights into the research problem.

Recommendation for Future research: This study focused on student retention mainly in higher education institutions by exploring the influence of psychological contract as a variable which includes relational contract, balanced contract, transitional contract and transactional contract. While the results provide valuable insight, student retention is an issue that needs a deeper investigation and future exploration. To expand on the existing study, a number of suggestions are proposed for future research. It is to explore further elements that may influence psychological contract among students at higher educational levels including peer support, friendship and teamwork. Social dynamics can significantly contribute to enhancing students' sense of belonging and dedication to their studies. Future research might explore whether strong peer networks can bring a positive impact on relational and balanced contracts or if their lack reduces these benefits. Moreover, expanding the sample size to include students from other UiTM campuses, as well as students from public universities and private institutions in Malaysia this would improve the generalizability of the findings. Private university students may experience a different study environment, institution support structures, and challenges related to retention. This highlights the importance of a comparative perspective to have a wider effect of psychological contracts in different educational environments.

Future studies can also consider including secondary-level students to investigate the psychological contract between them. Examining the impacts of psychological contract and student retention among younger students might broaden the comprehensiveness of the role throughout various educational levels. This might help to determine whether relational contract and transactional contract both have the same impact if conducting these studies by including younger participants from secondary educational level compared to tertiary educational level students since the impact may differ for both educational levels. Lastly, future studies can implement a longitudinal study which can offer a deeper understanding of how students' perceptions of psychological contract might change over time and how these perceptions can impact their likelihood of staying enrolled in their study until graduation. Future studies could also examine how external factors like changes in economic conditions and social changes influence the psychological contract that can affect student retention. Conducting a study on these topics, future research may contribute to a more holistic understanding of the relationship between psychological contract and student retention and can help educational institutions to develop more effective strategies to support students' likelihood to remain in the same institution and retain them until graduation.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Household Financial Strain in Malaysia: Investigating the Drivers of Elevated Cost of Living

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Abstract: Rising living costs in Malaysia impose significant financial burdens on households and challenge economic policymaking. This study identifies and quantifies the influence of six macroeconomic variables—Population Growth Rate, Tax Rate, Import Rate, Export Rate, Income Inequality, and Lending Interest Rate—from 1993 to 2023 on the country's cost of living. Drawing on data from the Department of Statistics Malaysia (DOSM) and the World Bank, we apply descriptive statistics, correlation analysis, and multiple regression methods to uncover long-term relationships. Our findings indicate that population growth and income inequality are positively associated with increased living costs, while fluctuations in import/export rates and adjustments in tax and lending interest rates exert varying but significant effects. These results offer robust empirical evidence of complex interdependencies, underscoring the need for targeted policy strategies—such as equitably structured taxation, inclusive growth policies, trade balance stabilization, and prudent monetary regulation—to alleviate living cost pressures. By illuminating the macroeconomic drivers of living cost dynamics in Malaysia, this study provides actionable insights for policymakers to enhance household welfare.

Keywords: *Tax Rate, Import Rate, Income Inequality, Lending Interest Rate, Cost of Living, Malaysia.*

1. Introduction and Background

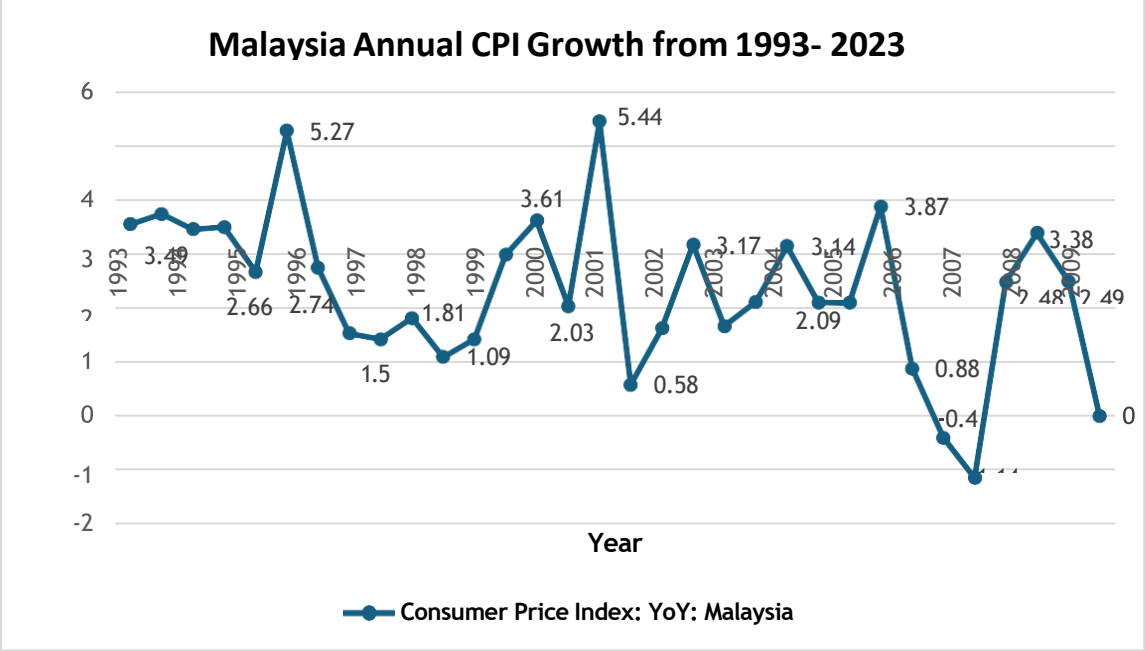
The increasing cost of living presents a considerable impediment in both developed and developing countries, with Malaysia being no exception. Despite reports indicating a decline in the poverty rate and an improvement in the overall well-being of its populace, the issue of rising living costs remains a prominent concern, prompting significant governmental efforts to alleviate the burden on its citizens (Mat, Fadzim, Harun, & Jamil, 2020). This persistent challenge is particularly acute for low-income households, such as the B40 group, who possess limited financial resources and minimal savings, rendering them highly susceptible to economic fluctuations and price escalations (Mainal, Hanipah, Zuhaimi, & Kamarudin, 2024). This escalating burden is attributable to several factors, including income fluctuations, price variations, and changes in household consumption patterns (Sulaiman, Sanusi, & Muhamad, 2019). The implementation of the Goods and Services Tax in 2015 exacerbated the financial strain on Malaysian consumers by augmenting the price of goods and services, while wages have largely remained static (Sulaiman, Shamsudin, Kheng, & Othman, 2020). This has disproportionately affected low-income households, compelling them to adopt various coping strategies to manage their expenses (Mat et al., 2020). Overspending is a widespread problem that leads to social issues due to financial limitations and can result in theft, unauthorized money lending, and long-term personal loans (Othman, Abu, Samsiah, & Sallim, 2020).

The Consumer Price Index is a key indicator for understanding the cost of living in Malaysia. It measures the changes in prices paid by consumers for a basket of goods and services. Malaysia's CPI has shown a consistent increase over the years (Malaysia Consumer Price Index, 2025), reflecting changes in the policy environment and economic structure. Consumption patterns have also shifted, as indicated by the CPI and other economic indicators (Sulaiman et al., 2020). Studies analyze CPI data to understand price movements and inform monetary policy (Ruslan & Mokhtar, 2020; Teall, 1999).

The Consumer Price Index is a vital economic indicator used to assess inflation trends and inform monetary policy decisions (Teall, 1999). It measures the average change in prices over time for a basket of goods and services purchased by consumers (Ghunaimi, Almaqtari, Wesonga, & Elmashtawy, 2025). Central banks and governments use the CPI to understand the effectiveness of past policies, gauge the economy's temperature, and implement monetary policies, such as inflation rate targeting (Teall, 1999). In Malaysia, the Department of Statistics uses findings from household income, expenditure, and basic amenities surveys, along with the CPI, to derive the cost-of-living indicator. The CPI focuses on essential components like food, non-alcoholic beverages, transport, healthcare, education, and housing and utility expenses, which significantly impact household living costs. While Malaysia's CPI growth rate is moderate compared to other ASEAN nations, it still

indicates consistent trends. Furthermore, accurate forecasting of CPI inflation is crucial for policymakers, especially considering the shifts in monetary policy frameworks, increased globalization, and events like financial crises and pandemics (Sengupta, Chakraborty, & Singh, 2024).

Figure 1: Malaysia Annual CPI Growth from 1993 to 2023



Source: Department of Statistics, Malaysia

According to research by the Department of Statistics Malaysia, Figure 1 displays the data showing that the Consumer Price Index (CPI) in Malaysia has experienced notable fluctuations from 1993 to 2023, highlighting significant phases of economic transformation. A crucial year was 1998, during the Asian Financial Crisis, when the CPI growth rate peaked at 5.27%, indicating substantial economic difficulties. Referring to data from the Department of Statistics Malaysia (2023), Malaysian households saw their average monthly expenditures rise from RM 3,683 in 2019 to RM 4,282 in 2022, which corresponds to a 16.26% increase in living costs. Additionally, the year 2008 marked another significant period with a CPI growth rate of 5.44%, driven by global economic instability and rising oil prices. These fluctuations underscore the vulnerability of Malaysian households to macroeconomic changes, particularly affecting urban households who face the greatest economic pressures.

Previous studies have extensively investigated the factors contributing to rising living costs in Malaysia, employing various theoretical frameworks and research methodologies. Researchers like Ismail, Daud, Mohd, Samat, and Ridzuan (2022) have explored multiple dimensions, including macroeconomic variables, household income disparities, and global economic influences. Significant research has focused on understanding the complex interactions between inflation, economic policies, and household expenditure patterns. Theoretical approaches such as the Theory of Cost-of-Living Index, Theory of Consumer Choice, and Engel's Curve Theory have been utilized to analyze cost-of-living dynamics. These studies have consistently highlighted the multifaceted nature of living expenses, emphasizing the need for comprehensive, interdisciplinary research approaches to address the challenges faced by Malaysian households.

The cost of living is a highly significant topic to analyze, as Harian (2023) reports that it is steadily increasing, with the prices of basic goods and services soaring and the Malaysian currency in 2023 depreciating to RM4.71 against one US dollar. Population growth rate, tax rate, import rate, export rate, income inequality, and lending interest rate have been chosen as independent variables due to their significant influence on the cost of living. Based on Wahab, Shahiri, Mansur, and Zaidi (2018) highlight that factors such as imports, population growth, income inequality, and housing costs closely linked to lending interest rates, are strongly associated with the rising cost of living in Malaysia. Moreover, it is stated in Ruslan and Mokhtar (2020) emphasize that economic

fluctuations in exports impacted the cost of living in the Federated Malay States between 1930 and 1940, illustrating the substantial role of export dynamics in determining living standards.

In summary, the cost of living in Malaysia has exhibited a dynamic and intricate pattern of change over the last three decades. Consequently, this study aims to elucidate the shifts in living costs within Malaysia, which are perceived as unpredictable due to a confluence of economic and social determinants since the 1990s. The research will concentrate on the impact of macroeconomic variables on household expenditure and living expenses in Malaysia. The analysis of living costs will be conducted using the Consumer Price Index, which provides a thorough assessment of essential household expenditures. Furthermore, several relevant theoretical frameworks will be employed to comprehend the diverse factors influencing the dynamics of the cost of living, thereby offering a holistic perspective on the economic challenges confronting Malaysian households.

2. Literature Review

The Cost of Living: The cost of living is one of the most critical economic indicators globally and has been significantly impacting the socioeconomic development of nations, particularly in developing countries like Malaysia. However, the continuous rise and complexity of living costs have been a subject of intense research among economists and policymakers who are keen to understand the underlying determinants affecting household economic sustainability. Previous studies have been conducted to examine the variables influencing the cost of living in Malaysia. The fluctuations in living costs can occur due to several factors such as population growth rate, tax rate, import rate, export rate, income inequality, and lending interest rate. Latimaha, Ismail, and Bahari (2020) conducted research using Malaysian data from 1980 to 2014, employing the Toda Yamamoto causality model. The researchers found significant relationships between GDP per capita, population growth, unemployment rate, and degree of openness with the cost of living. Their findings align with Ismail et al. (2022), who identified population size and density as significant factors positively influencing household living costs. The study by Azmi, Fitriana, Rohsede, Ramden, and Puteh (2024) further supports these findings, highlighting how taxes on goods and services, reduced subsidies, stagnant income levels, and reliance on imported goods contribute to rising living costs in Malaysia.

Ismail et al. (2023) expanded on these findings by applying Engel's Curve theory to analyze Malaysian household expenditure patterns, particularly focusing on 14,551 households, including 6,720 B40 households. Their research demonstrated that as household income increases, the percentage of expenditure decreases, indicating changing consumption patterns among different income groups. This finding aligns with earlier studies that emphasize the complex relationship between income inequality and living costs, suggesting that policy interventions should consider the income elasticity of necessities when addressing cost-of-living challenges.

The Theory of Cost-of-Living Index, as established by Konüs in the 1920s and elaborated by Triplett (2001), provides a fundamental framework for measuring changes in living standards through utility functions subject to budget constraints. When analyzing living costs, the theory demonstrates how different price regimes affect the monetary expenditure required to maintain constant utility levels. According to Triplett (2001), a true cost-of-living index exists when the satisfaction or standard of living of a family remains constant despite changing economic conditions. The application of the cost-of-living index can be examined through two primary measurement approaches: the Laspeyres index and the Paasche index. Gillingham and Greenlees (1987) collectively established that the true cost of living consistently falls between these two measures, expressed as $L > I > P$. The Laspeyres index serves as the upper limit of the true cost of living, while the Paasche index establishes the lower limit, providing a range within which the actual cost of living must fall. Based on these foundational studies, the relationship between price changes and the cost-of-living index follows a clear pattern. This theoretical framework shows how market price changes directly impact household welfare, with the actual cost of living derivable from the indifference curve given the level of satisfaction enjoyed.

The Theory of Consumer Choice, as applied to cost-of-living analysis, explains how households make spending decisions within their total income or budget constraints. When a person's purchasing power increases due to higher income or wages, the quantity of normal goods purchased also increases. This relationship

demonstrates how budget lines shift forward and parallel to each other as consumption possibilities expand, reflecting an improved standard of living. The theory's application to the cost of living can be analyzed through both substitution and income effects. As described in this previously studied framework, when prices change, both the intercept and slope of the budget constraint shift, leading to two distinct effects on consumer behavior. The substitution effect involves movement along the demand curve, while the income effect represents a shift between different utility curves due to changes in real income. These movements reflect changes in consumers' purchasing power and their ability to maximize utility under different price conditions. According to Keat and Young (2009), maintaining a consistent standard of living depends on various factors that determine the demand function, including prices of related goods, income distribution, tastes and preferences, number of buyers, and future price expectations. Government policies, particularly taxes and subsidies, directly influence the prices of goods and services, affecting consumer tastes and living costs. Additionally, population growth and density changes impact market dynamics by altering the number of buyers in the market.

The Engel Curve explains the relationship between income or total expenditure, where an increase in income will cause the percentage of expenditure to increase at a decreasing rate (Shah, Ullah, Ullah, & Amin, 2020). The theory demonstrates that higher incomes correlate with a lower proportion of household spending on necessities, providing crucial insights into how income changes affect living standards. As household income rises, their purchasing power increases, leading to changes in consumption patterns. Emery and Guo (2020) further elaborate that when household purchasing power increases due to income growth, the income elasticity of household items decreases, making households less sensitive to price changes. This relationship helps explain how different income groups experience and adapt to changes in living costs. The theory provides a framework for understanding how households adjust their spending patterns as their economic circumstances change. According to Perloff (2018), the Engel curve describes the relationship between consumption quantities and income levels, assuming constant prices and other factors. The research demonstrates that the relationship between income and consumption patterns follows predictable patterns, helping explain why different income groups experience varying impacts from changes in living costs. This theoretical framework provides valuable insights into how income changes affect household welfare and living standards across different economic groups.

Population Growth Rate: The population growth rate stands as a critical demographic factor with multifaceted implications for a nation's socioeconomic fabric. It is defined as the rate at which the number of individuals in a population increases (or decreases) per unit time, typically expressed as a percentage of the base population. Increases in population size augment aggregate demand for goods and services, thereby exerting upward pressure on prices, particularly when supply rigidities exist (Johari & Said, 2021). This surge in demand encompasses essential items, including food, housing, healthcare, and education (Liu & Ong, 2021).

Based on findings, population growth is an important factor and has a positive impact on the cost of living for a household. It has been found that the factors of population growth and population density are positively correlated with the cost of living in an area. Furthermore, Population growth has a positive and significant relationship with the cost of living. The expansion of urban areas, driven by rural-to-urban migration in pursuit of employment opportunities, has been a defining characteristic of Malaysia's development trajectory (Man & Salihin, 2018). With the country's urbanization rate standing at 77.7% in 2021, the concentration of people in urban centers has placed substantial strain on housing, transportation, and utilities, contributing to a higher cost of living in these areas characterized by heightened population density (Samad, Zainon, Mohd Rahim, Lou, & Abd-Karim, 2016). Malaysia's rapid urbanization, increased traffic, and rising housing and rental costs are clear examples of this trend. The cost of living in Malaysia's big cities is increasing. This causes the cost of living in an area to rise. The increasing cost of living in Malaysia is also attributed to urbanization. When people move from rural to urban areas in search of better job opportunities, cities get densely populated (Guyatt, Akl, Crowther, Gutterman, & Schünemann, 2012). Malaysia's urban population was 77.7% in 2021.

Therefore, the population growth rate greatly affects the cost of living of households in Malaysia. For every increasing population, there would be greater demand for shelter, food, transportation, and other basic needs and services to be dealt with, leading to inflation or price increases. This means loss of purchasing power for a household, which has a challenge in maintaining its standard of living. Population growth reinforces economic activity and develops lower costs due to economies of scale. Large and fast-growing populations, without

proper planning and investment, however, often place an extraordinary burden on resources and infrastructure and ultimately drive up the cost of living.

Null Hypothesis (H0): There is no relationship between population growth rate and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between population growth rate and cost of living.

Tax Rate: The second independent variable of this study is the tax rate. The rising cost of living in Malaysia has emerged as a significant concern, particularly as tax rates increase due to economic challenges and government initiatives. These tax rates are crucial in shaping the cost of living, influencing consumer purchasing power, inflation, and the pricing of goods and services. Recent tax policies have become key indicators of living expenses in Malaysia. The implementation of the Goods and Services Tax in 2015, which replaced the Sales and Services Tax, has been identified as a contributing factor to the rising cost of living in Malaysia (Sulaiman et al., 2019). The GST increased the monetary value that customers paid for products and services. Many Malaysians are grappling with stagnant annual salaries juxtaposed against a higher cost of living, resulting in decreased purchasing power (Sulaiman et al., 2020). In order to fund government operations and infrastructure development, Malaysia's tax policies, especially sales and service taxes, have a substantial impact on consumer finances and spending patterns.

Research by Mainal et al. (2024) deals with the tax element, which might have an influence on the cost of living. Using 30 years of data and statistical methods, it examines the link between direct tax, housing prices, and other economic variables. According to the report, when taxes rise, households would have more financial difficulties in meeting basic demands such as food, lodging, transit, education, and so on. Thus, the analysis suggests that increased living costs have a favorable influence on tax rates and overall household budgets. The idea of customer preference also explains the cost of living since each consumer has a set amount of money to spend based on their overall income or financial constraints. A person's purchasing power increases when their income or pay rises, allowing them to buy more of each common product. As a result, as the number of items required grows, the budget lines will advance and run parallel to one another. This shows that the level of life has increased. Government policy, including the imposition of taxes and subsidies, will have a direct influence on future pricing, consumer preferences, and the cost of products and services (Mainal et al., 2024).

Although taxes are crucial to the government because they fund public services and infrastructure, they may also be a key driver of the cost of living. Direct taxes, like income taxes, restrict consumers' disposable income by limiting what they can spend. Indirect taxes, such as sales and value-added taxes, directly increase the cost of products and services since consumers pay more. Taxes have varying effects on living costs, depending on tax rates, tax regimes, and economic situations. Policymakers must carefully assess the possible effects of their tax policy on families and companies, balancing income generation with economic stability. If the tax imposition is too big, it can be expected that people will not be able to get a house, bring up children, they will reduce their consumption and economies will get worse (Kovárník, Hamplová, Jedlička, & Hájek, 2015). Indirect taxes are an element of the price of goods bought by consumers or producers (Kaya, Yıldız, & Kaya, 2022). When indirect taxes go up, consumers can expect to see an increase in the price of goods (Hassan, Mahmood, Tahir, Alkhateeb, & Wajid, 2021). Inflation makes the money the individual has less valuable and it also makes the taxes paid seem less significant. Certain taxes, such as capital gains taxes, are pegged to increases in an asset's value and may increase as a result of elevated inflation (L'Huillier & DeLuca, 2023).

Null Hypothesis (H0): There is no relationship between tax rate and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between tax rate and cost of living.

Import Rate: Next, the independent variable is the import rate. Imports are fundamental aspects of international trade and play an important role in sustaining the global economy. Import also refers to the goods and services acquired by businesses or consumers from other countries. This results in an outflow of funds from the country that is purchasing foreign goods and services. Most countries try to export more goods and services than they import because it is able to boost domestic revenue. A high volume of imports indicates a signal of economic growth. But on the other hand, imports could also influence the high cost of living, especially among households. A decline in the value of the Ringgit Malaysia negatively impacts the individuals who really depend on imported goods and services. If this problem is prolonged, it can contribute to an increase in the cost of living (Bank Negara Malaysia, 2022). Business that relies on importing products face increasing costs when the Ringgit Malaysia depreciates because they need to spend more money to purchase the same quantity

of goods in a foreign country. As a result, they often pass these higher costs on to consumers in the form of an increase in retail prices, such as food.

Tariffs can significantly impact consumers by increasing the cost of imported goods, potentially reducing foreign competition and allowing local businesses to raise prices (Fong & Mohs, 2020). Taxes on imports and exports, known as tariffs, have an impact on the cost of products and services in international commerce. Tariffs can make imported goods more costly, which raises the cost of living and changes consumer spending habits (Fong & Mohs, 2020). Tariffs may be used to safeguard local sectors, promote domestic production, and generate cash, but they may also result in higher costs for consumers and retaliatory actions from other countries, influencing global trade relations (Kohn, 2006). If tariffs are imposed on items like machinery or raw materials, manufacturers' input costs may rise, which would raise prices for consumers.

Based on the findings, imports can directly influence domestic inflation through the prices of imported goods included in the consumer price index. Additionally, imports impact inflation indirectly by creating competition between local goods and services and imported alternatives. To manage the excess on demand, a country can implement import policies. Typically, an increase in imports can lead to depreciation of the exchange rate, which can heighten inflationary pressures. This can be controlled by raising the cost of imports. Moreover, when a country imports raw materials, a depreciating local currency increases the expense of these imports. Consequently, the cost of producing finished goods rises due to the higher prices of raw materials. Therefore, higher import levels generally contribute to the increase in inflation that led to a high cost of living (Muarief, Herawati, Suroso, Iswahyuningsih, & Wardani, 2024). According to Mbutor (2014), an increase in inflation makes every individual sadder because of a decrease in the purchasing power of wages, undermines living standards, and exacerbates the uncertainty of life in many ways.

Previous studies also stated that there are several factors that influence the import price to increase in food prices, as an important concern. A report on "Household Income and Expenditure Survey – Sri Lanka 2016", an average Sri Lankan household spends 35% of its income on food. The food basket of Sri Lanka is highly import-dependent and the entire requirements of wheat and red lentils, along with 87% of sugar and 50% of milk and milk products imported. In terms of major nutrients, 42% of total energy, 34% of protein and 45% of fat are obtained from the consumption of imported food items as per the food balance sheets. Hence, these changes in import policies could potentially have significant welfare effects in terms of cost of living as well as food security and nutrition (Nayanathara, Ilangarathna, Rathnayaka, & Weerahewa, 2023).

In conclusion, imports are important to the global economy and significantly influence a country's domestic financial conditions. While they contribute to economic growth and promote competition between local and foreign products, they can also present challenges, particularly when the country's currencies depreciate. In Malaysia, a weaker Ringgit can result in higher costs for imported goods, which can increase household expenses. Studies show that nations that are heavily reliant on imported goods, such as Sri Lanka, face major issues with the rising cost of living due to the increasing import prices. This highlights the importance of effective import policies to manage demand, control inflationary pressures and reduce the negative impact of currency depreciation.
Null Hypothesis (H0): There is no relationship between import rate and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between import rate and cost of living.

Export Rate: Export rate serves as a crucial metric to evaluate a country's economic performance and its impact on domestic living conditions (Yee, WaiMun, Zhengyi, Lee, & Xin, 2016). It measures how effectively a nation trades its goods and services in international markets, subsequently affecting domestic prices and living costs. Components encompassed within this metric include total exports, primary commodity exports, and manufactured exports, which collectively illustrate a country's trade capabilities and economic strength. By the Export-Led Growth theory, the effective management of exports can significantly influence domestic economic conditions, contributing to overall living standards. This may involve achieving economic growth through increased production capacity, enhanced technological advancement, or improved trade relations, ultimately affecting household living costs through various economic channels, such as employment opportunities and domestic price levels.

The exchange rate's impact on export prices is another key mechanism. When a country's currency weakens, its exports become relatively cheaper for foreign buyers, potentially leading to increased demand and higher export volumes (Rajakaruna, 2017). With regards to the Malaysian export rate, trade is a process of economic activity that plays an important role in many situations, which can improve the living standards and prosperity for the said country (Yanita, Napitupulu, & Rahmah, 2020). International trade is frequently leveraged to stimulate economic expansion, as nations engage in the exchange of goods and services across their borders (Chugan & Singh, 2014; Yanita et al., 2020).

Moreover, the enhancement of export performance is crucial due to its direct impact on domestic economic conditions and living costs. Countries that achieve high export rates create favorable conditions for economic growth, while low export performance can lead to increased living costs (Khalafalla & Webb, 2001). Athukorala and Menon (1997) note that efforts to enhance export performance through industrialization and economic diversification can result in improved living standards, thereby reducing domestic economic pressures and providing citizens with better economic opportunities through increased national income and employment generation. The transformation of export structures, particularly in developing economies like Malaysia, demonstrates how strategic trade policies can directly influence economic development and household economic well-being. Previous research studies have aimed to comprehend the relationship between export rates and living costs. As per Iram, Bashir, Gazali, and Idrees (2023), countries with strong export performance tend to demonstrate better economic stability and controlled living costs. Atkin (2024) affirmed that increased exports can lead to economies of scale, potentially lowering domestic prices and affecting living costs. Yee et al. (2016) identified that Malaysia's transition from primary commodities to a more diverse manufacturing and service sector has significantly influenced its economic landscape. The research highlights how exports contribute to economic diversification, creating multiple channels of economic growth and potentially reducing the challenges associated with rising living costs through increased economic opportunities and national productivity.

Despite the potential positive impacts, research also reveals potential negative relationships between export rates and the cost of living. Inflation can negatively impact export competitiveness due to higher production costs, as noted by Yee et al. (2016). The dependence on imported inputs in manufactured exports can create additional economic pressures, potentially offsetting some of the positive economic gains. Khalafalla and Webb (2001) observed that while manufacturers' exports are significant, they may not have a strong growth-stimulating effect due to their reliance on imported inputs. This negative relationship suggests that the impact of exports on living costs is not significant, with potential challenges including increased production costs, potential inflationary pressures, and the vulnerability of export-dependent economies to global economic fluctuations. Similarly, Khalafalla and Webb (2001) discovered a significant positive relationship between exports and economic growth in their examination of Malaysian economic data from 1965 to 1996. Athukorala and Menon (1997) revealed that Malaysia's export-led industrialization success has contributed to rising living standards, with manufactured exports playing a crucial role in economic development and household welfare.
Null Hypothesis (H0): There is no relationship between export rate and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between export rate and cost of living.

Income Inequality: The income inequality and high cost of living have an important relationship, given that the rising cost of living increasingly burdens households across different economic strata. Many studies have been conducted, revealing that income inequality is one of the specific factors for individuals struggling to manage their living costs. According to Kelly, Ruch, Ruch, and Matlhatsi (2018), income inequality is highlighted as an important issue that contributes to social and economic inequality. These gaps are frequently related to basic needs such as a house, groceries, job opportunities and financial mobility. A study from Azmi et al. (2023) states that low-income households often struggle to meet their basic needs due to limited income, especially when living costs rise. It also stated that many Malaysian workers earn above the poverty but this does not mean it gives a good improvement in their overall living conditions. Therefore, this indicates that even though the small increase in income still cannot tackle the high cost of living, it can be very burdensome. This study implies that strategic management is essential to effectively resolve these concerns.

Furthermore, achieving a minimum acceptable standard of living has proven challenging for many low-wage workers around the world in recent times (Seow, 2022). Other than that, as stated by Moretti (2010), considering variations in the cost of living reduces real income inequality, but it does not establish a direct

relationship between income inequality and fluctuations in living expenses. Even if the income gap decreases, for example, because of an increase in the minimum wage, the cost of living does not necessarily decrease. According to Wahab et al. (2018), it shows how income inequality exacerbates the hardship experienced by those on low incomes, as rising costs for essential products, groceries and services affect them disproportionately. Based on the findings, although Malaysia has enjoyed overall economic growth, wage stagnation among low-income workers has caused greater financial stress, making it difficult for these households to keep up with increased spending. This study can be strengthened further with studies from Zainuddin, Nazri, Dali, and Ahmad (2024). The study provides an example where the spending pattern of the B40 group, which spends RM0.80 for every additional RM1, indicates their expenses are very similar to their income. On the other hand, the high-income group has a larger gap between income and expenses. As a result, it proves how higher spending has a big impact on the low-income group that worsening income inequality.

A study has also been conducted which investigates how the difference in income growth between different categories of households in Malaysia namely Low Income (B40), Medium Income (M40) and high income (T20), can impact significantly the cost of living (Sulaiman, Rashid, Ridzuan, Samsudin, Saputra, Abidin, & Hussain, 2024). The study found that, while income growth has been documented, it often fails to keep pace with inflation, particularly among the B40 group. This income mismatch worsens their financial problems, especially in managing expenses related to housing, transportation and necessities. The study also emphasizes the importance of government efforts to address these concerns, such as fair wage increases and subsidies for essential commodities, to improve the living conditions of low-income households. Meanwhile, a study by Carroll and Chen (2016) has found one positive relationship regarding income inequality. As income inequality decreases, low-income households will often have better exposure to education as well as job opportunities, which will enhance their economic mobility. Therefore, it will enable them to obtain a high standard of living since their financial situation improves. With that, they can afford a lot of basic needs, which results in a more stable cost of living.

Income inequality has been on the rise in Western nations since the 1970s, which may be the cause of crime, poor governance, and economic inefficiencies, where it is very noticeable (Houle, Ruck, Bentley, & Gavrilets, 2022). Meanwhile, in Malaysia from 1957/58 to 1990, Malaysia completed one cycle of Kuznets' Inverted-U Hypothesis, but since the 1990s, income inequality has begun to move upward again (Ismail, 2000).
Null Hypothesis (H0): There is no relationship between income inequality and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between income inequality and the cost of living.

Lending Interest Rate: When assessing the cost of living, the lending interest rate is a crucial factor to take into account. It has an impact on the cost of borrowing for both individuals and companies, which has an effect on spending patterns and general economic well-being. The lending interest rate, which is set by central banks or market forces, is the cost of borrowing money expressed as a percentage of the loan amount. Mortgage rates, auto loans, personal loans, and credit card interest rates are all directly impacted by it. Changes in the lending interest rate can have a substantial impact on consumer spending and investment decisions. Furthermore, interest rates serve two purposes in an economy: they represent the cost of borrowing for borrowers and the return on investment (Odionye, Ojiaku, & Uba, 2023). In general, when interest rates are high, borrowing becomes more expensive, which deters consumers and businesses from taking out loans to make purchases or investments (Sari, Setyowati, Putri, & Faridatussalam, 2022). This may cause a decline in demand, which would restrain economic growth and perhaps lower the cost of living. When interest rates are low, borrowing money is less expensive, which encourages spending and investment. The importance of interest rates is especially significant in developing economies, where they play a crucial role in managing the balance between demand and supply in both goods and money markets (Anthony & Saracoglu, 1983).

In Malaysia, the lending interest rate is affected by the Overnight Policy Rate. The Overnight Policy Rate serves as the benchmark interest rate that influences the base rate of lending institutions (Khomariyah, Setyowati, & Utomo, 2022). Based on the Bank Negara Malaysia, the lending interest rate charged typically follows the Overnight Policy Rate set by Bank Negara Malaysia since the Standardized Base Rate will follow OPR exactly. The Standardized Base Rate (SBR), effective 1 August 2022, is the reference used by all banks for pricing new floating rate retail loans, refinancing existing ones, and renewing revolving retail loans. Any changes to the Overnight Policy Rate (OPR) will result in an equivalent adjustment to the SBR (Wexler, Shaffer, & Cotgreave, 2017). The lending interest rate will affect house prices because the profit of Islamic finance or banking in

Malaysia is based on the profit rate, while for conventional banking based on the interest rate (Gazali, Halim, Abdullah, Ahmad, Mamat, Abdullah, & Mokhtar, 2018). However, the strong increase in inflationary pressures has encouraged a few central banks to raise interest rates at a more rapid rate, which may result in tighter global financial conditions (Ibrahim, Omar, & Arshad, 2023).

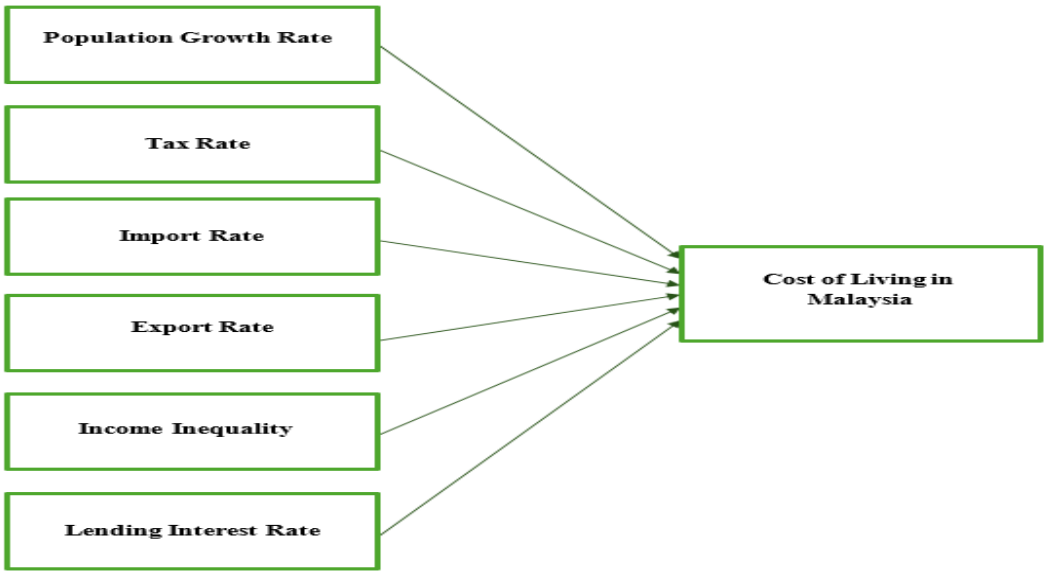
Moreover, lending interest rates can impact the housing market by influencing mortgage rates and affordability (Latif, Majeed, Rozzani, & Saleh, 2020). Lower rates can boost housing demand and prices (Latif et al., 2020). Relatively low inflation can allow a country's central bank to keep its policy interest rate low, reducing borrowing costs for businesses and individuals, ultimately supporting economic growth (Resosudarmo, Rezki, & Effendi, 2023). When the housing finance interest is low, citizens will be enabled to make some investments, such as buying or renovating a house (Rahman & Ridzuan, 2020). The lending interest rate affects the cost of living in a number of ways, which in turn affects consumer spending, investment decisions, and economic growth. Understanding how lending interest rates work is essential for policymakers and individuals.
Null Hypothesis (H0): There is no relationship between lending interest rate and cost of living.
Alternate Hypothesis ($H1_1$): There is a relationship between lending interest rate and cost of living.

3. Research Methodology

This research utilizes a comprehensive time-series study spanning 34 years (1990-2023) to determine the factors contributing to the cost of living among households in Malaysia. The cost of living in Malaysia has demonstrated significant fluctuations, with notable increases observed across various economic indicators. The economic landscape has been characterized by complex interactions between macroeconomic variables such as population growth rate, tax rates, import/export rates, income inequality, and lending interest rates. Data for the cost-of-living index, serving as the dependent variable, is collected from the Department of Statistics Malaysia, while independent variables are sourced from the World Bank Group, Macrotrends, and other legitimate websites. This extensive methodology enables a comprehensive examination of the intricate factors driving household economic experiences in Malaysia, offering critical insights into the dynamics of living costs over three decades of economic development. This study will use a time series of yearly data as its sample. A correlation analysis will be performed to find the multicollinearity issue in the regression and determine the correlation between the dependent and independent variables.

Figure 2 illustrates the correlation between the dependent and independent variables. The independent factors influenced the dependent variable. This study employs cost of living as the dependent variable and population growth rate, tax rate, import rate, export rate, income inequality, and lending interest rate as the independent variables.

Figure 2: Research Framework



Before the analysis of the multiple regression model, two preliminary tests will be performed, which are descriptive statistics analysis and correlation coefficient analysis. This was followed by statistical tests in the regression analysis, such as the T-test and F-test were conducted and the R-squared and Adjusted R-squared were then determined.

4. Results

This section discusses descriptive statistics analysis, correlations, variance inflation factor, and multiple regression results.

Table 1: Descriptive Statistics

Variable	Mean	Std Dev	Minimum	Maximum
Consumer Price Index	2.5288	1.4596	-1.1400	5.4400
Population Growth Rate	2.0852	0.6276	1.0900	2.9200
Tax Rate	15.4141	2.7960	10.9000	19.9800
Import Rate	7.2808	11.3250	-18.7538	26.2855
Export Rate	6.4361	8.4853	-10.8784	21.9067
Income Inequality	0.4371	0.0273	0.3970	0.4900
Lending Interest Rate	6.6058	2.2913	3.4000	12.1000

Descriptive Statistics: Six variables have been used in this study's descriptive statistics analysis for 34 years of observation starting from the year 1990 to 2023. The variables include consumer price index growth rate, population growth rate, tax rate, import rate, export rate, income inequality and lending interest rate.

According to the descriptive statistics analysis result shown in Table 1, the import rate has the highest standard deviation, which is 11.325. A high standard deviation indicates that these rates have a greater dispersion of values compared to other variables. There is a significant difference from other variables, which could be due to a variety of factors such as economic fluctuations, which are changes in currency values that will affect import prices and volumes. A weaker domestic currency makes imports pricier and can reduce them, while a stronger currency makes imports cheaper and can increase them. Other factors could be the exchange rate volatility, changes in trade policies and also commodity prices volatility. Income inequality follows with the lowest value of standard deviation, which is 0.0273. A low standard deviation for income inequality rates suggests that the level of income inequality within a specific region or across a set of comparable regions is relatively stable and consistent over time. This could be because of the stable economic conditions. Stable economies with low unemployment and inflation tend to have more income distribution.

Meanwhile, the mean CPI is 2.53% with a standard deviation of 1.46%, suggesting moderate variability in inflation rates. The CPI ranges from -1.14% to 5.44%, indicating periods of both deflation and significant inflation, which directly impacts the cost of goods and services. The introduction of the Goods and Services Tax in Malaysia has been identified as a contributor to the rising cost of living (Sulaiman et al., 2019), which would be reflected in the CPI. The 1Malaysia People's Aid program's value is higher than the inflation CAGR value (measured by the Consumer Price Index value which is only around 2.65 percent over the same period) (Khan, Abdullah, Mat, Bakar, Ali, & Abdullah, 2018).

Population Growth Rate: The average population growth rate is 2.09% with a standard deviation of 0.63%. This steady growth, ranging from 1.09% to 2.92%, can influence demand for housing, infrastructure, and public services, thereby affecting living costs. Malaysia experienced relatively high birth rates during the 1980s and early 1990s, as the country was still in a phase of population expansion. The fertility rate was above replacement level, meaning more children were being born compared to the number of deaths, leading to rapid population growth. In 1990, the growth rate was approximately 2.92%, which decreased to 1.09% by 2023 (Macrotrends, 2025). Declining population growth can also lead to potential labor shortages in certain sectors, potentially driving up labor costs and consequently increasing the prices of goods and services produced by labor-intensive industries. Moreover, a smaller workforce may impact economic growth and development, which could in turn affect income levels and overall economic prosperity, ultimately influencing the cost of living for individuals and households. It is crucial to acknowledge that the relationship between population

growth and cost of living is intricate and influenced by a multitude of factors, including economic development, government policies, and global economic conditions.

Tax Rate: The average tax rate is 15.41% with a standard deviation of 2.80%. Fluctuations in the tax rate, which range from 10.90% to 19.98%, can significantly alter disposable income and business profitability, influencing both consumer spending and overall economic activity. Tax policies like sales and service taxes have a substantial impact on consumer finances in Malaysia. An efficient public administration is essential to collect taxes efficiently, which necessitates a requirement of a good quality of governance (Hassan, Mahmood, Tahir, Alkhateeb, & Wajid, 2021). As of 2022, the tax-to-GDP ratio has increased slightly to 11.70%, highlighting the ongoing struggle in maintaining a robust tax revenue framework amid changing economic conditions. According to the research that has been carried out, it was found that Malaysia's tax structure is quite narrow, with a strong emphasis on direct taxes compared to indirect taxes such as sales tax or value-added added (Rabi & Mansor, 2024). For instance, the introduction of the Goods and Services Tax (GST) from April 2015 to September 2018 generated significant income, which demonstrates the tax's effectiveness in raising government revenue. Although Malaysia's tax collection varies relative to GDP, addressing structural faults in the taxation system is critical for long-term economic stability. Additionally, more study explores the factors that impact tax revenue, highlighting key determinants that affect collection efficiency (Das, 2024). This study shows that increasing the compliance rate, broadening the tax base, and improving the efficiency of tax administration are important to increase Malaysia's tax-to-GDP ratio. Thus, as Malaysia recovered economically from the pandemic, redesigning its tax structure is essential to increase fiscal capacity, ensure long-term growth and fund essential public services.

Import Rate: The mean import rate is 7.28% with a high standard deviation of 11.33%, indicating substantial variability. The import rate ranges from -18.75% to 26.29%. High variability in import rates can lead to price volatility for imported goods, affecting the cost of living, especially for items heavily reliant on imports. This study demonstrates that the import rates significantly influence both the cost of living and the consumer price index (CPI). When the country relies heavily on imported goods, the higher import rates whether it is from taxes or any unfavorable currency exchange rates can cause the prices of goods to increase. Increasing the price of goods will increase the household expenses especially for essential items such as food, clothing and electronics. Table 3 shows that, the minimum value for the import rate was recorded in 1998. In 1998, Malaysia recorded its drastic decline in import growth rate at -18.75%, which was primarily a result of the Asian Financial Crisis (1997-1998). The crisis started in mid-1997 due to currency devaluations in Thailand and quickly spread throughout the region. The Malaysian Ringgit (MYR) faced severe depreciation, falling significantly against the US Dollar. This devaluation increased the cost of imports, as purchasing foreign goods became more expensive for Malaysian businesses and consumers, leading to a sharp decline in import volumes as demand for imported products diminished. With a reduction in consumption, investment, and government spending, the country's growth was expected to rely primarily on net exports. Initially the crisis caused a drop in imports of luxury items as domestic demand weakened due to the Ringgit's depreciation (Ariff & Abubakar, 1999). While the maximum rate for import is 26.29% which happened in the year 1990, because in the late 1980s and early 1990s, Malaysia experienced significant economic growth driven by industrialization, export-focused manufacturing, and infrastructure expansion. This growth led to the higher demand for imported machinery, raw materials and technology to support both industrial and construction sectors.

When there is a huge difference between the minimum and maximum values, this study expects that there will be a huge difference in standard deviation values also. The value for standard deviation is 11.32505 relatively high value, especially when compared to the mean import rate of 7.280841. Import is highly responsive to shifts in economic growth. During an economic boom, imports tend to surge as demand for goods and services increases. On the other hand, during an economic downturn, imports usually decrease significantly due to the lower demand for goods and services. The high standard deviation reflects the significant impact of the Asian Financial Crisis on import rates. The crisis caused a sharp currency depreciation and economic recession in many countries including Malaysia.

Export Rate: The average export rate is 6.44% with a standard deviation of 8.49%. The export rates range from -10.88% to 21.91%. Fluctuations in export rates can impact a country's trade balance and economic health, indirectly influencing employment levels and income, and consequently, the cost of living. Malaysia's export

rate showed significant variations throughout the period, with notable peaks and troughs driven by key export sectors including the Electronics and Electrical (E&E), palm oil, and rubber industries. Based on the historical event of the 2008 Global Financial Crisis, where the export rate declined to 2.3% while the CPI growth rate peaked at 5.44%, particularly impacted by the E&E sector which accounted for the largest share of Malaysia's exports during this period. The interconnected relationship between export performance and living costs continued to be evident in subsequent years, as shown by the sharp decline in export rates to - 12.7% in 2009, coinciding with a dramatic drop in CPI growth to 0.58%. Malaysia's position as a major exporter of palm oil and rubber made these commodities significant contributors to export earnings, with their performance directly influencing domestic price levels and cost of living throughout these periods (Hassan et al., 2021)

The minimum export rate of -12.7% recorded in 2009 had substantial implications for Malaysia's cost of living metrics, particularly due to the underperformance of major export sectors. According to Khushairi et al. (2019), this sharp decline in exports, especially in the E&E sector and commodity exports like palm oil and rubber, coincided with significant changes in domestic price levels, as evidenced by the CPI growth rate dropping to 0.58% in the same year. This pattern of export-driven impact on living costs continued to be visible in recent years, as shown by the data from 2020, where exports fell by -7.9% while the CPI growth rate reached -1.14%, before recovering strongly in 2021-2022 with export rates of 21.2% in 2021 and 15.9% in 2022 respectively. These fluctuations in export performance, particularly in key sectors like E&E, palm oil, and rubber, corresponded directly with changes in CPI growth rates of 2.48% and 3.38%, demonstrating how these major export industries consistently influenced domestic living costs throughout the observed period.

Income Inequality: The mean income inequality is 0.44 with a low standard deviation of 0.03. The income inequality ranges from 0.40 to 0.49. Persistent income inequality can lead to social disparities and affect overall economic stability, potentially influencing the cost of living for different segments of the population. Income inequality in Malaysia, as measured by the Gini coefficient, has shifted significantly over time due to economic changes and the impact of social policies. The highest reported Gini coefficient was about 0.4900 in 1998. It represents Malaysia's high-income inequality, which is closely related to the wider financial instability caused by the Asian Financial Crisis. It led to an increase in the unemployment rate from more than 2.5% in 1997 to more than 6% in 1998, along with many business closings and job losses. The recession hit low-income households disproportionately, exacerbating existing inequalities. The Malaysian government implements policies to encourage low-income people and transfer resources to bridge this gap. With the implementations, the Gini coefficient has been lowered to the lowest value of about 0.3970 by 2023. A study published in highlighted that Malaysia has effectively reduced income inequality, especially among ethnic groups. According to research, real per capita GDP growth and government redistributive efforts, such as progressive taxation and cash transfers to low-income households, have played an important role in reducing income inequality over time (Goh, Wong, Ayupp, & Lai, 2023).

However, this decline in inequality is a short-term trend. A small increase in the Gini coefficient to about 0.407 by 2023 indicates that income inequality is increasing. The economic disruption due to the COVID-19 pandemic, which mainly affects low-income groups and start-ups that are less prepared to deal with financial problems, is partly responsible for this rise (Department of Statistics Malaysia, 2023). As industries such as tourism and retail suffer severe downturns, many people find they have no steady income or job security. The consequences of increasing income inequality are particularly significant when considering the cost of living in Malaysia. Moreover, low-income households find it more challenging to meet their basic needs as the cost of living rises. This creates a loop in which increased spending exacerbates current disparities, preventing low-income households from improving their financial status (Azmi, 2023). Even though the government has made several initiatives, the challenges remain to tackle the issue.

Lending Interest Rate: The average lending interest rate is 6.61% with a standard deviation of 2.29%. The lending interest rate ranges from 3.40% to 12.10%. Variability in lending interest rates directly impacts borrowing costs for consumers and businesses, affecting spending, investment, and the affordability of housing and other major purchases. Low interest rates can reduce borrowing costs and support economic growth, while higher rates may curb inflation but also dampen economic activity. The Overnight Policy Rate (OPR) affects the interest rates. Meanwhile, among the ASEAN countries, Malaysia’s lending rate is ranked the second-highest in 2022. This could be due to a high-risk premium demanded by lenders in Malaysia. The lending rate in Malaysia

remains sustainable due to robust macroeconomic fundamentals. According to Bank Negara, the lending rate in Malaysia is still manageable.

Table 2: Correlation

	Consumer Price Index	Population Growth Rate	Tax Rate	nport Rate	xport Rate	Income Inequality	Lending nterest Rate
Consumer Price Index	1.0000	0.3979	0.4749	0.2355	0.4315	0.3642	0.5194
Population Growth Rate		1.0000	0.8595	0.3324	0.4452	0.8976	0.8697
Tax Rate			1.0000	0.2611	0.3437	0.7488	0.8117
nport Rate				1.0000	0.9184	0.2242	0.1475
xport Rate					1.0000	0.3706	0.3547
Income Inequality						1.0000	0.8018
Lending Interest Rate							1.0000

Correlation: Based on Table 2, this study discovered that most of the independent variables, which are Population Growth Rate, Tax Rate, Income Inequality, and Lending Interest Rate are demonstrate correlations below the threshold of 0.9. However, a notable exception was identified between Import Rate and Export Rate, which showed a correlation of 0.918443, exceeding the critical threshold. This high correlation suggests potential multicollinearity between these two variables. At this point, while most variables appear independent, the relationship between Import Rate and Export Rate raises concerns. Therefore, this study proceeded with the Variance Inflation Factor (VIF) test to further investigate potential multicollinearity issues among all independent variables.

Table 3: Variance Inflation Factor

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
Tax Rate	0.0213	107.4042	3.3240
Import Rate	0.0004	1.5727	1.1030
Income Inequality	207.0670	815.5635	3.0838
Lending Interest Rate	0.0383	38.4011	4.0154
C	27.5506	565.6127	NA

Variance Inflation Factor: Based on the VIF result, tax rate, import rate, income inequality, and lending interest rate, centered VIF scores below 5. However, the population growth rate and export rate exceed 5. Hence, this study decided to drop the population growth rate and export rate because the VIF score was above 5 in the model due to the high correlation among them. After excluding both Population Growth Rate and Export Rate, all four remaining independent variables showed Centered VIF values well below the 5.0 threshold. These results indicate that the remaining variables are sufficiently independent of each other and suitable for inclusion in subsequent analyses. This final set of variables can now be confidently used in further preliminary tests and a regression model.

Table 4: Multiple Regression

Variables	Coefficient	T-Statistic	Prob.
Tax Rate	0.0814	0.5574	0.5815
Import Rate	0.0213	1.0282	0.3124
Income Inequality	-12.7206	-0.8840	0.3840
Lending Interest Rate	0.3563	1.8190	0.0793
R-squared	**0.3169**		
Adjusted R-squared	**0.2227**		
F-statistic	**3.3638**		
Prob. (F-statistic)	**0.0222**		
Number of Observations	**34**		
Durbin-Watson statistic	**1.9069**		

Based on the multiple regression analysis results, the F-statistic value is 3.3638 with a probability value of 0.0222, which is less than the critical threshold of 0.05, which is 5% significance level. This statistical evidence indicates that the study's overall regression model is significant and demonstrates good model fitness. This result validates that this study model, which examines the relationship between Cost of Living and the four independent variables of Tax Rate, Import Rate, Income Inequality, and Lending Interest Rate, is statistically fit and significant for further interpretation and analysis. The model's fitness is crucial in determining whether there exists a significant relationship between the dependent variable, Cost of Living and four independent variables of Tax Rate, Import Rate, Income Inequality, and Lending Interest Rate. In this research hypothesis testing framework, the null hypothesis (H0) suggests no relationship between the independent and dependent variables, while the alternative hypothesis (H1) suggests there is a relationship. Given that this study's probability value (0.0222) is less than the 0.05 threshold, this study has sufficient statistical evidence to reject the null hypothesis (H0) in favor of the alternative hypothesis (H1). This confirms that there is indeed a significant relationship between the four remaining independent variables and the cost of living in Malaysia.

The findings demonstrate that this study's regression model has a moderate explanatory power, with an adjusted R-square of 0.2227, indicating that this model explains 22.27% of the fluctuations in cost of living in Malaysia. According to the model, approximately 22.27% of the variation in the cost of living is attributed to Tax Rate, Import Rate, Income Inequality and Lending Interest Rate. While the remaining 77.73% of the variation is due to other factors that have been excluded from this study due to multicollinearity issues, like Population Growth Rate and Export Rate, as well as other potential factors that have not been included in this study's initial analysis. This moderate explanatory power is reasonable given that researchers are working with four independent variables after the necessary exclusion of other variables through the Variance Inflation Factor Test. The remaining unexplained variation in the model suggests that while Tax Rate, Import Rate, Income Inequality and Lending Interest Rate is a significant factor in determining cost of living, as confirmed by this study F-statistic and probability values, other important variables influence living costs in Malaysia, indicating potential areas for future research to explore additional factors that could affect the cost of living in Malaysia.

The findings presented in Table 4 indicate that the Tax Rate is an insignificant factor influencing the Cost of Living in Malaysia. This is demonstrated by a probability value (p-value) of 0.5815, which is notably higher than the tolerance threshold value of 0.10. This p-value indicates a lack of statistical significance, falling below the 90% confidence level. Consequently, this study fails to reject the null hypothesis (H0) that there is no significant relationship between Tax Rate and cost of living and cannot accept the alternative hypothesis (H1) that there is a significant relationship between Tax Rate and Cost of Living in Malaysia.

According to Table 4, the Import Rate is an insignificant factor influencing the Cost of Living in Malaysia. This is demonstrated by a probability value (p-value) of 0.3124, which is higher than the tolerance threshold value of 0.10. This p-value indicates a lack of statistical significance, falling below the 90% confidence level. Consequently, this study fails to reject the null hypothesis (H0) that there is no significant relationship between Import Rate and cost of living and cannot accept the alternative hypothesis (H1) that there is a significant relationship between Import Rate and cost of living in Malaysia.

The findings presented in Table 4 indicate that Income Inequality is not a statistically significant factor influencing the cost of living in Malaysia. This is demonstrated by the t- t-statistic of -0.8840, with a p-value of 0.3840, which is greater than the tolerance threshold value of 0.10. This p-value indicates a low level of statistical significance, falling below the 90% confidence level as it exceeds the tolerance threshold value of 0.10. Consequently, this study fails to reject the null hypothesis (H0) that there is no significant relationship between Income Inequality and cost of living and cannot accept the alternative hypothesis (H1) that there is a significant relationship between Income Inequality and Cost of Living.

The information in Table 4 provides evidence that the Lending Interest Rate is a statistically significant factor influencing the cost of living in Malaysia. This is demonstrated by the t-statistic of 1.8190, with a p-value of 0.0793, which is less than the tolerance threshold value of 0.10. This p-value indicates a high level of statistical significance, exceeding a 90% confidence level, as it falls below the tolerance threshold value of 0.10. Consequently, this study confidently rejects the null hypothesis (H0) that there is no significant relationship between Lending Interest Rate and cost of living and accepts the alternative hypothesis (H1) that there is a significant relationship between Lending Interest Rate and cost of living.

Table 5: Regression Results Summary

Independent Variable	Hypotheses (+/-)	Result (Significant/ Insignificant)	Confidence Level (%)	Support to Hypotheses (Yes/ No)
Tax Rate	Positive	Insignificant	-	**No**
Import Rate	Positive	Insignificant	-	**No**
Income Inequality	Negative	Insignificant	-	**No**
Lending Interest Rate	**Positive**	**Significant**	**90**	**Yes**

Discussion

The first independent variable, tax rate, shows a p-value of 0.5815, indicating the tax rate does not significantly influence the cost of living in Malaysia. This is evidenced by a probability value of 0.5815, which exceeds the tolerance threshold of 0.10. This p-value suggests a lack of statistical significance, as it falls below the 90% confidence level. Therefore, the study does not reject the null hypothesis, indicating no significant relationship between the tax rate and the cost of living, and it cannot accept the alternative hypothesis that such a relationship exists. This result aligns with earlier research by Mainal et al. (2024), who found a similar positive connection between these variables. Likewise, this theory is supported by the studies of Gillingham and Greenlees (1987; 1990). Thus, the findings of Mainal et al. (2024), Gillingham and Greenlees (1987;1990) were consistent with this study's conclusion regarding the directional relationship between Tax Rate and Cost of Living, though the study findings differ in terms of statistical significance. Several interconnected reasons can explain the positive link between Tax Rate and Cost of Living, even though this study's results show a statistically insignificant link. Rising tax rates often result in increased financial burdens on households, affecting their ability to meet basic needs such as food, housing, and transportation.

According to Gillingham and Greenlees (1990), the U.S. Bureau of Labor Statistics' Tax and Price Index (TPI) methodology provides a more comprehensive assessment of how taxes influence living costs compared to the traditional Consumer Price Index (CPI). This expanded perspective demonstrates that direct taxes, including income taxes and Social Security contributions, have meaningful impacts on consumer living costs, offering significant insights into the overall effects of taxes on household expenses and living standards. The positive relationship between Tax Rate and Cost of Living identified in this study is particularly significant given the Malaysian economic context. As demonstrated by Mainal et al. (2024) through their 30-year data analysis, the impact of direct taxation on household budgets creates a ripple effect throughout the economy. When taxes increase, households face greater financial constraints in meeting their basic needs, leading to an overall increase in the cost of living. This relationship suggests that policymakers need to carefully consider the broader implications of tax policies on household economic well-being, as changes in tax rates have

demonstrable effects on living costs across different socioeconomic groups.

The second independent variable, import rate does not significantly affect the cost of living in Malaysia. This is evidenced by a probability value of 0.3124, which exceeds the tolerance threshold of 0.10. This p-value suggests a lack of statistical significance, as it is below the 90% confidence level. Therefore, this study does not reject the null hypothesis that there is no significant relationship between the import rate and the cost of living, nor can it accept the alternative hypothesis that such a relationship exists in Malaysia. The Import Rate variable has a positive coefficient of 0.0213, which means that for every one unit increase in Import Rate, the cost-of-living increases by 0.0213 units, though this relationship is statistically insignificant. This result aligns with earlier research by Muarief et al. (2024), who found a similar positive connection between these variables. Likewise, this theory is supported by the studies of Mbutor (2014) and Nayanathara et al. (2023). Thus, the findings of Muarief et al. (2024), Mbutor (2014), and Nayanathara et al. (2023) were consistent with this study's conclusion regarding the directional relationship between Import Rate and cost of living, though this study's findings differ in terms of statistical significance. Several interconnected reasons can explain the positive link between the Import Rate and the cost of living, even though the study results show statistical insignificance. Increasing imports often leads to exchange rate depreciation, which can heighten inflationary pressures and subsequently affect living costs.

According to Muarief et al. (2024), when a country increases its imports, it can lead to depreciation of the exchange rate, which creates inflationary pressures. The study explains that this effect is particularly pronounced when importing raw materials, as a depreciating local currency increases the expense of these imports. Consequently, the cost of producing finished goods rises due to the higher prices of raw materials, contributing to increased inflation and ultimately higher living costs. The study emphasizes the direct connection between import levels and inflationary pressures that affect household living costs. Imports can directly influence domestic inflation through the prices of imported goods included in the Consumer Price Index. Additionally, imports impact inflation indirectly by creating competition between local goods and services and imported alternatives. When a country imports raw materials, a depreciating local currency increases the expense of these imports. Consequently, the cost of producing finished goods rises due to the higher prices of raw materials. Therefore, higher import levels generally contribute to the increase in inflation that leads to a high cost of living. Subsequently, tariffs can make imported goods more costly, which raises the cost of living and changes consumer spending habits (Fong & Mohs, 2020).

The third independent variable, income inequality, is not a statistically significant factor influencing the cost of living in Malaysia. This is demonstrated by the t-statistic of -0.8840, with a p-value of 0.3840, which exceeds the tolerance threshold value of 0.10. This p-value indicates a low level of statistical significance, as it falls below the 90% confidence level. Consequently, this study fails to reject the null hypothesis that there is no significant relationship between income inequality and the cost of living, and it cannot accept the alternative hypothesis that there is a significant relationship between income inequality and the cost of living. The Income Inequality variable has a negative coefficient of -12.7206, which means that for every one unit increase in Income Inequality, the cost-of-living decreases by 12.7206 units. However, this relationship is not statistically significant as indicated by the p-value. This result aligns with earlier research by Kelly (2018), who found that income inequality contributes to social and economic inequality, particularly affecting basic needs such as housing, groceries, job opportunities, and financial mobility. The findings of Azmi et al. (2023) support the complex relationship between income inequality and cost of living, noting that even when workers earn above poverty levels, this does not necessarily translate to improved living conditions. Their research demonstrates that small increases in income often fail to adequately address rising living costs, suggesting that the relationship between income inequality and cost of living is influenced by multiple factors beyond simple linear correlation. According to Moretti (2010), it highlights that accounting for cost-of-living differences reduces real inequality in income, but it does not prove that there is a relationship between inequality in income and changes in the cost of living. Even if the income gap decreases, like by raising the minimum wage, the cost of living does not automatically decrease. Inflation and other economic variables are more likely to affect affordability. This suggests that while this study's statistical analysis shows an insignificant relationship, the practical impact of income inequality on the cost of living may be more nuanced and complex than what can be captured in a simple linear relationship. Further support comes from Seow (2022), who identifies the widespread challenge of achieving minimum acceptable living standards among low-wage workers globally. This research highlights

how the relationship between income inequality and cost of living is a universal concern, even though this study's statistical analysis for Malaysia shows an insignificant relationship. The study emphasizes that the impact of income inequality on living costs might be influenced by various other economic and social factors that could mask or complicate the direct statistical relationship observed in this study analysis.

Finally, the lending interest rate significantly influences the cost of living in Malaysia. The t-statistic of 1.8190, coupled with a p-value of 0.0793, indicates a high level of statistical significance, surpassing a 90% confidence level. Therefore, the study rejects the null hypothesis, affirming a notable relationship between the lending interest rate and the cost of living. As lending interest rates rise, borrowing becomes more expensive for consumers and businesses, leading to increased costs for goods and services, which in turn elevates the overall cost of living. This finding underscores the critical role of monetary policy in managing inflation and maintaining economic stability. The Lending Interest Rate variable has a positive coefficient of 0.3563, which means that for every one unit increase in Lending Interest Rate, the cost-of-living increases by 0.3563 units. This result aligns with recent research by Crawford (2024), who found that fluctuating interest rates significantly influence living costs through their impact on mortgage payments, demonstrating a positive relationship between interest rates and the cost of living. The findings of Bolhuis, Koosakul, and Shenai (2024) strongly support these study results, as their research demonstrates how higher interest rates directly affect household cost of living through increased mortgage payments, car payments, and other credit payments required for everyday financing. Their study provides substantial evidence for the positive relationship between lending interest rates and cost of living, confirming this study statistical findings. This aligns with Sari et al. (2022) assertion that elevated interest rates generally increase borrowing costs, discouraging consumers and businesses from acquiring loans for expenditures or investments.

According to Wahab et al. (2018), the persistent problem of rising living costs in Malaysia has been exacerbated by sharp increases in housing prices over the past decade. Their research specifically highlighted how interest rates contribute to this issue, providing crucial context for understanding the significant positive relationship that researchers found between lending interest rates and the cost of living in this study analysis. The positive relationship between lending interest rates and the cost of living has profound implications for monetary policy and financial regulation in Malaysia. This study shows that lending interest rates are a significant factor that influences the cost of living, which highlights the need for a comprehensive economic strategy that integrates monetary policy and financial regulation to improve living standards and promote sustainable economic development.

5. Implications and Recommendations

This section delves into the implications of the study's findings and proposes actionable recommendations for policymakers, businesses, and future researchers. By understanding the relationships between key economic indicators and the cost of living in Malaysia, stakeholders can develop informed strategies to promote economic stability, improve living standards, and foster sustainable development. The recommendations aim to provide practical guidance for addressing the challenges and opportunities identified in the research, ultimately contributing to a more prosperous and equitable society. As Malaysia navigates evolving economic landscapes, these insights offer valuable perspectives for shaping effective policies and practices.

This study provides crucial insights for the Ministry of Domestic Trade and Cost of Living, particularly highlighting the significant positive relationship between lending interest rates and the cost of living in Malaysia. The findings emphasize that increases in lending interest rates directly contribute to higher living costs for Malaysian households, primarily through increased borrowing costs for essential purchases such as housing, vehicles, and consumer goods. This relationship underscores the critical need for the Ministry to work closely with Bank Negara Malaysia (BNM) in developing comprehensive strategies to manage lending interest rates effectively. The Ministry should prioritize policies that can help mitigate the impact of high lending rates on household expenses, particularly for low- and middle-income families who are most vulnerable to interest rate fluctuations. To address these challenges, the Ministry should consider implementing a multi-faceted approach to cost management. This could include developing targeted financial assistance programs that offer subsidized interest rates for essential purchases, particularly for lower-income households. Additionally, the Ministry should strengthen its collaboration with financial institutions to create specialized loan products with

more favorable terms for essential purchases. The study's findings also suggest that the Ministry should enhance its monitoring and regulatory framework to ensure lending practices remain fair and transparent, preventing predatory lending that could exacerbate living costs. Furthermore, the Ministry could work on developing comprehensive financial education programs to help households better understand and manage their borrowing costs, thereby making more informed financial decisions that could help mitigate the impact of high lending rates on their cost of living.

For the Federation of Malaysian Consumers Association (FOMCA), this study's findings regarding the significant relationship between lending interest rates and cost of living present important implications for their advocacy work. FOMCA should intensify its efforts to lobby for more consumer-friendly lending policies and regulations, particularly given the direct impact of lending rates on household expenses. The association can use this research to support their calls for a comprehensive Consumer Credit Act that would better regulate lending practices and protect consumers from excessive interest rates. Furthermore, FOMCA should focus on developing strategic partnerships with financial institutions to create more affordable financial products specifically designed for low- and middle-income households. The association should also expand its role in consumer education and protection by developing targeted programs that help consumers understand the relationship between lending rates and living costs. FOMCA can use this study's findings to advocate for more transparent lending practices and push for policies that require financial institutions to clearly communicate the impact of interest rates on total repayment amounts. Additionally, FOMCA should work towards establishing a monitoring system that tracks changes in lending rates and their subsequent effects on household expenses, providing regular updates and recommendations to both consumers and policymakers. This proactive approach would help ensure that consumer interests are better protected in the face of fluctuating lending rates.

For Malaysian consumers, this study's findings highlight the critical importance of understanding how lending interest rates directly affect their cost of living. The significant positive relationship between lending rates and living costs emphasizes the need for consumers to be more strategic in their financial planning and borrowing decisions. Consumers should actively monitor interest rate trends and consider the timing of major purchases or loans to take advantage of more favorable lending conditions. Furthermore, the study suggests that consumers should prioritize financial literacy and education to better understand how different types of loans and interest rates can impact their monthly expenses and overall financial well- being. The research findings also indicate that consumers should take a more proactive approach to managing their existing loans and seeking out more favorable lending terms when available. This could include exploring options for loan consolidation, refinancing existing loans during periods of lower interest rates, and comparing different financial institutions to secure the most competitive rates. Additionally, consumers should consider participating in government-sponsored financial assistance programs or seeking guidance from financial advisors to optimize their borrowing strategies. The study's results emphasize the importance of building emergency savings and maintaining good credit scores to qualify for better interest rates, thereby reducing the overall impact of lending rates on their cost of living.

For future researchers, this study's identification of lending interest rates as a significant factor affecting the cost of living in Malaysia opens up several important research directions. The moderate regression models result suggests that there are other significant factors influencing living costs that warrant further investigation. Researchers should consider expanding the scope of variables examined, particularly focusing on the interaction between lending rates and other economic indicators that might have been excluded from this study. Furthermore, future research could explore the differential impacts of lending rates on various demographic groups, income levels, and geographical regions within Malaysia to provide more nuanced insights for policy development. Additionally, researchers should consider conducting longitudinal studies to better understand how the relationship between lending rates and living costs evolves over time, particularly in response to various economic policies and global economic conditions. The development of more sophisticated econometric models that can capture both direct and indirect effects of lending rates on household expenses would be valuable for policy formulation. Future studies could also benefit from incorporating qualitative research methods to better understand how households adapt their financial behaviors in response to changes in lending rates. This mixed-methods approach could provide more comprehensive insights into the mechanisms through which lending rates impact living costs and help identify

more effective policy interventions to manage these effects.

Several limitations were identified in this study that potentially impacted its comprehensiveness and results. The first significant limitation relates to the unavailability of complete historical data for potentially influential variables, particularly the Government Subsidy Rate. While reviewing past literature, this study identified Government Subsidy Rate as a crucial variable that could significantly impact the cost of living in Malaysia. However, reliable data for this variable was only available from 1996 forward, falling short of this study required 34-year timeframe. This data limitation forced the exclusion of this potentially important variable, which might have contributed to the study's relatively modest adjusted R- squared value of 22.27%. The inclusion of government subsidy data could have provided more comprehensive insights into cost-of-living dynamics and potentially improved the model's explanatory power. A second limitation concerns the generalizability of the study's findings beyond the Malaysian context. The research findings, particularly the significant relationship between lending interest rates and cost of living, are specifically contextualized within Malaysia's unique economic, social, and regulatory framework. Different countries operate under varying monetary policies, financial regulations, and economic structures, which could lead to substantially different relationships between lending interest rates and living costs. For instance, while this study found lending interest rates to be a significant factor in Malaysia's cost of living, this relationship might not hold true or might manifest differently in other Asian or global economies due to variations in financial systems, regulatory frameworks, and economic policies. This limitation of geographical scope restricts the applicability of this study findings to other countries and emphasizes the need for country-specific analyses of cost-of-living determinants.

The third limitation relates to the study's reliance on time series data without integration of other data types such as panel and cross-sectional data. This singular focus on time series data has resulted in potential gaps in understanding the full complexity of cost-of-living dynamics across different demographic and geographical segments within Malaysia. The absence of integrated data sources has made it challenging to conduct comprehensive cross- sectional analyses that could reveal how the impact of lending interest rates varies across different income groups, regions, or urban-rural divisions. Moreover, the complexity involved in examining combined data types would have required sophisticated statistical methodologies and extensive resources beyond the scope of this undergraduate study. This limitation may have resulted in a more simplified view of the cost-of-living phenomenon than what might be revealed through a more integrated data approach.

Another significant limitation encountered in this study relates to the accessibility of certain critical economic indicators, particularly the Overnight Policy Rate (OPR) data. Many high-quality economic datasets are housed within subscription-based international organizations and proprietary databases, making access challenging for undergraduate researchers with limited institutional resources. This accessibility constraint forced the study to exclude potentially valuable variables that could have enhanced researchers understanding of cost-of-living dynamics in Malaysia. The restriction in accessing comprehensive financial and economic data may have limited this study ability to explore additional aspects of the relationship between monetary policy instruments and living costs, potentially affecting the completeness of this study analysis. The final limitation concerns the relatively limited selection of independent variables included in the final model. With an adjusted R-squared value of only 22.27%, the model explains less than a quarter of the variation in the cost of living, indicating that 77.73% of the variation is attributed to factors not captured in this study. This suggests that several important variables influencing the cost of living were not included in this study analysis. The limitation in variable selection may be attributed to various factors, including data availability constraints, the scope of literature review, and the focus on specific economic indicators. The exclusion of potentially significant variables may have contributed to the model's relatively low explanatory power. This limitation highlights the complexity of cost-of-living determinants and suggests the need for a more comprehensive variable selection in future research. Based on recent literature and empirical evidence, future studies should prioritize the inclusion of a more comprehensive set of variables identified as significant determinants of living costs. Drawing from Azmi et al. (2023) and Ismail et al. (2022), researchers should incorporate variables such as transportation costs, food prices, and utility expenses alongside the already identified factors of government subsidies, housing costs, education expenses, and healthcare costs. This expanded variable selection would help address the current model's limited explanatory power of 22.27% adjusted R-squared and provide a more complete picture of cost-of-living determinants.

Conclusion

This study was conducted to determine the factors contributing to the cost of living among households in Malaysia, utilizing time series data spanning 34 years from 1990 to 2023, sourced from the World Bank, Macro Trends, and the Department of Statistics Malaysia (DOSM). The investigation employed Ordinary Least Squares (OLS) regression analysis to examine the relationship between the cost of living as the dependent variable and six independent variables, which is consumer price index growth rate, population growth rate, tax rate, import rate, export rate, income inequality, and lending interest rate. Through rigorous preliminary testing, including correlation analysis and multiple rounds of Variance Inflation Factor (VIF) test, two variables which is Population Growth Rate and Export Rate were excluded due to multicollinearity issues. This result leaving four independent variables in the multiple regression analysis which is Tax Rate, Import Rate, Income Inequality, and Lending Interest Rate. The empirical findings from the multiple regression analysis, which demonstrated overall model significance with an F-statistical probability of 0.0222 and an adjusted R-squared of 0.2227, revealed that among the four remaining independent variables, only the Lending Interest Rate showed a significant positive relationship with the cost of living in Malaysia. This significant relationship indicates that changes in lending interest rates substantially impact household living costs, likely through their influence on borrowing costs for housing, vehicles, and other consumer goods. The model's adjusted R-Squared of 22.27% suggests that while lending interest rates play a crucial role in determining living costs, there are other potential factors not captured in this study that warrant further investigation. Henceforth, through these findings, this study successfully achieved its research objective by identifying lending interest rates as a significant factor affecting the cost of living among Malaysian households, while also highlighting the complexity of cost-of-living determinants in the Malaysian economic context.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Assessing the Influence of Digital Entrepreneurial Role Model, Innovative Cognition and Social Media Adroitness on Digital Entrepreneurial Intention Among University Students in Malaysia

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Abstract: Digitalization has caused significant changes in the evolution of entrepreneurial business models, evolving new digital business prospects and opportunities with the creation of online businesses. Digitalization form of entrepreneurial activity known as digital entrepreneurship. This provides new self-employment opportunities for university students to establish a new venture. This study investigates the social capital factors of digital entrepreneurial role model, innovative cognition and social media adroitness in influencing digital entrepreneurship intention among university students in Malaysia. Using purposive and convenience sampling methods, a sample of 399 data points was collected from university students in Klang Valley, Malaysia. The PLS-SEM analysis results showed that the digital entrepreneurial role model, innovative cognition and social media adroitness significantly influenced digital entrepreneurship among university students. The findings of this study provide meaningful implications for policymakers and educational institutions.

Keywords: *Digital entrepreneurship, Digital entrepreneurial role models, Social media adroitness, Innovative cognition*

1. Introduction

The digitalization revolution has brought changes in the business world. Digital technologies invention such as the internet, social media, mobile technology, and cloud technologies, create new forms of collaboration, resource management, new product and service development, and implementation (Markus & Loebbecke, 2013). The advent of digital advancements has created unparalleled prospects for entrepreneurship, fundamentally transforming the establishment and operation of businesses (Manea et al., 2021; Nguyen & Nguyen, 2024). The integration of emerging digital technologies (e.g., social media) "has transformed the nature of uncertainty inherent in entrepreneurial processes and outcomes as well as the ways of dealing with such uncertainty" Nambisan, 2017, p. 1029). The creation of the new digital venture that integrates digital technologies into their operations (Elia et al., 2020) creates a new type of business enterprise called digital entrepreneurship. Digital entrepreneurship refers to the pursuit of new business prospects using internet technology and media (Guthrie, 2014).

The emerging of social media sites such as Facebook, Instagram, WhatsApp, YouTube, and TikTok and e-commerce platforms such as Shopee, Lazada, Grab, and Food Panda are medium or places for entrepreneurs to explore new market and promote products and provide medium and opportunities to start up business and provides opportunities and potential marketplaces for digital entrepreneurs to startup businesses (Ahmad et al., 2022). These digital platforms enable a new start-up to minimize business expenses, decrease time and labor requirements, make market penetration easier, and reduce corporate risk (Ben Youssef et al., 2021).

The digital revolution has accelerated the growth of digital entrepreneurship in developing countries and increased opportunities for students to collaborate and connect with international peers. Digitalization reduces the barriers for tertiary students to initiate entrepreneurial endeavors. There were some studies that have examined the factors that affect the digital entrepreneurial intention of tertiary students (Nguyen & Nguyen, 2024; Li et al., 2024; Alferaih, 2022; Wibowo et al., 2023; Sobaih & Elshaer, 2022; Mir et al., 2022). Still, there is a lack of studies on factors that influence university students' digital entrepreneurial intentions, especially in the Malaysian context. Graduates should adopt a new mindset that embraces entrepreneurship as a means of creating value. Thus, it is crucial to understand factors that influence university students' intentions to

engage in digital entrepreneurship. It will help in developing efficient strategies and initiatives to promote digital entrepreneurship and boost the economy. Most of the previous studies mainly focused on the Theory of Planned Behavior; the present study validates an alternative theory within the emerging domain of entrepreneurship. This study enhances the current research on resourcefulness and entrepreneurship by investigating the impact of attributes related to personal social capital on the intention to engage in digital entrepreneurship.

The accomplishments and professional skills of a role model are perceived as a source of inspiration for creating better opportunities for the younger generation to establish entrepreneurial intent (as a career option) (Auken et al., 2006; Mungai & Velamuri, 2011). In addition to teaching about entrepreneurial behaviors and inspiring others to act in similar ways, role models can help people establish an entrepreneurial identity and transform one's anticipated potential into reality (Laviolette et al., 2012). Thus, an entrepreneurial role model refers to an individual's attitudes, behaviors, and actions that influence his/her desirability and credibility in choosing an entrepreneurial career path (Driga et al., 2005). It is imperative for entrepreneurs to have a personal entrepreneurial role or characteristics in managing strategies and making decisions by taking advantage of new prospects.

As the use of social media and the Internet grows rapidly, it is crucial to understand digital entrepreneurs' digital skills in operating digital platforms as a medium of business. Social capital is derived from interaction with established digital entrepreneurs, which increases the likelihood of aspiring or future entrepreneurs choosing digital entrepreneurship as a career path. Individuals' networks with embedded resources and specialized knowledge, which is referred to as human capital (Richardson, 1986), can be obtained through education, are frequently associated with the anticipated benefits of initiating a new business endeavor (Dutta et al., 2015). Furthermore, digital entrepreneurs have significantly transformed the worldwide business environment through innovative business strategies (Kraus et al., 2019). Innovativeness is a personality trait that reflects an individual's openness and willingness to embrace change (Hurt et al.,1977), in which successful entrepreneurs possess a greater innovative style of problem-solving (Buttner & Gryskiewicz, 1993).

An entrepreneur's capacity to act entrepreneurially can be gauged by the way they organize their network and the significance of their social capital. An entrepreneur's capacity to act entrepreneurially can be gauged by the way they organize their network and the value of their social capital. Social capital gives entrepreneurs the connections they need to take advantage of possibilities to leverage both human and financial resources (Thornton & Flynn, 2003). Thus, social capital may inspire potential entrepreneurs towards this career path. Exposure to entrepreneurial role models as a source of inspiration and learning and individual capital features, such as financial, social, and human capital, are crucial factors in new venture formation (Richardson, 1986; Mickiewicz et al., 2017). Furthermore, digital entrepreneurs have significantly transformed the worldwide business environment through innovative business strategies (Kraus et al., 2019). Innovativeness is a personality trait that reflects an individual's openness and willingness to embrace change (Hurt et al.,1977), in which successful entrepreneurs possess a greater innovative style of problem-solving (Buttner & Gryskiewicz, 1993). This study investigates factors influencing the intention of individuals to pursue digital entrepreneurship by considering social capital factors of innovative cognition and social media adroitness and the digital entrepreneurial role model.

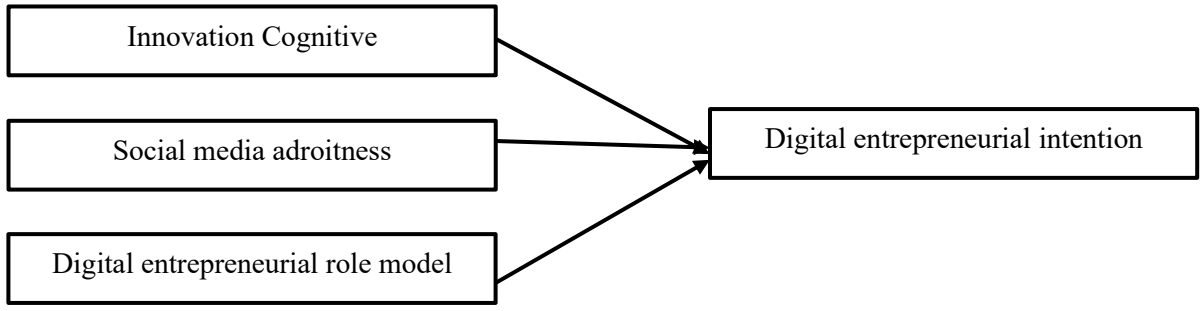
2. Literature Review

Social Capital Theory

Cognitive aspects are important in determining entrepreneurial career choice-making. Social capital facilitates the connections that enable an entrepreneur to access and utilize human and financial capital. Social capital refers to the degree of altruistic inclinations and mutual trust among individuals within society (Guiso et al., 2004) that is gained by individuals via social interactions to enhance their social capacity (Mahfud et al., 2020). Social networks are important for entrepreneurs to accomplish their entrepreneurial objectives (Hoang & Antonic, 2003) as "entrepreneurship is a result of the interplay of environments (i.e., social networks) and certain cognitive biases in entrepreneurs" (De Carolis & Saparito, 2006, p. 41). Social capital features such as the structure of the social network (e.g., frequency, strength, and density of social connections), the nature of the relationship of network members and shared resources have an impact on entrepreneurial intention (Malebana, 2016).

Social capital incorporates formal and informal forms of connections that are attained by individuals through their interaction with others in order to gain a desired outcome in the market (Liñán & Santos, 2007). Thus, social capital can be described as the capital that is acquired via social relationships (Lin, 2003). An individual's capital is made up of their domain-specific knowledge or human capital, financial resources, and networks with embedded resources, as stated by capital theory (Richardson, 1986; Mickiewicz et al., 2017). Basic cognitions, education, and abilities are human capital elements acquired by an individual that are crucial in the process of creating a new business (Marvel et al., 2016). Human capital can be assessed through digital proficiency, innovative cognition and adaptability in using social media as suggested by Mir et al. (2023). Using the theoretical framework of social capital theory, this study investigates the development of preference for digital entrepreneurship among university students in Malaysia. The research model is shown in Figure 1.

Figure 1: Research Model



Innovation Cognitive

Entrepreneurs' cognitive perspective includes beliefs, values, cognitive style, mental practices, and models used to identify and capitalize on opportunities and decision-making with available information and knowledge. Innovativeness is a personal trait that characterizes an individual's willingness to accept and adopt new ideas and changes (Hurt et al., 1977). Innovation is perceived as a distinctive trait of entrepreneurs; it is the ability to identify and exploit opportunities beyond others and offer inventive and unique solutions (Armstrong & Hird, 2009). There were studies that investigates the effect of innovativeness on entrepreneurial behavior from the aspect of readiness to change (Hurt et al., 1977), innovate capacity for problem-solving (Jackson, 1976), desire to approach things in a different way (Kirton, 1976), and intention to participate in entrepreneurial activities (Mirjana et al., 2018). Mirjana et al. (2018) and Mir et al. (2023) findings revealed that innovative cognitive style and entrepreneurial intention are positively related. The creative process and the introduction of new opportunities are strongly impacted by the innovative cognitive style (Mirjana et al., 2018). The hypothesis is proposed as:

H1: Innovation cognitive has a positive relationship with digital entrepreneurial intention

Social media adroitness

Social media is a powerful medium to convey and spread information to the end users. With the emergence of the Internet, its popularity and high application of social media platforms, it is important for digital entrepreneurs to be equipped with digital skills in using digital platforms as a medium to develop their career or business. Social adroitness refers to the great capacity to influence others to accomplish a specific objective and possesses social intelligence (Stuart & Abetti, 1990). Research on digital entrepreneurship has highlighted that possessing proficiency skills in the online environment needs to equips entrepreneurs to establish and maintain an internet-based group of consumers (Dhir et al., 2018) and create an online community (Standing & Mattsson, 2016; Talwar et al., 2020). Individuals who are actively engaging in social media and possess the ability to persuade and inspire family and friends to adopt social media (Lester et al., 2012; Mir et al., 2023) and acquire information from social media can cultivate individuals' intentions to be digital entrepreneurs. Mir et al., (2023) findings indicate the significant effect of social media adroitness on digital entrepreneurial intention. The following hypothesis is developed:

H2: Social media adroitness has a positive relationship with digital entrepreneurial intention

Digital entrepreneurial role model

A successful entrepreneur role model can serve as a source of inspiration that affects individuals' perception

in pursuing an entrepreneurial career (Gibson, 2004). The role model refers to a person's ability to learn to others according to social learning theory (Bandura & McClelland, 1977) and it is seen constructively in inspiring people to identify and acquire particular skills and acquire the knowledge needed to become entrepreneurs (Scherer et al., 1989; Lent et al., 1994; Bosma et al. 2012). Entrepreneurial role models offer direction and motivation (Nauta & Kokaly, 2001; Bosma et al., 2012; Walter & Dohse, 2009) that facilitates individuals to explore and undertake new business designs and opportunities in the early phases of the entrepreneurial activity (Fornahl, 2003). The entrepreneurial role model is a cognitive concept where an individual identifies certain traits in others who hold social roles similar to them and wishes to increase their perceived similarity by imitating such attributes (Gibson, 2004). An entrepreneurial role model provides useful insights that can decrease uncertainty in setting up a new venture (Minniti & Nardone, 2007). Entrepreneurial role model was found to have a significant effect on entrepreneurial intention (Yang, 2019; Fellnofer, 2017; Jin et al., 2023; Al Halbusi et al., 2022), while some findings do not support the significant effect of entrepreneurial role model on entrepreneurial intention (Efrata et al., 2016; Karimi et al., 2013). Mir et al. (2023) found a significant positive effect of the digital entrepreneurial role model on digital entrepreneurial intention. Thus, it is hypothesized that:

H3: A Digital entrepreneurial role model has a positive relationship with digital entrepreneurial intention

3. Methodology

This is a quantitative study that is conducted through a self-administered survey to assess the impact of entrepreneurial role model, social media adroitness and innovative cognition on university students' digital entrepreneurship behavior intention. A convenience sampling method was used in collecting data among the university students in Klang Valley, Malaysia. Questionnaires were distributed through the online platform Google Forms. The sample size of the study was computed using GPower version 3.1.9.3, a statistical power analysis software (Faul et al., 2007) with a power of 0.95 and an effect size of 0.15 (Cohen, 1992). The minimum sample size required, computed by GPower, is 119. A total of 430 responses were received and 399 (92.8%) questionnaires are usable for data analysis. The profile of the respondents is shown in Table 1.

Table 1: Respondents' characteristics

Variable	Frequency	Percentage
Gender		
Female	262	65.70%
Male	137	34.30%
Education Institution		
Private Higher Education Institution (IPTS)	56	14.00%
Public Higher Education Institution (IPTA)	343	86.00%
Program		
Foundation program	28	7.00%
Diploma	106	26.60%
Bachelor degree / Ijazah sarjana muda	248	62.20%
Postgraduate	17	4.20%
Did you pursue any entrepreneurship courses offered by the university?		
No / Tidak	214	53.60%
Yes / Ya	185	46.40%
Are you interested in starting your own business after graduating?		
No / Tidak	149	37.30%
Yes / Ya	250	62.70%
Do you plan to start your own business after graduating?		
No / Tidak	206	51.60%
Yes / Ya	193	48.40%

The questionnaire of this study is constructed by adopting from past studies. Five items used to measure digital

entrepreneurship behavioral intention were adapted from Zamzami (2021). Measurement items for social media adroitness (6 items) were adopted from Belch et al. (2005), for innovative cognition (8 items) were adopted from Mueller and Thomas (2001), and for the digital entrepreneurial role model were adopted from Fellnhofer and Mueller (2018). All items in the questionnaire are measured using a 5-point Likert scale ranging from 1= strongly disagree to 5 = strongly agree.

The study used data analysis techniques, partial least squares structural equation modelling (PLS-SEM) (Hair et al., 2022) to examine the hypotheses relationship in the study as it predicts the multifaceted theoretical relationship between variables (Hair & Alamer, 2022) and it is applicable for non-normal data. The evaluation of the normality test using online WebPower of Mardia's multivariate skewness and kurtosis indicates that the data of this study is not normally distributed, as the coefficients' p-values are less than 0.05. The PLS-SEM estimation was using SmartPLS 4 version (Ringle et al., 2024). The PLS-SEM analysis comprises the measurement and structural models.

As the data were collected on a single-source basis, the issue of common method bias might have appeared (Podsakoff et al., 2003). Following Kock (2015) and Kock and Lynn (2012), this study applied full collinearity techniques to detect the presence of common method bias. The full collinearity test results are shown in Table 2. The VIF values of all the variables less than 3.3 indicate that single-source bias is not an issue.

Table 2: Full Collinearity Test

Variable	SMA	INNOV	ROLE	ENTRE
VIF	1.685	1.309	2.212	2.489

Note: SMA = Social Media Adroitness, INNOV = Innovative Cognition Digital, ROLE = Entrepreneurial Role Model, ENTRE = Digital Entrepreneurship Behavior Intention

4. Data Analysis

The reliability and validity of the model are evaluated with a measurement model through convergent validity and discriminant validity (Hair et al., 2022). The convergent validity assessment includes factor loadings, average variance extracted (AVE) and composite reliability (CR). The values of factor loadings should be ≥ 0.708, the AVE should be ≥ 0.5 and the CR should be ≥ 0.7. As shown in Table 3, the factor loadings greater than 0.708, the AVEs are higher than 0.5 and the CRs exceed 0.7, confirming the reliability and convergent validity of the model.

Table 3: Measurement

Construct	Item	Loadings	Composite reliability (CR)	Average variance extracted (AVE)
Digital entrepreneurship behavioral intention	ENTRE1	0.910	0.956	0.814
	ENTRE2	0.927		
	ENTRE3	0.913		
	ENTRE4	0.903		
	ENTRE5	0.858		
Innovative cognition	INNOV3	0.781	0.838	0.564
	INNOV4	0.717		
	INNOV5	0.750		
	INNOV6	0.755		
Entrepreneurial role model	ROLE1	0.838	0.937	0.749
	ROLE2	0.890		
	ROLE3	0.903		
	ROLE4	0.852		
	ROLE5	0.844		

Social media adroitness	SMA1	0.776	0.907	0.661
	SMA2	0.787		
	SMA3	0.822		
	SMA4	0.867		
	SMA5	0.810		

The discriminant validity of the model was assessed using the HTMT criterion as suggested by Henseler et al. (2015) and Franke and Sarstedt (2019). As shown in Table 4, the values of HTMT were all lower than the stricter criterion of ≤ 0.85, indicating the respondents' understanding of the 4 constructs is distinctive; thus, discriminant validity is confirmed.

Table 4: ***Discriminant Validity (HTMT)***

	1	2	3	4
1. Digital entrepreneurship behavior intention				
2. Innovative cognition	0.472			
3. Entrepreneurial role model	0.783	0.357		
4. Social media adroitness	0.629	0.561	0.572	

The structural model was assessed using a bootstrapping procedure of 10000 resamples for the path coefficients, the standard errors, t-values and p-values Becker et al., 2023). Table 5 presents the results of the structural model on the hypotheses developed.

The R^2 value of 0.598 indicates that 59.8% of the variation in digital entrepreneurship behavior intention is explained by all three 3 predictors. Innovative Cognition (β = 0.133, p< 0.01), Entrepreneurial Role Model (β = 0.582, p< 0.01) and Social Media Adroitness (β = 0.211, p< 0.01) were all positively related to Digital Entrepreneurship Behavior Intention; thus, H1, H2 and H3 were supported.

Table 5: ***Hypothesis Testing***

Hypothesis relationship	Std beta	Std error	t-value	p-value	BCI LL	BCI UL	f^2	R^2
H1: INNOV -> ENTRE	0.133	0.043	3.054	0.001	0.061	0.203	0.035	0.598
H2: ROLE -> ENTRE	0.582	0.047	12.307	p<0.001	0.501	0.658	0.615	
H3: SMA -> ENTRE	0.211	0.05	4.209	p<0.001	0.13	0.294	0.071	

Additionally, a predictive relevance test, PLSPredict, was conducted, a holdout sample-based procedure that generates case-level predictions on an item or a construct level, a 10-fold procedure as proposed by Shmueli et al. (2019). If the differences of all items of PLS-LM root mean square error (RMSE) were lower than LM RMSE, there is strong predictive power; if all items' PLS-SEM RMSE are higher than LM RMSE, predictive relevance is not confirmed, while if the majority of PLS-SEM RMSE are lower than LM RMSE, there is moderate predictive power and if a minority of PLS-SEM RMSE is lower than LM RMSE, then there is low predictive power. Based on Table 6, all the PLS-SEM RMSEs were lower than the LM model; thus, we can conclude that the model has a strong predictive power.

Table 6: PLS Predict

	PLS-SEM		LM	PLS-SEM - LM
Item	Q^2predict	RMSE	RMSE	RMSE
ENTRE1	0.529	0.759	0.763	-0.004
ENTRE2	0.495	0.788	0.802	-0.014
ENTRE3	0.466	0.799	0.818	-0.019
ENTRE4	0.482	0.76	0.782	-0.022
ENTRE5	0.408	0.821	0.843	-0.022

Discussion

This study investigates the influence of digital entrepreneurial role model, innovative cognition and social media adroitness on digital entrepreneurial intention among university students in Malaysia. The findings show that innovative cognition has a significant influence on entrepreneurial intentions is consistent with Mirjana et al. (2018) and Mir et al. (2022) indicate that successful digital entrepreneurs acquire an innovative cognitive style. Personal innovation is positively related to entrepreneurial intentions in technology-related fields (Dutta et al., 2015). Successful entrepreneurs tend to be more innovative in problem-solving and greater willingness to adapt and embrace change (Buttner & Gryskiewicz, 1993). As innovativeness is a personality trait (Hurt et al., 1977), individuals who possess a higher degree of innovativeness with high acceptance and adaptation towards changes, leading them to try doing things differently leading them to have a higher intention to be a digital entrepreneur.

Analysis results indicate that individuals who actively engage in social media platforms and have their ability to effectively motivate and inspire others to use social media may have high desirability to engage in a creative venture, as suggested by Lester et al. (2012). High adroitness in persuading people, especially peers and family members, using social media platforms to search and obtain products and sales information (Mir et al., 2022). Social media adroitness strengthens entrepreneurs' determination to transition to the digital sphere. Thus, entrepreneurs must possess a certain level of social media proficiency in establishing and sustaining a group of internet-based consumers and building an online community.

Findings of the study on the significant effect of digital entrepreneurial role model on digital entrepreneurial intention of university students are in line with Mir et al. (2022) and Al Halbusi et al. (2022) for Iraqi university students. This supports the significance of successful entrepreneurial role models in influencing entrepreneurship.

Intention. Exposing potential entrepreneurs to various favorable entrepreneurial role models can inspire university students to engage in digital ventures.

5. Conclusion and Implications

Based on the analysis of the partial least squares structural equation modelling, the empirical results were consistent with the theoretical measurement model for both the digital entrepreneurial role model, innovative cognition and social media adroitness on digital entrepreneurial intention among university students in Malaysia. The research outcomes will provide information specifically relevant Malaysian environment, contributing to the existing knowledge and insight on the digital entrepreneurial intentions of university students in fostering the economic development of the country.

This study contributes to the existing literature by considering social media adroitness as a relatively unique factor, as suggested by Mir et al. (2022) in the realm of digital entrepreneurship. Social media capacity and usage are not sufficient to position oneself as a viable online business. This study emphasized the development of online social capital by focusing on theoretical perspectives on the significance of individual-level resources in the realm of digital entrepreneurship. Furthermore, our study contributes empirical evidence on the influence of individual networks and the ability to persuade the social media community in accessing specific context information to initiate a digital business.

As the business world moves towards digitalization, factors enhancing individual capability to operate in the digital realm are increasingly important. Academic institutions have been recognized as significant in facilitating and providing young people with opportunities to acquire entrepreneurial knowledge and improve their skills (Mirjana et al., 2018). It is important to foster individual knowledge and skills and as individual self-confidence, for engaging in entrepreneurial activities, as well as to generate broader social awareness (Mirjana et al., 2018). So, the entrepreneurial education system should be designed to provide related and applicable information and practical experience and also inspire students' innovation cognition towards entrepreneurial endeavors.

Educational institutions in Malaysia typically offer training or academic programs to provide students' digital

skills to enhance their ability to set up new digital ventures. Social media adroitness was found to have a significant effect on digital entrepreneurial intention for university students. Thus, it is important to enhance university students' ability to build an online community and create and maintain a group of internet users.

To enhance the effectiveness of the digital entrepreneurial role model function, it is imperative to provide a role model that possesses a well-defined character to students. Thus, exposure to university students through academic and non-academic programs and training opportunities that encounter with digital entrepreneurial role model could potentially enhance their digital entrepreneurial aspirations. Well well-understanding of an entrepreneurial role model for students will enhance their ability to identify with and reflect upon its character. Although this study provides valuable insights into the influence of social capital factors—namely, digital entrepreneurial role models, innovative cognition, and social media adroitness—on digital entrepreneurship intentions among Malaysian university students, several limitations should be acknowledged.

First, the study employed a cross-sectional design, which captures perceptions and intentions at a single point in time. This limits the ability to establish causal relationships between variables. A longitudinal approach in future studies would allow for a better understanding of how these intentions develop over time. Second, the sample was restricted to university students in the Klang Valley region, which may not represent the broader population of university students across Malaysia or in other cultural contexts. Third, the study may be subject to common method bias or social desirability bias, despite the use of collinearity diagnostics to minimize this issue. Future research could benefit from incorporating multiple data sources, including peer or instructor evaluations and actual entrepreneurial behaviour data.

Fourth, other potential influencing factors, such as personality traits, digital literacy, institutional support, and government policies, were not included but may also significantly impact digital entrepreneurship intention. Lastly, qualitative methods such as interviews or focus groups could provide deeper insights into the motivations and challenges faced by aspiring digital entrepreneurs. Future research should address these limitations to enhance findings in the context of digital entrepreneurship education and policy development.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Macroeconomic Factors Driving Inflation: A Panel Data Study of ASEAN Countries

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Abstract: The increase in price for consumer goods and services has an impact on the economic growth of a country. Many of the previous studies had been done to determine what really causes inflation across many countries. Referring to the existing variables that impact the growth of inflation, this study aims to ascertain what factors cause inflation in four selected countries, namely Malaysia, Indonesia, Thailand and Vietnam. The study also investigates the relationship between inflation with several independent variables, which consist of money supply, interest rate, unemployment, gross domestic product, exchange rate, government expenditure and imported goods and services. The data used in this study were obtained from various sources such as the World Bank, the International Monetary Fund (IMF), as well as Eikon. The type of research in this study is panel data, consisting of time series from the year 2008 to 2023 annually. The diagnostic tests conducted include a normality test, a Variance Inflation Factor (VIF) test, a Modified Wald Test, as well as a unit root test for each variable. To estimate the panel data, Pooled Ordinary Least Squares (POLS) is used. The study finds that among seven variables, government expenditure, interest rate and imported goods and services significantly affected the inflation. Interest rate and imported goods and services have a positive relationship with inflation, while government expenditure has a negative relationship with inflation.

Keywords: *Inflation, ASEAN Countries, Macroeconomic variables, Pooled Ordinary Least Squares (POLS), Panel data analysis*

1. Introduction and Background

Inflation is a global issue that has persisted despite extensive efforts from policymakers, economists, and financial institutions. It continues to impact economies all over the world, affecting individuals, businesses, and governments. Ming-Yu Cheng and Hui-Boon Tan (2002) stated that inflation causes problems and messes with the economy, possibly affecting economic growth. But, as we all know, fixing inflation is not easy. To manage it successfully, it is crucial to accurately identify its underlying causes. An incorrect diagnosis may result in applying inappropriate remedies, which could inadvertently harm the economy. Unveiling the determinants of inflation is crucial as it is one of the key factors to maintain a country's macroeconomic equilibrium and formulate judicious economic policies, particularly within rapidly evolving economies. Continuous pressure of inflation was one of the factors of the gradual decline of economic growth of Southeast Asia in the second quarter of 2023, from the strong growth in 2022, along with other factors, including a global economic downturn, low commodity prices, and tight monetary policies (Bugrov, Dhara, & Kamarudin, 2023).

Historically, Malaysia, Indonesia, Thailand and Vietnam, which are among the developing countries in Southeast Asia, have experienced tough times relating to the inflation issue as their economies were also affected by what is happening globally. For instance, Malaysia experienced the highest level of inflation in March 1974 at the rate of 17.3% due to the sudden increase in oil prices (Chiew & Sek, 2019), caused by the 1973 oil crisis. An increase in oil prices affects the business costs. This will increase the price of goods and services available. The inflation rate also increased during the Asian financial crisis in 1997 and 1998, from 2.7% to 5.3% where the depreciation rate of the Malaysian Ringgit had reached 28.2% against the US Dollar (Chiew & Sek, 2019). According to World Bank Open Data, Indonesia and Thailand had encountered a high inflation rate of 1,136.254% in 1996 and 24.314% in 1980, respectively. The increase in money supply in Indonesia was one of the factors, where there was an increase of almost fivefold in 1965. Meanwhile, in Thailand, their economy suffered from the sudden increase in oil prices as well as the global recession from 1980 to 1985 (Krongkaew, 1999). To further discover the effects of inflation, rising inflation has a direct

relationship with rising costs for products and services, which reduces customers' purchasing power as well as raising the price of goods and services (Yusof et al, 2021). People are immediately impacted by this decrease in purchasing power, which limits their capacity to make purchases for necessities.

Therefore, this study intends to determine the factors of inflation in selected countries, specifically Malaysia, Indonesia, Thailand, and Vietnam, focusing on the unemployment rate, exchange rate, Growth Domestic Product (GDP), interest rate, import volume of goods and services, money supply (broad money) and general government total expenditure. This paper contributes to the government policies, perhaps in tightening monetary policy, considering giving subsidies, and controlling the fiscal policy spending. If the government fails to control inflation, the most significant impact is substantial economic instability. This includes weakening the currency, which drives up import costs and throws off the trade balance, and raising interest rates, which makes borrowing more expensive and slows down economic activity. In addition, understanding and accurately forecasting inflation is critical for policymakers, particularly central banks, as it informs monetary policy decisions aimed at maintaining economic stability (Sengupta et al., 2024). In addition, controlling the factors that contribute to inflation would also assist individual in managing their spending pattern and improve impulse buying.

This article is structured as follows. The next section explains the empirical studies on the impact of inflation in various countries and aspects. Then, it continues to explore the methodology employed in this study. Moreover, the key findings and analysis are explained in section four of the article. The final part of this article will conclude the contents together with the implications and direction of future research.

2. Literature Review

Various theories related to the economic determinants have been highlighted to explain the relationship between variables. The underpinning theories that are related include:

Keynesian theory

This underpinning theory has been developed by John Maynard Keynes (1883–1946), who is regarded as the founder of modern macroeconomics. One of the important points in this theory is explaining aggregate demand, which is measured by the sum of spending by households, businesses, and the government. The aggregate demand is the most important driving force in an economy, whereby if the aggregate demand is insufficient, recession and unemployment could affect the country's economy. He added, Keynesian economics provides insights into the relationship between interest rates, inflation, and overall economic activity, especially in the short run. This theory also emphasized the government's intervention to stabilize the economic condition. In the situation of recession, the government will increase spending or cut taxes to boost aggregate demand. This can help to close the output gap and reduce unemployment (Greenlaw & Shapiro-Ilan, 2018; Jahan et al., 2014). Government spending can also drive up demand for goods and services, potentially leading to demand-pull inflation (George-Anokwuru & Ekpenyong, 2020).

Empirical Evidence on the Variables

There have been many studies conducted to find the determinants of inflation that significantly affect the inflation rate, for instance, the consumer price index, which includes Interest Rate, GDP, Unemployment Rate, Exchange Rate, Money Supply, Government Total Expenditure and Imported Goods and Services. According to Ani Movsisyan et al. (2024) study stated that inflation functions like a tax increase that reduces household purchasing power, making essential commodities such as food and medication less affordable, which in turn triggers a series of health-related issues. This situation could lead to a decline in living standards, as people nowadays have to spend more on things than before to obtain the same quantity of goods and services. These economic pressures can worsen existing inequalities, as people with lower incomes will be more affected by rising costs.

In addition, Jayalakshmi (2023) explores the causes and consequences of inflation in India highlighted Inflation, while decreasing consumer purchasing power and causing a mismatch between supply and demand, is essential to the economy as it raises the cost of goods and services, thereby boosting output and contributing to economic expansion. Besides, people and businesses will be more careful with their spending, which helps

keep the economy from becoming more unstable.

Money supply and inflation

An empirical study done by Gyebi & Boafo (2013) that used the Ordinary Least Squares (OLS) model in their analysis found that money supply had a significant impact on inflation in Ghana. The inflation rate will exist in a condition of growing money supply than the economy's ability to produce goods and services, and thus will tend to raise prices. Hashim et al. (2014) also agreed that money supply has a significant relationship with inflation. Further, the impact of short and long-run money supply on inflation has been studied by Lim and Sek (2015). The findings demonstrated that money supply has a short-run influence on inflation in low-inflation countries, which leads to a positive impact on inflation. Meanwhile, the excess money supply has a significant negative impact on inflation in high-inflation countries, which means that an increase in the excess money supply will increase the rate of inflation. However, a contradictory relationship was found by Salim et al (2021) in their study of determinants of inflation in 10 selected countries from the period of 2006 to 2015. He found that the money supply has a significant negative relationship with inflation at 1% level, which means that an increase in the money supply will decrease inflation. The increase in the money supply is faster than the growth in real output will cause inflation because more money is chasing the same number of goods. Hence, the formulated hypothesis can be explained by:

H1: There is a positive relationship between money supply and inflation rate.

Interest rate and inflation

Interest rate is one of the determinants that influence the inflation rate. It signifies the cost of borrowing and is typically expressed as a proportion of the principal sum (the amount borrowed) to modulate economic activity, with a primary objective of maintaining price stability (Efendi et al., 2023). According to the Fisher effect theory, the relationship between interest rates and inflation is positive, as the lenders will demand higher nominal interest rates in the long run to maintain their return when they want to adjust for inflation (Fisher,1930). In terms of monetary policy, central banks will raise interest rates when inflation is high to maintain price stability, hence, to control spending by consumers (Mankiw, 2021). Salim et al. (2021) studied the factors of inflation in selected countries from the period of 2006 to 2015, which used the Pooled Ordinary Least Squares, Random Effect Model, and Fixed Effect Model found that interest rate has a negative and significant relationship with inflation in all models. An increase in interest rates typically leads to reduced borrowing and spending, thereby dampening aggregate demand and exerting downward pressure on inflation. Conversely, a decrease in interest rates encourages borrowing and investment, stimulating economic activity and potentially leading to inflationary pressures (Sanghvi, 2024). Keynesian macroeconomic theory posits an inverse relationship between interest rates and investment, where higher interest rates increase the cost of borrowing, leading to a reduction in investment, while lower interest rates make borrowing more attractive, encouraging investment (Chowdhury et al., 2024). Thus, the hypothesis can be written as:

H2: There is a negative relationship between interest rate and inflation rate.

Unemployment rate and inflation

Another indicator which commonly used to measure the impact on the inflation rate is the unemployment rate. Kurniasih & Kartika (2020) studied the relationship between inflation and unemployment rate and found a negative and significant impact on inflation in the long run for the period of 1988 to 2017 in Indonesia. Increasing the unemployment rate in the long run will influence inflation to go down due to lower demand for goods and services caused by limited income. It is consistent with the Phillips curve, which describes the theoretical inverse relationship between unemployment and inflation, suggesting that as unemployment decreases, inflation tends to increase, and vice versa (Lewin et al., 2025). The reason is that when unemployment falls, wages tend to rise due to increased competition for labor, leading to higher production costs and ultimately higher prices for goods and services (Pfajfar & Winkler, 2024). On the other hand, lower unemployment rates lead to higher inflation as it will increase the demand for labor, which could drive up wages and prices (Rolim, 2024). Additionally, Al-Mustafa (2023) identified a negative and significant relationship between the unemployment rate and inflation in the short run.

The hypothesis for this relationship is:

H3: There is a negative relationship between the unemployment rate and the inflation rate.

Growth Domestic Product (GDP) and inflation

Gross domestic product (GDP) is also frequently used to measure a country's economic output and is one of the key indicators of economic transactions and aggregate demand. The demand for goods and services will increase when GDP growth is higher, as it leads to pressure on prices, particularly when the economy is at full capacity operations, hence, inflation occurs in the economy. Conversely, when the demand decreases, it will slow the GDP growth and result in deflation (Lastauskas & Nguyen, 2024). Changes in GDP growth can also shape inflation expectations among economic agents, including consumers, businesses, and investors. Based on these findings, we can formulate the following hypotheses:

H4: There is a positive relationship between GDP and the inflation rate.

Exchange rate and inflation

The exchange rate plays a pivotal role in influencing the changes in inflation, particularly in open economies. Exchange rate movements can directly impact the prices of imported goods and services, as well as influence overall inflation levels (Lastauskas & Nguyen, 2024). A devaluation of the domestic currency would contribute to inflation of the imported goods and services as it becomes more expensive for domestic consumers (Yoldaş, 2024). This effect is particularly pronounced for countries that rely heavily on imports or have a significant portion of their trade denominated in foreign currencies. Contrarywise, a strengthening domestic currency can reduce imported inflation, which causes a buffer against rising prices. However, the impact of exchange rate fluctuations on inflation is not always straightforward and can be influenced by various factors, including the degree of pass-through from exchange rates to prices, the structure of the economy, and the credibility of monetary policy. Exchange rate fluctuations can have broad economic impacts, influencing international trade terms between countries such as China and Japan (Liu, 2024). Hence, the hypothesis would be:

H5: There is a negative relationship between the exchange rate and inflation rate.

Government Expenditure and Inflation

Government expenditure can exert a significant influence on inflationary pressures within an economy. According to George-Anokwuru and Ekpenyong (2020), increased government expenditure—particularly when funded through borrowing or money creation—can significantly raise aggregate demand. When this occurs in an economy nearing full capacity, it may contribute to inflationary pressures. This effect is applied when government spending is directed towards sectors with limited supply elasticity, causing prices to rise more rapidly in response to increased demand. The relationship between government expenditure and inflation is complex and multifaceted, influenced by the fiscal policy stance, the level of economic activity, and the structure of the economy. Based on the Okunlola et al. (2024), government expenditure demonstrated a positive impact on economic growth, referring to Keynesian economics. However, other studies suggest that public expenditure may have negative effects under certain circumstances (Sosvilla-Rivero et al., 2025). Investment in critical sectors such as education and infrastructure can boost economic activity and enhance productivity and competitiveness over the long term (Garg et al., 2024). Hence, the hypothesis is:

H6: Is there a positive relationship between government expenditure and the inflation rate?

Imported goods and services and inflation

Imported goods and services exert a notable influence on inflation dynamics, particularly in economies with significant international trade exposure. Changes in the prices of imported goods and services, driven by factors such as exchange rate fluctuations, global commodity prices, and trade policies, can directly impact domestic inflation levels. A depreciation of the domestic currency, for example, tends to increase the cost of imported goods, leading to imported inflation, as domestic consumers face higher prices for these products (Aragaw, 2024).

H7: Is there a positive relationship between imported goods and services and the inflation rate?

3. Research Methodology

This study employed a quantitative method in measuring the relationship between macroeconomic variables towards inflation. The macroeconomic variables that are used include money supply, interest rate, unemployment, GDP, exchange rate, government expenditure, and imported goods and services. The sample of this study is Malaysia, Indonesia, Thailand, and Vietnam, with the time frame from 2008 to 2023. The listed variables were chosen because it is crucial in determining inflation rates, as they provide a comprehensive view

of the overall economic condition (Immanuel & Yayamo, 2020). Data is obtained from the International Monetary Fund website, Eikon Database, and the World Bank website. As this study integrates time series and cross-sectional data, the panel data analysis method is more appropriate to explain the relationship between variables. Hence, the Pooled Ordinary Lease Square model is expressed as below:

$$INF_{it} = \alpha + \beta_1 MSS_{it} + \beta_2 IR_{it} + \beta_3 UNEMP_{it} + \beta_4 GDP_{it} + \beta_5 ER_{it} + \beta_6 GE_{it} + \beta_7 IMP_{it} + \varepsilon_{it}$$

Where;

INF_{it} = Consumer Price (annual% %) of country i during year t
MSS_{it} = Broad Money Growth of country i during year t
IR_{it} = Interest rate on lending by the central bank (%) of country i during year t
$UNEMP_{it}$ = unemployment rate (%) of country i during year t
GDP = GDP growth (%) of country i during year t
ER_{it} = Official exchange rate (LCU per US$, period average in country i during year t
GE_{it} = Government expenditure of country i during year t
IMP = Imported goods and services of country i during year t
$\mathcal{E}$ *it* = error term
and α is an intercept and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ is the model's variable.

For the purpose of assessing the robustness or validity of the regression model and the outcomes it produces, panel data diagnostic checks are required. The diagnostic tests that are conducted for this study are normality, unit root test, and variance inflation factor test.

4. Results and Analysis

Unit Root Test

Table 1: Unit root test

Test	Inflation	MSS	IR	UNEMP	GDP	ER	GE	IMP
LLC	-4.5041***	-4.9884***	-4.9434***	-2.9198***	-5.8128***	-2.12132**	-3.3856***	-5.7285***
IPS	-5.2090***	-4.6830***	-4.1438***	-1.7793**	-3.8058***	-2.22029**	-4.1935***	-4.5017***
ADF	39.0534***	35.4379***	31.6152***	15.8377*	29.2784***	17.9946**	31.8757***	34.5567***
PP	82.2599***	59.1382***	55.3001***	15.7178*	37.1089***	28.9937***	61.4776***	52.6376***

Table 1 indicates the findings of the unit root test, which uses Levin, Lin & Chu (LLC), Im, Pesaran & Chin (IPS), ADF Fisher Chi-Square (ADF), and PP Fisher Chi-Square (PP). Referring to the table, it indicates that all variables are stationary either at the level or at the first difference lag.

Pooled Ordinary Least Squares (POLS) result

Table 2: Regression result using the POLS Model

Dependent variable: Inflation	
Independent variable:	
Money Supply (MSS)	-0.0595
Interest Rate (IR)	1.1887***
Unemployment Rate (UNEMP)	0.0937
Growth Domestic Product (GDP)	-0.3023
Exchange Rate (ER)	-3.8206
Government Expenditure (GE)	-0.6605*
Import of goods and services (IMP)	0.0883*

R-squared	0.5620
F-statistic	9.5302***
Observations	60

The regression result in Table 4.2 reveals that the interest rate (IR) has a positive and significant correlation with inflation, as indicated by a coefficient of 1.1887 and a p-value of 0.0001. It means that, to control inflation from rising for a long period, the central bank will keep on maintaining a high nominal interest rate to make borrowing more expensive and attract more savings. Hence, it will slow down consumer spending and people prefer to save their money since the returns are better. It is in opposition to the Keynesian theory and thus, the hypothesis H2 is rejected. This finding is in line with previous studies by Adu and Marbuah (2011) and Uddin et al. (2014) but contrasts with the research by Salim et al. (2021) and Ayub et al. (2014), which observed a negative impact on the dependent variable. After the COVID-19 pandemic, the economic conditions are relatively unstable for most countries; thus, some adjustments have been made to tailor to the conditions. Such as the Malaysian government has determined the rate of Overnight Policy Rate (OPR) at 3.00 percent since May 2023 to stabilize inflation after giving incentives such as a moratorium during the post covid period.

Similarly, the import volume of goods and services (IMP) exhibits a positive and significant relationship with inflation, as shown by a coefficient of 0.0883 and a p-value of 0.0160; thus, the H7 is not rejected. This result aligns with the findings of Arif & Ali (2012) and Bashir et al. (2011) in the long run, but differs from Hashim et al. (2014), who found a negative and insignificant relationship. Inflation can occur when the price of goods and services increases, which may happen due to exchange rate fluctuations or higher global demand. As imported items become more expensive, the overall price level in the country can rise. In addition, when domestic demand for goods is higher than what producers can supply, prices tend to increase. To meet this excess demand, a country may increase its imports. If these imports are costly, they can further contribute to inflation. Therefore, both global and local factors can cause prices to rise.

In contrast, Government expenditure (GE) demonstrated a negative and significant impact on inflation, with a coefficient of -0.6605 and a p-value of 0.0103. The finding strongly failed to reject H6. This result is in accordance with the findings of George-Anokwuru & Ekpenyong (2020) in the long run, but contrasts with Nguyen (2014), Shifaniya et al. (2022), and Nguyen et al. (2022), who found that government expenditure positively and significantly influences inflation. In a general situation, government expenditure has a positive relationship with inflation, as increased spending raises aggregate demand, which can lead to upward pressure on prices. However, for certain conditions, if the spending results in higher employment and improved productivity, it can expand the economy's output capacity. In such cases, especially over the long term, the supply-side improvements may help offset inflationary pressure. Therefore, under specific conditions, for example, when economic slack or when investing in productive capacity, higher government spending may contribute to stable or even lower inflation. The finding contradicts the Keynesian theory, which states a positive relationship between government spending and inflation. However, the relationship could be negative if the output or economy is already near full capacity, thus the government will implement fiscal tightening, which involves the government will cut spending and increasing taxes. Therefore, the aggregate demand will fall and pressure the inflation to drop via less borrowing and higher interest rates. To further look at the performance of countries such as Thailand, where the country implemented a 145billion cash-transfer "digital wallet" aimed at boosting consumption. However, the inflation stayed low (0.6–1.1%) due to loose capacity and external deflationary forces (Dixon, 2024). Central banks often raise interest rates to combat inflation (Ibrahim et al., 2023).

Overall model indicates that three variables are significant and fit to explain the model of the relationship between macroeconomic variables towards the inflation rate. The R-squared shows 56.20% variation in the inflation rate (INF) can be explained by the significant independent variables, which are interest rate, government expenditure and import goods and services. The lower R-squared is contributed from the high noise or randomness in the data due to the cross-sectional sample and period being taken into account. Besides, the lower number of observations also resulted in the weakness of the relationship between variables.

Diagnostic Test

Table 3: Normality test

	INF	MSS	IR	UNEMP	GDP	ER	GE	IMP
Skewness	2.849037	1.138590	1.120291	0.705853	-1.533747	-0.947059	0.283494	-0.361295
Kurtosis	13.74358	4.336262	4.935013	2.535322	6.405019	3.226461	2.638046	2.679841

Based on the table above, the inflation variable has a 2.849037 skewness, which means that the distribution is skewed to the right. The unemployment rate has a value of 0.705853, which means that the distribution is slightly skewed to the right. Gross domestic product has a value of -1.533747 that the distribution is skewed to the left. Next, for the exchange rate, the figure is -0.947059, which shows that the distribution is slightly skewed to the left. Additionally, the Interest Rate has a positive skewness which is 1.120291 from the distribution. Broad money growth has a value of 1.138590, and the distribution is skewed to the right. Surprisingly, Government expenditure has a near-zero skewness, which indicates a symmetrical distribution which is 0.283494. Lastly, for skewness, imported goods and services also have a near-zero but negative skewness, which means it skewed to the left, although very slightly at -0.361295.

Variance Inflation Factor (VIF)

Table 4: Multicollinearity result

Variable	Centered VIF
MSS	1.197154
IR	1.592154
UNEMP	1.058069
GDP	1.681282
ER	1.130587
GE	1.537887
IMP	1.417846

The Variance Inflation Factor (VIF) test is utilized to identify if there is a presence of multicollinearity among the independent variables. Multicollinearity appears when independent variables in the linear regression are heavily correlated. Based on Table 4.3, the scores for each variable were found to be below 5, which indicates that a multicollinearity issue does not exist between the independent variables.

5. Implications and Recommendations

Identifying the factors that will influence inflation is crucial to the economic players. The findings show that the relationship between inflation and interest rates holds a significant positive implication for central banks as policymakers. Central banks are charged with upholding the stability of prices, and often set interest rates to influence inflation levels. By regulating the interest rates, the cost of borrowing and spending in the economy can be controlled by central banks. When inflation rises above the target level, central banks typically raise interest rates to cool down economic activity and reduce price pressures. Conversely, lowering interest rates can stimulate economic growth and inflation when it is below target or the economy is sluggish.

The relationship between government expenditure and inflation carries important implications for central banks. Typically, increased government spending raises aggregate demand, which can lead to higher inflation

if the economy is operating near full capacity. However, empirical results may vary by country and context. For instance, in some regression analyses, government spending appears to hurt inflation, possibly due to its role in boosting long-run supply or stabilizing output during recessions. These mixed findings suggest that policymakers should carefully consider the composition and context of fiscal policy when assessing its inflationary effects. Moreover, imported goods and services can significantly impact inflation, particularly when their prices increase due to global supply shocks or exchange rate depreciation. As such, central banks may analyze which imported items contribute most to domestic inflation. Since the exchange rate affects the cost of imports, central banks should also monitor the foreign exchange market and manage reserves where appropriate. A stronger domestic currency can help reduce the cost of imports, thereby mitigating imported inflation pressures.

Based on the study, there are a few recommendations that can be considered in order to further improve the results of the study. Firstly, the study's focus should be widened, including those in Asia, Europe, and the Middle East, to determine and identify global trends in the inflation rates to include other nations as well, rather than only those in the ASEAN region, such as Malaysia, Indonesia, Thailand, and Vietnam. Besides that, future researchers can find and add more independent variables that are compatible with the study, such as government revenue, the price of oil, and more. These variables could be included in the study to understand their implications for inflation.

Conclusion

In conclusion, this study has provided valuable insights into the key factors influencing inflation rates in Malaysia, Indonesia, Thailand, and Vietnam over the period from 2008 to 2023. The results of the static panel data analysis indicate that interest rates, government expenditure, and imported goods and services significantly impact the inflation in these countries. Based on these findings, it is recommended that policymakers adopt effective strategies to manage consumer spending, regulate government expenditure, and closely monitor the volume and pricing of imported goods and services. Such measures are essential to maintaining inflation at manageable levels and preventing adverse effects on the overall economy.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

AI Integration in TVET: Examining Educators' Behavioral Intentions and the Moderating Role of Experience

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Abstract: Artificial Intelligence (AI) is a branch of contemporary science and information technology that aims to replicate human-like intelligence in machines. Its application has increasingly become a significant component in modern education, transforming the way knowledge is accessed and delivered. Educators are now required to recognize AI technology as a pivotal tool in both current and future educational environments. In light of this, the present study investigates the predictors of behavioral intention, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions, towards the use of AI technology among lecturers in Polytechnics and Community Colleges (POLYCC) in Malaysia. This research is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Employing a simple random sampling method to ensure equal representation, data were collected from 142 academic staff members in POLYCC through an online questionnaire. The data were analyzed using SPSS to test the proposed research model and hypotheses. Findings revealed that performance expectancy, effort expectancy, and facilitating conditions significantly and positively influence lecturers' behavioral intention to use AI. In contrast, social influence did not have a significant effect. Additionally, the study identified experience as a moderating variable, which significantly strengthened the relationships between effort expectancy, social influence, and facilitating conditions with behavioral intention. These results highlight the importance of considering educators' experience levels when designing strategies for AI adoption in teaching and learning environments.

Keywords: *Artificial Intelligence, Behavioral Intention, UTAUT Theory, TVET*

1. Introduction and Background

The adoption of artificial intelligence (AI) is a growing global trend, and Malaysia is actively participating in this movement. The use of AI technologies in Malaysia is expanding rapidly, with more companies exploring and integrating AI to support business growth. According to a study by the IBM Malaysia Business Value Institute, one-third of surveyed companies have adopted generative AI, setting new benchmarks for innovation and success. This reflects the crucial role of AI in promoting innovation, supporting economic recovery, and reducing the digital divide. Holmström (2022) emphasized that the successful implementation of AI technologies significantly influences organizational performance. In response to these developments, the Malaysian government introduced the Malaysia National Artificial Intelligence Roadmap 2021-2025 (Ministry of Science, Technology and Innovation, 2023). This initiative aims to guide the responsible and ethical use of AI, with the broader goal of enhancing employment, competitiveness, innovation, and quality of life. The roadmap also seeks to promote sustainable economic growth through effective AI governance and implementation.

In the age of artificial intelligence (AI), lecturers need to adapt to new teaching environments and changing social conditions. More digital tools are being introduced into classrooms, and both lecturers and students must learn how to use them effectively. AI in education offers great potential to solve current challenges and improve the overall learning experience. Advancements in AI and smart technologies are expected to play an important role in shaping the future of higher education. The use of Artificial Intelligence in Education (AIEd) is likely to transform teaching and learning processes in universities and colleges (Hwang et al., 2020; Luan et al., 2020). Meanwhile, Pelletier et al. (2023), in the Horizon Report 2023, also identified AI as a key technology for teaching and learning in higher education. AI may also impact how higher education institutions are managed and organized. The Ministry of Higher Education (MOHE) views AI as a useful tool to improve learning in Malaysia. To support this, the Director General of the Polytechnic and Community College Department issued

a directive on 17 April 2023 encouraging the use of AI to maintain the quality of teaching. The Malaysian Qualifications Agency (MQA), in Advisory Note 2/2023, also recommended including AI skills in study programs, so students are better prepared for future careers.

Artificial Intelligence (AI) is becoming more important in Technical and Vocational Education and Training (TVET), as it can help improve teaching by reducing teachers' workload (Bryant et al., 2020). Although some TVET institutions are already using AI and robotics, many educators still do not fully understand the skills needed to use these technologies effectively (Benvenuti et al., 2022). Implementing AI is not easy, and many institutions face difficulties and fail to adopt it successfully (Alhwaiti, 2023). A study by Park and Kwon (2023), found that teachers in Korea were more interested in real-life uses of AI than in learning the basic concepts. This suggests that while TVET educators want to use AI for practical teaching, they may lack knowledge of how AI works. To use AI effectively in TVET, educators need a better understanding of the technology. Challenges such as technical issues, low student engagement, privacy concerns, and confusion about how to use the tools can make adoption difficult (Raffaghelli et al., 2022). According to Jain et al. (2022), fear of change, lack of training, uncertainty, and low trust in AI also make educators hesitant to use it. Many TVET educators still do not understand how to use generative AI in their teaching strategies (Zahri et al., 2023). This lack of knowledge can prevent them from using AI effectively. Because of this, more research is needed to understand what influences their willingness to use AI, including the causes and related theories. Currently, there is limited research on this topic in Malaysian TVET institutions. Therefore, this study aims to identify the key factors that affect TVET educators' intention to use AI in their teaching.

2. Literature Review

Behavioral intention refers to the conscious plan or resolve to perform or avoid a specific action in the future, and it strongly predicts actual technology use (Warshaw & Davis, 1985; Venkatesh et al., 2008; Venkatesh et al., 2003). The Unified Theory of Acceptance and Use of Technology (UTAUT) is widely employed to examine intentions and adoption among different user groups, especially in educational and AI contexts.

For instance, Ragheb et al. (2022) applied the UTAUT model to examine factors influencing students' intentions to use chatbots in higher education. Their findings revealed that performance expectancy, effort expectancy, and social influence significantly affected students' behavioral intentions. Similarly, Kwak et al. (2022) investigated behavioral intentions toward AI-based healthcare technologies and reported that performance expectancy, effort expectancy, and self-efficacy were key predictors of positive user attitudes. In the higher education context, Chatterjee and Bhattacharjee (2020) highlighted that behavioral intention plays a critical role in the adoption of AI, indicating that acceptance of AI technologies is closely tied to users' willingness and readiness to integrate them into educational environments. Furthermore, Sergeeva et al. (2025) applied UTAUT2 to explore students' adoption of generative AI, finding that habitual use, performance expectancy, hedonic motivation, social influence, and price value significantly predicted behavioral intention.

Performance Expectancy

Performance expectancy refers to how much a person believes that using a new system will improve their job performance (Venkatesh et al., 2003). It includes perceived usefulness, job fit and expected outcomes factors that reflect how helpful the system is in supporting their work. According to Davis (1989), perceived usefulness is the belief that using a system will make tasks more efficient or improve results. In education, performance expectancy means that teachers believe AI can support their teaching, help them deliver lessons better, and improve student learning outcomes. AI is seen to offer benefits such as faster access to information, better communication, more flexible learning environments, and improved presentation of materials (Pantelimon et al., 2021).

Several studies support the importance of performance expectancy in encouraging technology use. Alhwaiti (2023) found that it positively affects teachers' confidence and well-being. Similarly, Ayaz et al. (2020) reported that performance expectancy is one of the strongest factors influencing people's decision to use AI. Srivastava and Singh Bhati (2020) also found that teachers who believe AI helps them perform better are more confident in using it for teaching.

These findings suggest that performance expectancy strongly influences the intention to use AI. Based on this, the following hypothesis is proposed:
H1: Performance Expectancy has a positive influence on the behavioral intention to use AI among TVET educators in Malaysia.

Effort Expectancy
Effort expectancy refers to how easy a person thinks it is to use a system (Venkatesh et al., 2003). It includes how simple, clear, and user-friendly the system is. In this study, it is expected that people with more experience using AI may not rely as much on how easy they think it is to use and instead focus on their experience. Liu et al. (2022) found that people are more likely to use a system if they think it is easy to use. Srivastava et al. (2020) also showed that ease of use influences people's intention to adopt new technology. Similarly, Anthony et al. (2023) reported that ease of use positively affects lecturers' willingness to use technology in teaching. However, not all studies agree. An et al. (2023) found that just being easy to use is not enough to make teachers want to use AI. This suggests that effort expectancy may not always predict behavior in the same way in different situations. Because of these mixed results, this study aims to better understand how effort expectancy influences educators' intention to use AI.
H2: Effort Expectancy has a positive influence on the behavioral intention to use AI among TVET educators in Malaysia.

Social Influence
The Unified Theory of Acceptance and Use of Technology (UTAUT) is defined as the extent to which individuals feel pressure from others, such as colleagues or their organization, to use new technology (Venkatesh et al., 2003). This influence can affect technology adoption in both voluntary and non-voluntary situations, where users may use the technology due to expectations rather than personal interest. Social influence includes how much people around the user, such as coworkers or supervisors, shape their perception of technology. Factors like age, gender, experience, and whether the use is voluntary can change how social influence works (Venkatesh et al., 2003).

Many recent studies support the idea that social influence affects technology adoption. Zhou et al. (2022) found that it has a positive effect on technology use. Ragheb et al. (2022) also reported that social influence encourages educators to use AI in higher education. Similarly, Kwak et al. (2022) found a strong relationship between social influence and intention to use AI. However, not all studies agree. Sabraz Nawaz et al. (2024) found that social influence had a weaker effect in some cases. These mixed findings suggest that more research is needed to better understand how social influence affects AI adoption in education.
H_3: Social Influence has a positive influence on the behavioral intention to use AI among TVET educators in Malaysia.

Facilitating Conditions
Facilitating conditions refer to the support and resources, such as technical help and infrastructure, that make it easier for individuals to use a system (Venkatesh et al., 2003). These conditions can influence a person's willingness to use AI, especially when assistance is available if problems occur. While Venkatesh et al. (2003) suggested that facilitating conditions do not directly affect behavioral intention, they may become important when combined with factors like age and experience. However, studies in education have shown different results. For example, Chatterjee and Bhattacharjee (2020) found that strong support systems can encourage educators to adopt AI. Kwak et al. (2022) also showed that facilitating conditions have a direct, positive impact on the intention to use AI. Meanwhile, Alkhwaldi (2023) supported this, stating that the presence of proper resources helps increase acceptance of AI. These findings suggest that in higher education, support systems can influence educators' intention to use AI. Therefore, more research is needed to confirm these relationships in different settings.
H_4: Facilitating Conditions have a positive influence on the behavioral intention to use AI among TVET educators in Malaysia.

Several theories about the moderation effect have been proposed based on the topics that have been presented before. A moderating variable has been proposed to study behavioral intention, which is experience. Venkatesh et al. (2003) studied user experience and found that the influence of effort expectancy, social influence, and

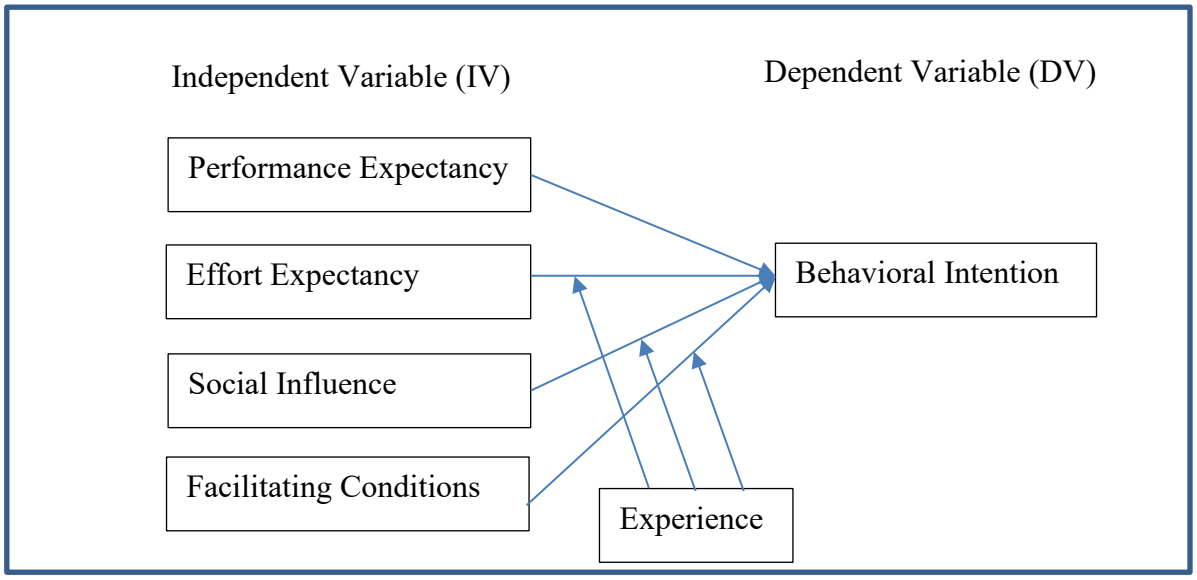
facilitation conditions on behavioral intention changes with the accumulation of use experience. Several hypotheses regarding the moderating effects have been developed as follows.

H5a: Experience moderates the relationship between effort expectancy and behavioral intention to use AI among TVET educators in Malaysia.

H5 b: Experience moderates the relationship between social influence and behavioral intention to use AI among TVET educators in Malaysia.

H5c: Experience moderates the relationship between facilitating conditions and behavioral intention to use AI among TVET educators in Malaysia.

Figure 1: Conceptual Framework



3. Research Methodology

This study adopts a quantitative research design using a structured questionnaire to examine the relationship between variables. A cross-sectional survey was conducted to collect data at a single point in time over several months. The study population consists of academic staff from Polytechnics and Community Colleges (POLYCC) across Malaysia. The focus on POLYCC academic staff is based on their relevance to the study's aim of exploring behavioral intentions to use AI in higher education. The sampling technique that is applied in this study is simple random sampling. Simple random sampling can be defined as a type of probability sampling. This sampling is the most frequently used because the selection of the audience is determined by chance (Salkind, 2018). In determining the minimum sample size for this study, G*Power software is employed. The researcher calculates the sample size by using G*Power 3.1.9.4. Thus, the setting measured in this study is as follows: Effect size f^2: 0.15, α=0.05, and the number of predictors = 5 (performance expectancy, effort expectancy, social influence, facilitating condition, and behavioral intention). The power was set at 95%. Thus, the sample size required for this study is 110.

This research study has received ethical approval from the Faculty Research Ethics Committee under the Faculty of Business and Management. Five constructs were measured in this study: performance expectancy, effort expectancy, social influence, facilitating condition, and behavioral intention. The constructs were measured using a five-point Likert scale ranging from 1, strongly disagree, to 5, strongly agree. Appropriate item modification was performed to fit the study context and validated by experts in the study area. A reliability test was conducted before the data collection to ensure the consistency of the measure. Based on the pilot test of 30 respondents, the internal consistency value for all constructs met the minimum requirement of 0.700. Meanwhile, to collect the data, an online survey was designed using Google Forms, and the invitation to participate in the study was sent through email and WhatsApp.

4. Results and Discussion

Data was analyzed using IBM SPSS Statistics version 26.0. Multiple regression analysis was conducted to examine the relationships between the study variables. Respondents were also required to provide demographic information to describe their background characteristics. The results of the demographic analysis are presented in Table 1.

Table 1: Demographic Profile of the Respondents (n=142)

Demographic Profile	Frequency	Percentage
Gender	49	34.5
Male		
Female	93	65.5
Age		
21-30 years	4	2.8
31-40 years	60	42.3
41-50 years	77	54.2
Over 51 years	1	0.7
Teaching Experience		
1-5 years	10	7.0
6-10 years	18	12.7
10-15 years	66	46.5
More than 15 years	48	33.8
States		
Federal Territory	14	9.9
Selangor	13	9.2
Melaka	11	7.7
Negeri Sembilan	15	10.6
Johor	13	9.2
Perak	9	6.3
Perlis	10	7.0
Kedah	12	8.5
Pulau Pinang	9	6.3
Pahang	12	8.5
Kelantan	6	4.2
Terengganu	7	4.9
Sarawak	6	4.2
Sabah	5	3.5

***Note: Frequency numbers are based on a total of 142 respondents**

Table 2: Demographic profile of use experience

Demographic Profile	Frequency	Percentage
Once or several times a day	70	49.3
Once a day	31	21.8
Once a week	27	19.0
Once a month	8	5.6
Once a year	2	1.4
Never	4	2.8
Total	**142**	**100.0**

According to the data analysis on user experience in Table 2, it shows that 60 respondents (49.3%) used generative AI once or several times a day, followed by 31 respondents (21.8%) who used generative AI once a day and 27 respondents (19.0%) have used generative AI once a week. Furthermore, the analysis on user experience demonstrated that 8 respondents (5.6%) use generative AI once a month, 2 respondents (2.8%) use generative AI once a month, and only 4 respondents (2.8%) never use generative AI. The data reveals that

almost three-quarters of the respondents have frequent usage and engage with generative AI every day or multiple times a day.

Reliability analysis was carried out in this study by calculating Cronbach's alpha values for each variable. A reliable measure should demonstrate both consistency and stability (Kaliani Sundram et al., 2016). According to Hair et al. (201), a Cronbach's alpha value above 0.70 is considered acceptable. Hinton et al. (2004) also state that a value of 0.70 or higher shows good reliability, while slightly lower values are still acceptable. These results suggest that the items in the questionnaire reliably measure how respondents view the five factors.

Table 3 shows the Cronbach's alpha values for five variables: performance expectancy (0.934), effort expectancy (0.761), social influence (0.855), facilitating condition (0.836), and behavioral intention (0.934). Four variables, performance expectancy, social influence, facilitating condition, and behavioral intentions, show very strong reliability. Meanwhile, effort expectancy shows acceptable reliability. Table 3 presents the results for Cronbach's Alpha for the dependent variable for this study.

Table 3: Cronbach's Alpha

Variables	Cronbach's Alpha	Strength of Association
Performance Expectancy	.934	Very Strong
Effort Expectancy	.761	Strong
Social Influence	.855	Very Strong
Facilitating Condition	.836	Very Strong
Behavioral Intention	.934	Very Strong

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.772[a]	.596	.585	.39935

a. Predictors: (Constant), Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition
b. Dependent Variable: Behavioral Intention

Table 5: ANOVA

Model		Sum of Squares	DF	Mean Square	F	Sig.
1	Regression	32.279	4	8.070	50.600	<.001[b]
	Residual	21.849	137	.159		
	Total	54.129	141			

a. Predictors: (Constant), Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition
b. Dependent Variable: Behavioral Intention

Table 6: Coefficient Analysis

	Unstandardized Beta	Std. Error	Standardized Beta	t-value	p-value
Performance Expectancy	.257	.075	.272	3.435	<.001
Effort Expectancy	.258	.078	.266	3.315	.001
Social Influence	.081	.051	.101	1.571	.118
Facilitating Condition	.315	.063	.324	4.981	<.001

a. Dependent Variable: Behavioral Intention

In Table 4, the R Square value (0.596) in Model 1 indicates that approximately 59.6% of the variance in behavioral intention can be explained by the combined influence of performance expectancy, effort expectancy, social influence, and facilitating condition. The adjusted R Square (0.585) suggests that the model's predictive power remains consistent even after considering the number of predictors. The standard error of the estimate (0.39935) represents the average difference between the actual and predicted values, reflecting the accuracy

of the model in behavioral intention. In Table 5, the ANOVA table displays the sources of variance in the regression model. The regression model's sum of squares is 32.279, with 4 degrees of freedom, resulting in a mean square of 8.070. The F-value (50.600) is highly significant (<.001), indicating that the regression model as a whole significantly explains the variance in behavioral intention.

The coefficient analysis in Table 6 shows that performance expectancy has a significant positive effect on behavioral intention, with a p-value of less than 0.001. This means that when TVET educators believe that generative AI can help improve their performance, they are more likely to use it. The findings support those of Bhat et al. (2024), who found that educators see generative AI as helpful in teaching and improving their daily tasks. This highlights the importance of showing how AI can offer real benefits. As noted by Venkatesh et al. (2003), people are more willing to adopt new technologies when they believe it will make them more productive and help them make better decisions. Therefore, promoting the practical advantages of AI can help increase its acceptance among educators.

This study found that effort expectancy significantly influences the intention to use generative AI, with a p-value of less than 0.001. The high mean value suggests that users perceive technology as easy to learn and apply effectively in their teaching and learning processes. These findings are consistent with previous studies, which highlight that effort expectancy plays an important role in shaping educators' attitudes toward technology adoption (Anthony et al., 2023; Zhou et al., 2022). However, contrasting results by An et al. (2023) suggest that effort expectancy does not always have a significant effect on behavioral intention. Their study indicates that some educators may be concerned that the time and effort required to learn new technologies could increase their workload and negatively affect their efficiency. This highlights the need to ensure that AI tools are not only easy to use but also well-integrated into existing educational practices to reduce resistance.

Another factor examined in this study was social influence. The results showed that social influence had a p-value of 0.118, which is greater than the significance level of 0.05, indicating that it does not significantly affect behavioral intention. In the context of technology adoption, the views and behaviors of peers, superiors, and organizational leaders often shape an individual's willingness to adopt new technologies. However, the findings of this study suggest that respondents were more influenced by their perceptions of usefulness and ease of use rather than by external social pressure. This implies that social influence was not a strong predictor of the intention to use generative AI among the respondents. While the UTAUT model (Venkatesh et al., 2003) identifies social influence as a key factor in behavioral intention, its relevance can vary depending on the technology and the context in which it is applied. Supporting this, O'Dea (2023) noted that the effect of social influence depends on how individuals perceive their social environment and the specific conditions under which technology is introduced.

Facilitating conditions were found to have a significant positive effect on the behavioral intention to use generative AI, with a p-value of less than 0.001. Although the original UTAUT model (Venkatesh et al., 2003) does not include facilitating conditions as a direct predictor of behavioral intention, expecting its effect to become insignificant once performance and effort expectancy are accounted for, this study presents a different outcome. The findings indicate that supportive infrastructure and resources play a crucial role in influencing educators' willingness to adopt generative AI. Respondents expressed confidence in the availability of technical support, training, and other institutional resources needed to use AI effectively. This suggests that facilitating conditions are a key determinant in shaping behavioral intentions, especially in higher education settings. As highlighted by Alhwaiti (2023), the presence of reliable support systems increases user confidence and strengthens their intention to use emerging technologies like generative AI.

Moreover, the study found a relationship between the coefficient of performance expectancy (0.272), social influence (0.266), and facilitating conditions (0.324), meaning that an increase in all three variables increases behavioral intention in the use of generative AI; however, changes in social influence have no impact on behavioral intention.

In order to verify the moderating effect of use experience on the relationship between independent variables and dependent variables, it was examined using the PROCESS Macro model 1 for SPSS, which Hayes (2017) suggested. There were 5000 samples, a 95% confidence interval, and a bootstrap was utilized for verification.

Table 7: Summary of Moderation Analysis

	DV: BEHAVIORAL INTENTION					
MODEL	**COEFF**	**SE**	**t**	**p**	**LLCI**	**ULCI**
EE x Exp	.0915	.0462	1.9819	.0000	.0002	.1828
SI x Exp	.1472	.0591	2.4911	.0139	.0304	.2641
FC x Exp	.1464	.0533	-2.7459	.0068	0.0410	.2518

Table 7 shows that experience significantly moderates the relationship between effort expectancy and behavioral intention, with a coefficient of 0.0915 and a p-value of 0.000. The confidence interval (LLCI = 0.0002, ULCI = 0.1828) confirms this effect, as it does not include zero. This means that educators' experience with generative AI influences how strongly ease of use affects their intention to use it. Educators who use generative AI more frequently tend to find it easier to use and are more willing to adopt it. In contrast, those who rarely use technology may find it more difficult, reducing their intention to use it. These findings support earlier studies by Yi and Choi (2023), Izkair and Lakulu (2021), and Alkhwaldi (2024), which also highlight the importance of experience in shaping attitudes toward new technologies. Providing more training and exposure could therefore improve acceptance among educators.

Meanwhile, the analysis shows that experience has a positive and significant effect on the relationship between social influence and the intention to use generative AI. The interaction coefficient is 0.1472, with a standard error of 0.0591 and a t-value of 2.4911. The p-value of 0.0139 ($p < 0.05$) confirms that the moderation effect is statistically significant. The confidence interval (LLCI = 0.0304, ULCI = 0.2641) does not include zero, showing the result is reliable. This means that educators with more experience are more influenced by social factors like peers or supervisors when deciding to use generative AI. Experienced users may follow existing practices and advice from colleagues, while less experienced users may be more open to adopting new tools based on social cues. This is supported by Wei et al. (2025) and Jaradat et al. (2020). However, Ab Jalil et al. (2022) found no such effect, suggesting that experience may not always change how social influence affects technology use. Overall, the impact of social influence can differ based on the user's level of experience.

Lastly, the analysis shows that experience moderates the relationship between facilitating conditions and behavioral intention to use generative AI, with a positive coefficient of 0.1464 and a significant p-value of 0.0068. The confidence interval (LLCI = 0.0410, ULCI = 0.2518) does not include zero, confirming the significance of this effect. Facilitating conditions refer to available support, resources, and infrastructure that help educators use AI effectively. However, their impact depends on the educator's level of experience. This study supports the UTAUT model (Venkatesh et al., 2003), which suggests that experience strengthens the influence of facilitating conditions. Experienced educators can adapt better and are less affected by the lack of support, while less experienced educators rely more on support systems to build confidence in using AI. Understanding this moderating role is important for institutions to support both experienced and inexperienced educators in adopting AI tools.

5. Managerial Implications and Recommendations

This study offers several practical insights for higher education leaders, especially within the Polytechnic and Community College (POLYCC) system in Malaysia. The results show that lecturers are more likely to use AI technology when they believe it can improve their teaching performance. Therefore, management should focus on showing how AI tools can support teaching and learning effectively. Emphasizing the benefits of AI in improving productivity and outcomes can encourage wider adoption among educators. The study also found that when AI tools are easy to use, lecturers are more willing to adopt them. This means that institutions should provide user-friendly systems and offer training to help lecturers become comfortable with AI. Training sessions, user manuals, and simple interfaces are important to reduce resistance to using new technology.

In addition, facilitating conditions such as technical support, proper infrastructure, and access to resources were found to significantly influence lecturers' intention to use AI. Institutions should ensure that educators have the tools, support, and guidance they need. Dedicated IT support and ongoing assistance can help overcome barriers to using AI.

Based on these findings, several recommendations are proposed. First, institutions should offer regular training and workshops tailored to the needs of lecturers at different skill levels. Second, they should set up a support team to provide help with AI tools. Third, sharing successful examples of AI use within the POLYCC system could inspire more lecturers to adopt the technology. Lastly, institutions should gather feedback from lecturers to monitor the impact of AI use and improve support over time.

Conclusion

The intention to adopt generative AI among educators in higher education institutions is primarily influenced by the ease of learning and the availability of skills required to use technology. The findings indicate that performance expectancy, effort expectancy, and facilitating conditions significantly and positively affect educators' behavioral intention to use generative AI. In contrast, social influence was found to have no significant impact; educators' decisions to adopt technology were not shaped by peers' or colleagues' encouragement.

This study highlights that educators are more inclined to adopt generative AI when they perceive it as beneficial, easy to use, and supported by adequate institutional infrastructure and resources. These insights offer valuable implications for developers and researchers seeking to enhance technology integration in education. Overall, the research contributes to the broader understanding of AI adoption within educational contexts, emphasizing the importance of perceived usefulness, usability, and support systems in influencing technology acceptance.

In addition, the study found that experience serves as a significant moderating factor in the relationship between effort expectancy, social influence, and facilitating conditions on the intention to use generative AI. Educators with more experience are typically more familiar with digital tools and are better equipped to adapt to new technologies, reducing their reliance on external guidance or peer influence (Venkatesh et al., 2003). This self-sufficiency allows them to navigate and adopt AI technologies with greater confidence. Conversely, less experienced educators may depend more on institutional support, social encouragement, and user-friendly system features to build their intention to use generative AI. These findings underscore the need for differentiated support strategies in technology implementation, tailored to the varying experience levels among educators.

Acknowledgement: The authors would like to acknowledge the Faculty of Business and Management, Universiti Teknologi MARA, for supporting the research work.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Impact of Teaching Presence, Cognitive Presence and Social Presence on Student Engagement

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Abstract: Technology has undoubtedly enhanced the significance of convenience in learning, especially in tertiary educational institutions, as the dynamic integration between online and traditional learning is demonstrated. However, it is fair to debate whether this technology has also helped to enable the students to be more engaged in the classroom or whether the learning related factors are more prominent determinants. This descriptive research was a correlational study which was intended to examine the relationship between the elements of Community of Inquiry (CoI), comprised of teaching, learning and social presence and student engagement in UiTM Puncak Alam. The study has applied a convenience sampling method, involving 378 respondents from 22,441 undergraduates of UiTM Puncak Alam. A self-administered questionnaire of three sections was used as the instrument for this study to collect the students' perspectives on how the elements can influence their student engagement. A Pearson correlational and multiple regression analysis was conducted to ensure the achievement of the research objectives. The results have found that social presence has the strongest relationship with student engagement, supporting a similar finding from the regression analysis. Regardless, it was also found that the independent variables have explained 35.3% of the dependent variables, whereas the remaining 64.7% of student engagement can be explained by other variables that are not included in this study. Therefore, all three research objectives were achieved, and the three hypotheses were supported. The researchers have then discussed and recommended further actions that can be taken by the authorities involved in ensuring that a quality education is accessible to all students in Malaysia.

Keywords: *Student engagement, Teaching presence, Cognitive presence, Social presence*

1. Introduction and Background

Civilization has classically grown innovations of technology and humans have been living and adapting their daily activities with the technology. Its rapid evolution has dynamically affected humans' lives, especially in the learning process, whether through direct or indirect approaches. Technology has conveniently transformed the learning process from the traditional approach of the blackboard to a remarkable smartboard. Electronic gadgets are pretty much a necessity for the youngsters nowadays, in their incorporation into education settings may pique their interest to get involved in the learning process (Haleem et al., 2022). Nonetheless, a simple question may incur a whole process of debate when it comes to this application of technology in the classroom. Will the convenience of technology present a natural way of getting the students to be engaged in the classroom learning process? It is wise to say that technology alone will never guarantee good learning, especially in engaging in the lesson taught. The accessibility and privilege of technology will never be equal to understanding, assisting the students to exclusively express themselves in terms of their opinions and views of what they learnt in the class. In other words, digital tools may aid the learning process, but they will never be able to replace learning effectiveness. The constructive benefits of digital tools are apparently seen in online learning, but it is also controversial in agreeing of how online learning has enabled individuals to feel isolated.

According to Carstens et al. (2021), students are doing self-learning in digital education settings, which can somehow miss out on some of the lesson time, which can lead to a thorough conversation on the problems. As a matter of fact, this is where student engagement has become very crucial in ensuring that students consistently feel a sense of belonging to the class, who subsequently will feel less disconnected and lose interest. Students who are strongly engaged in class will have no difficulties in expressing themselves, socially and cognitively, because they are those with better self-motivation and confidence (Lasekan et al., 2024), which will help them to feel less fear of failure and judgment. Constructively, student engagement serves its highest benefit to students not only as part of the cognitive learning process, but it will also give students the

opportunity of empowerment and self-efficacy in finding their voices in both academic and personal settings. As a matter of fact, the vitality of student engagement in academic settings was expansively addressed in multiple past studies (Gurcan et al., 2023).

When it comes to learning, it is undeniably important for all teachers and students to be able to communicate effectively in the most thoughtful way. Learning will happen best when all parties involved enjoy being with the companion of each other in a way that will constructively nurture the growth of everyone. Feeling contented with the learning process is very critical in ensuring that everyone will get the best possible outcome from the activity conducted. This is where Garrison et al. (1999) Has come with a concept which was commonly used in education called 'The Community of Inquiry'. This concept was known to comprehensively cover the elements involved in students' meaningful and collaborative learning experiences. These three interdependent elements are called 'teaching presence, cognitive presence and social presence,' which bear different coverage on how the learning process shall nurture a deep and meaningful experience among the students. (Carroll et al., 2025). As students in today's technology-driven world have diverted their priorities to digital tools for various justifications, these elements highlight how learning should be able to make them learn, communicate and prepare for the prospective future.

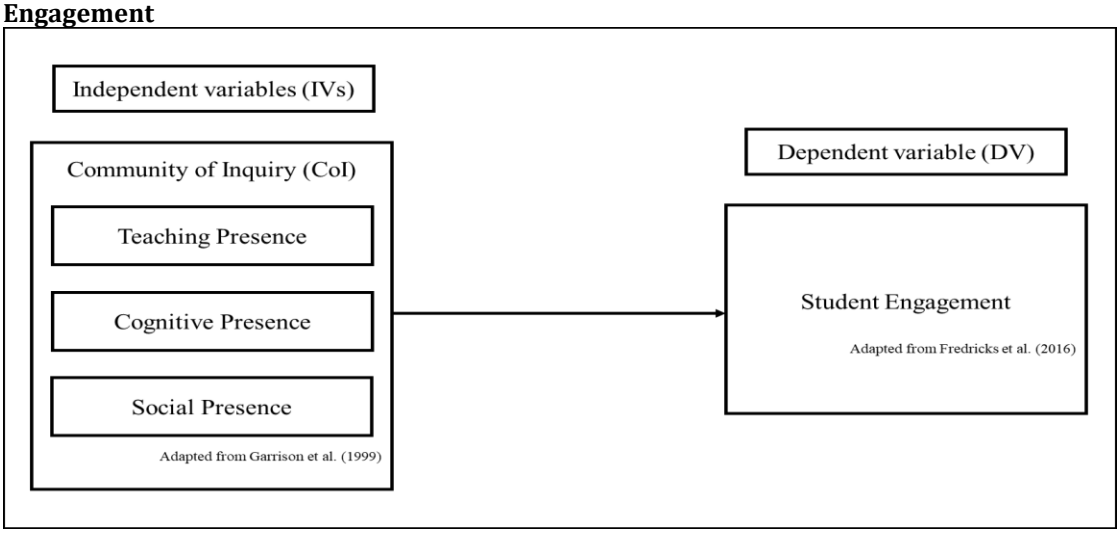
Teaching presence can be referred to as the design, assistance and instructional direction in courses, which may include the instructional feedback, strategies and support by the instructors. Simply, teaching presence is the extent to which a teacher can direct and facilitate a course to achieve its learning objectives. (Garrison et al., 2010). A teacher or an educator should be able to present to the students through the development of a structured learning environment. A good teacher should have the ability to help the students concentrate in class while demonstrating what they are expected to do during the learning process. The ability and expectation will help the students to build trust in their vulnerability towards the teacher, which subsequently encourages them to feel motivated in class. (Daumiller et al., 2023). This is because a proactive educator will make the students feel belong and are cared for, which will foster a sense of connection in the students. Ideally, a great relationship between the students and educators will boost the need for active participation as students feel engaged through their voices. (Daoayan Biaddang & Caroy, 2024). They will feel the significance in their voices, which will encourage them to ask questions, think critically and express their point of view. Besides, teaching presence would also allow the students to receive timely constructive feedback from the educators. Failure in this matter would put them in a situation to feel ignored and lost. These students are expecting prompt and helpful responses from the educators as they consider them as a reference figure or role model. Nonetheless, educators are also expected to have two-way dialogues with the students to ensure the roles of sender and receiver are taken.

Furthermore, cognitive presence can be defined as the extent to which the construction and confirmation of meaning by the learners occurs through the discourse, reflection and exploration of ideas. (Garrison, 2007). Simply, cognitive presence demonstrates the learners' ability to intellectually derive meaning through communication and reflection by creating, analyzing and applying the knowledge that they gained. About student engagement, cognitive presence will promote students to be curious and explore new things that are beyond their comfort zone, with a sense of enthusiasm in seeking answers. (McCarroll & Hartwick, 2022) That assists them to invest more time, energy and effort into learning. Consequently, this element will encourage the students to seek deep learning as they want something that is beyond memorization. They want their ideas to be connected and can provide constructive, critical feedback on the learning content, which naturally attracts them to be more engaged. Therefore, this will enhance their sense of purpose in building meaningful learning together. (Alshammari & Alrehaili, 2025) This will strengthen the need for collaborative and shared learning processes. Though learning will require the students to collaborate with their peers, they still need to foster the sense of empowerment and independence in reflecting on the knowledge learned and have more control over their learning process. Thus, it is wise to recommend that educators nurture an inquiry culture in the classroom to improve the students' cognitive presence, which empowers them with creativity and intellectual engagement. (Hambali et al., 2022).

Lastly, the final element of social presence can be referred to as the individuals' ability to identify themselves in the study community who can purposefully communicate in the respective department while developing strong interpersonal relationships through their personalities (Garrison, 2009). Multiple previous studies have

highlighted how social presence significantly and positively influences the students' learning satisfaction and overall learning outcomes (Lee & Pillai, 2022; Supardi & Ashari, 2021). With social presence, students will feel more valued, accepted and seen regardless of their background. Through social presence, students are expected to build good relationships with their educators or instructors and their peers. This element will work in conjunction with teaching and cognitive presences to aid the students to express their own selves in terms of their emotions, views and personalities. This expressiveness can support the students to feel motivated and belong to their classroom community, which will boost their sense of inclusiveness (Alshammari & Alrehaili, 2025), which is one of the many keys to sustaining student engagement. Feeling included and connected to the classroom will encourage the students to be more likely to participate in the learning activities by engaging in group work and discussions (Gökoğlu et al., 2024). This element has engraved all its goodness in enriching the learning experiences while ensuring that the students feel respected and emotionally safe. Hence, through the comprehensive literature review, three research objectives were articulated for this study which includes (1) To determine the level of student engagement of UiTM Puncak Alam students; (2) To investigate the relationship between teaching presence, cognitive presence, social presence and student engagement among UiTM Puncak Alam students; and (3) To identify the strongest predictor of student engagement among the community of inquiry elements.

Figure 1: Conceptual Framework on the Relationship between Community of Inquiry and Student Engagement



Through a literature review, three research hypotheses were suggested to meet the objectives of this study:
H_{1a}: There is a significant relationship between teaching presence and student engagement among UiTM Puncak Alam students.
H_{1b}: There is a significant relationship between cognitive presence and student engagement among UiTM Puncak Alam students.
H_{1c}: There is a significant relationship between social presence and student engagement among UiTM Puncak Alam students.

3. Methodology

This study was a descriptive study that intended to measure the relationship between two respective variables in a defined population of a public university in Malaysia. This is aligned with the cross-sectional types of investigation, which mainly aim to investigate the relationships between each element of the community of enquiry (teaching presence, cognitive presence and social presence) and student engagement in UiTM Puncak Alam. This research has applied a convenience sampling technique to approach 378 samples out of 22,441 undergraduate students. The researchers had conveniently collected the required data from these samples by approaching hostels, cafes and various faculty buildings. Apart from the physical places, the researchers also disseminated a Google Form link to potential respondents through WhatsApp and Telegram to smooth the data collection process. Briefly, the number of samples was obtained based on the formula by Krejcie and Morgan

(1970), which has been agreed to be sufficient in fulfilling the criteria of the advanced regression analysis (Hair et al., 2018). This study has managed to get a commendable 100% response rate in two weeks, in which data was further analyzed for its descriptive, correlational and multiple regression analyses by using SPSS version 29.0. Though convenience sampling was commonly known for its greater tendency to bias but it serves as one of the best sampling techniques in getting responses with great speed and less cost (Stratton, 2021). Other than that, this research has used a set of self-administered questionnaires as its instrument for data collection. This instrument comprises three parts of Part A: Demographic profile of the respondents, Part B: Student engagement questionnaire and Part C: Community of inquiry questionnaire. Part B items were adapted from Imran et al. (2023), while Part C items were adapted from Shea and Bidjerano (2010). Before the pilot study, a face validity was conducted, involving an expert in research methodology course who checked and validated the content of the instrument. Besides, a pilot study has later approved the reliability of the instrument used with the Cronbach's alpha scores of 0.734 to 0.921.

4. Results

Descriptive Analysis of Student Engagement

The first research objective was to determine the level of student engagement among UiTM Puncak Alam students, which can be accomplished through a descriptive analysis. It started with the computation of all items for teaching presence, cognitive presence and social presence into mean scores, which were then interpreted into three categories of poor engagement, fair engagement and good engagement. The Best's Principle of Thaoprom (2004) Was used for the results interpretation, in which poor engagement was represented by the scores of 1.00 to 2.00, fair engagement was represented by the mean scores of 2.01 to 3.01 and lastly, the mean scores of 3.02 to 4.00 represented good engagement. The categorization of the student engagement levels was tabulated in Table 1, where it highlighted that the majority of students have fair student engagement, with 60.3%. Surprisingly, this study has seen 13 students with poor engagement. This number may look superficially insignificant, but the occurrences may indicate otherwise. Nonetheless, this has presumed the achievement of the first objective.

Table 1: Level of Student Engagement (n=378)

Poor Engagement (Mean score 1 – 2.00)*	Fair Engagement (Mean score 2.01 – 3.01)*	Good Engagement (Mean score 3.02 – 4.00)*
13 (3.4%)	228 (60.3%)	137 (36.2%)

*Interpreted by using Best's Principle by Thaoprom (2004)

Correlational Analysis of Community of Inquiry Elements and Student Engagement

The relationship between CoI and student engagement, as of the second research objective, can be identified through the Pearson correlational analysis, considering the fact that all data were found to be normal. Table 3 shows the results from the analysis, which were interpreted by using the guidelines. Cohen (1988) For the strength and direction of the coefficient values (r). The results have identified two elements of CoI, encompassing learning and social presence, to have strong positive relationships to student engagement (r=.555, p=<.001; r=.559, p=<.001 respectively), leaving out teaching presence as the sole component of CoI with a moderate relationship with the dependent variable (r=.467, p=<.001). Accordingly, it can be summarized that the second research objective was achieved as all the hypotheses of H_{1a}, H_{1b} and H_{1c} were supported by the findings.

Table 2: Correlations between Community of Inquiry Elements and Student Engagement

Variables		Student Engagement
Teaching presence	Correlation coefficient	.467**
	Sig. (2-tailed)	<.001
Cognitive presence	Correlation coefficient	.555**
	Sig. (2-tailed)	<.001
Social presence	Correlation coefficient	.559**
	Sig. (2-tailed)	<.001

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

Multiple Regression Analysis of Community of Inquiry Elements and Student Engagement

In achieving the third research objective, a multiple regression analysis was conducted, and the results are demonstrated in Table 3. Based on the results, it can be concluded that the study has no collinearity problem as the values of tolerance were smaller than one and the values of VIF were smaller than 10. The study also has seen the R^2 value of .353 and a significant F value of <.001, which indicates that all elements of community of inquiry (teaching presence, cognitive presence and social presence) explained 35.3% of the variance for student engagement in UiTM Puncak Alam. Besides, the analysis has also shown that all elements of CoI can predict the dependent variable with social presence as the strongest predictor (β=.292, p <.001). This was then followed by the cognitive presence (β=.237, p=.002) and the teaching presence (β=.124, p=.032). Henceforth, this has marked the achievement of the third research objective.

Table 3: Multiple Regression Analysis on Community of Inquiry Elements and Student Engagement

Independent variables	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
				Tolerance	VIF
Teaching presence	.124	2.150	.032	.522	1.917
Cognitive presence	.237	3.162	.002	.307	3.261
Social presence	.292	4.150	<.001	.349	2.865
R2 Value			.353		
F			68.020		
Sig. F Value			<.001		

Discussion

Level of Student Engagement

Student engagement is undoubtedly proven to be crucial in influencing students to have better learning outcomes, stronger interpersonal relationships and stronger self-motivation, which will eventually lead to better personal growth. Various research studies on student engagement were conducted to expand the understanding of the education community in which it is expected to believe that higher educational institutions are very much known to be accountable for the students' engagement. Hence, a good level of student engagement was expected from this study, but unfortunately, a contradictory result was shown. It was found that most students had fair student engagement and only 36.2% believed that they were having good engagement. These findings were very much like Malaysia's previous studies' findings. (Md Nawi et al., 2021; Teoh et al., 2013). Though these contrasting findings may be a bit surprising for most educators, they also projected that the interventions done did not sufficiently reflect what they needed from the instructors and institutions. Regardless of these inferior results found, some previous studies in other countries may be aligned and justified. According to Subramainan and A. Mahmoud (2020)Asian students were generally found to possess a low student engagement level, as most of them (more than 80%) feel disinterested in the classes and would not ask questions during the lessons.

The Relationship between Community of Inquiry Elements and Student Engagement

The significance of student engagement was critically addressed by various studies and it was also commonly linked to multiple influential factors for instance, learning environment (Meganathan, 2024), social interaction (Istijanto & Nathalie, 2024) and teacher behavior (Li & Xue, 2023). The integration of these concepts into becoming the determinants of student engagement is in line with the constructs of CoI. Accordingly, this study has found that teaching presence, cognitive presence and social presence have significant positive relationships with student engagement. These results were aligned to past studies where teaching presence was found to have a positive correlation with affective student engagement (Lasekan et al., 2024; Zhang et al., 2023). Even so, according to Doo et al. (2023), teaching presence was indicated not to have any significant impact on student engagement, even though there was a mediating effect of the variable on the association between self-efficacy and learning engagement. This is because it is believed that the active participation from the students was not sufficiently assisted by the instructors (Doo et al., 2023). On the other hand, cognitive presence has been emphasized to be correlated to the dependent variable as found by Alshammari and Alrehaili (2025). This link was justified as students' cognitive abilities in critical thinking are essential to foster an endurance learning

outcome, which consequently helped them to be engaged in the lessons learnt in the classroom. It was also found that teaching presence may positively affect cognitive presence (Doo et al., 2023), which has been discussed in relevant empirical literature (Caskurlu et al., 2020). Last of all, social presence, which was also commonly associated with teaching presence in terms of teacher-student relationships (Li & Xue, 2023), was found to be correlated with student engagement (Alshammari & Alrehaili, 2025). Through social presence, students are enabled to collaborate in learning, freely express their views on lessons and have an effective learning environment (Alshammari & Alrehaili, 2025). This has strengthened the findings by Odhiambo (2024), who discovered how the online learning community's engagement can be fostered by a strong sense of social presence.

Strongest Predictor of Student Engagement

Regardless, there was an abundance of literature indicating the strong impact of CoI's elements in impacting student engagement, and the R^2 value reflected a decent explanation. They may be able to explain the respective dependent variable, but 64.7% was explained by other independent variables. Moreover, the predicted effects showed by the standardized coefficients Beta of each CoI element have strengthened the mentioned indictment. Though all elements were significantly predicting the variable, social presence was the greatest predictor. According to Li and Xue (2023)Student engagement may be influenced by peer interaction, which includes the relationship between teacher and student. It is also important to point out that Malaysian students were found to have student-centered practices whereby the teachers possessed more eclectic beliefs, which demonstrated a combined student and teacher-centered learning approach. (Leng et al., 2018). Post-COVID-19 pandemic has witnessed the dynamic of learning approaches, whether it is online or blended learning, that offer better opportunities for students and lecturers to interact socially interacting to each other. (Joshi et al., 2023). The isolated emotions that circulated in the presence of social distancing during COVID-19 have seen a remarkable need for social presence. This is because some negative feelings can be reduced during learning through social interactions, whereby students are likely to come across positive experiences that enhance their willingness to learn and improve concentration (Wilson et al., 2018). Thus, this has projected the appropriate reasons behind the significant predictive effects of social presence on student engagement for this study.

5. Conclusion and Recommendations

In a nutshell, it is fair to conclude that UiTM Puncak Alam students have fair student engagement despite witnessing various types of learning interventions introduced during the classroom activities to ensure they are being engaged and presumably applied in their daily activities. The findings have indicated that teaching presence, cognitive presence and social presence have significant positive relationships to student engagement, with social presence having the strongest relation to the respective dependent variable. Similarly, findings from the multiple regression analysis have demonstrated a parallel result where social presence was found to be the strongest predictor of student engagement. This is why it has brought to light the importance of having good social relationships in the classroom so that the students will not feel isolated, and eventually feel a part of the class community. Subsequently, they will feel motivated to engage and be involved in any group activities or discussions. This whole scenario will witness a closer gap in achieving quality education as highlighted in the global agenda of SDG4, which is designed to ensure equal quality and integrative education that promotes lifelong learning opportunities by 2030 (Demirbağ & Sezgin, 2021). Quality education not only requires the assistance of teachers in providing the best learning materials and environment through teaching and cognitive presence, but also requires the presence of companions through social presence. Quality education is not particularly about who is smart and has a higher intelligence quotient, but it is about the upbringing of individuals to bring out the best in society as well. As for future studies, the researchers would like to suggest a more comprehensive coverage of the population to ensure the generalizability of the results. For instance, involving student representatives from all public universities in Malaysia, including the Borneo region. The limitations of convenience sampling can also be reduced by applying more reliable probability sampling, such as cluster sampling. A study on student engagement shall be conducted to explore more influential factors that will assist the required authorities, for example, the Ministry of Higher Education, to identify what is best for the students. Problem identification would enable the respective parties to counter the problems that existed by adapting the best practices to the study curriculum.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Exploring the Role of Digital Twin Technology in Enhancing Supply Chain Resilience: A Conceptual Framework

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Abstract: This research seeks to construct a more comprehensive conceptual framework that integrates enabling technologies, critical business activities, and outcomes of resilience to clarify the mitigating and performance boosting impacts of Digital Twins (DTs) on supply chains. The researcher reviewed literature and consulted diverse theories and scholars in order to devise the framework that addresses the problem. The framework was based on socio-technical systems theory, the Resource-Based View, and complexity theory to show the impacts of technology on the architectural evolution of the structures that make up a supply chain network. Its key elements, "inputs, processes and outcomes," were given and systematized about the dynamic interactions of supply chain resilience and digitized twin technology. The framework's digital enablers— the IoT, AI, and high-fidelity simulation platforms— are also important to real-time monitoring, risk evaluation, scenario modelling, and simulation of critical functions which bolster the resilience traits of responsiveness, operational flexibility, and risk mitigation. The study underlines the contribution of DTs to enhanced situational awareness and, therefore, more effective and strategic oversight in decision-making on supply chain management as a whole. Therefore, the research addresses a significant gap in the literature by bridging functionality of digital twinning with the assemblage of resilience genes and by emphasizing the framework's overriding digital resilience. Digitized two-dimensional replicas of core components of a business system, commonly known as digital twins, provide supply chain personnel with a systematic technique for incremental realization of anticipatory breach mitigation strategy implementation guided by comprehensive risk assessment and predictive scenario contingency strategy planning.

Keywords: *Digital Twin Technology, Supply Chain Resilience, Real-Time Monitoring, Risk Mitigation*

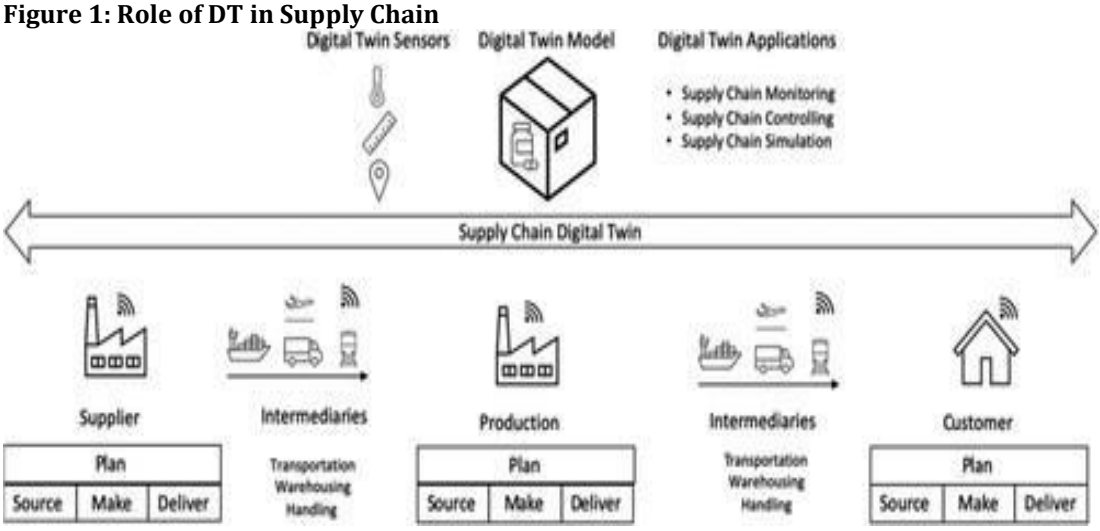
1. Introduction

The prevailing world environment now presents us with tightly interwoven crises: ever-more-frequent climatic disasters, deepening geopolitical tensions, and pandemics that reverberate through provision networks (Vatumalae, Rajagopal, & Sundram, 2020; Wong Chee, Sundram, Bakar, & Narayanan, 2024; Zolait et al., 2019; Zulfakar et al., 2019). Each perturbation underscores that provision networks must transcend remedial handbooks in favour of genuine distributional agility—the ability to detect, redirect, and recalibrate while critical operations remain undisturbed (Chowdhury & Quaddus, 2017). Architectures optimised for minimal cost alone have revealed vulnerabilities in extremis, necessitating that strategic infrastructures be reconfigured around the cadence of disruption. Into this gap, the Digital Twin (DT) paradigm advances. A DT offers an ever-updating mirror of any tangible asset, process, or entire system, thus merging real-time sensor data with cyber-analytic and experimental environments (Tao et al., 2019). Within supply chain ecosystems, these living threads amplify exposure to underlying dynamics, sharpen predictive signal-to-noise ratios, and empower pre-emptive governance. By sculpting high-fidelity virtual analogues of entire logistics arteries, organizations can probe thousands of stress permutations, spotlight latent vulnerabilities, and engineer fortified, adaptive supply chains in real time (Ivanov & Dolgui, 2021).

Despite their enticing potential, the specific role of Digital Twins in bolstering supply chain resilience has not yet attracted much focused attention in academic discourse. Existing studies analyzing their deployment in manufacturing environments and across product lifecycles highlight an obvious gap: there are few comprehensive models that connect Digital Twin capabilities directly to resilience-oriented supply chain strategies (Zhong et al., 2022). This underscores the demand for a deeper understanding of how DTs can be employed in a purposeful, systemic manner to defend supply chains against a range of disruptive shocks. Accordingly, we present a conceptual framework designed to demonstrate how Digital Twin technology can be harnessed to address and alleviate supply chain vulnerabilities. The framework aspires to serve as an actionable, integrative roadmap for practitioners eager to embed DTs into their resilience initiatives, drawing on an extensive literature review and fusing it with insights from cutting-edge technological developments.

Figure 1 presents a comprehensive view of a Supply Chain Digital Twin (SCDT), which integrates digital technologies throughout the entire supply chain, from suppliers to customers. It begins with digital twin sensors that collect real-time data such as location and environmental conditions. This data feeds into a digital twin model, which is a virtual representation of the physical supply chain. The model enables three key digital twin applications: monitoring (to observe real-time supply chain activities), controlling (to dynamically manage and respond to issues), and simulation (to predict and optimize future scenarios). The supply chain process is segmented into five key components: supplier, intermediaries, production, intermediaries (again), and customer. Each component follows the core supply chain functions—plan, source, make, and deliver—while intermediaries also manage transportation, warehousing, and handling. The digital twin framework thus provides end-to-end visibility, responsiveness, and efficiency across the supply chain ecosystem.

Figure 1: Role of DT in Supply Chain



This article is structured as follows. In the supply chain resilience and the Digital Twin technology review, the literature review section reviews relevant literature. In the methodology section, the approach taken to develop the proposed conceptual framework is described. In the conceptual framework section, the model that is proposed is presented along with all of its parts and their relations. In the discussion section, the implications of the framework for theory and practice are examined. Lastly, the conclusion rounds up the work and provides a synthesis of the findings while indicating promising avenues for further research.

2. Literature Review

The modern-day unpredictable natural calamities, political calamities, and pandemics serve as stressors toward a business's continual function (Mkumbo et al., 2019). These issues have instigated a shift toward comprehensive study centered around a business's Supply chain and how resilient its systems and processes are, keeping core functions uninterrupted and operative (Handra and Sundram, 2023). Supply chain resilience refers to a system's overall ability to prepare, adjust, and recover proactively while Agile, adaptive, proactive , and reactive core functions remain unhampered, uninterrupted, and undisturbed while supporting core

functions uninterrupted. Resilience encompasses four core themes, namely agility, adaptability, robustness, and visibility. "Agility" (Dubey et al., 2019) speaks toward the system's ability to refractor and operationally shift to realign to set operational functions and to supply chain imperatives. Longer-term strategic and structural shift towards adaptability (along with other goals) is the hallmark of "adaptability," explained by Kamalahmadi and Parast (2016). Ponomarov and Holcomb (2009) define resiliency as an entity's capacity to continue to function and operate while absorbing external shocks. Agile speaks of decisiveness in change versatility, while technologically supersedes shift adaptive accelerates responsive purposiveness access in the space of Core, the goals of visibility are instant. Muhammad et al., 2025, Narayanan et al, 2024 (a, b) highlight the tech-centered propelling empowerment of real-time tracking of all supply components of the chain and suggest its aiding toward on-the-spot decision making, enabling instant solutions toward resolution acceleration.

The use of Digital Twin technology in modern-day supply chains can markedly improve their resiliency and operational efficiency. Each Digital Twin acts as a unique responsive virtual replica of a physical unit, integrating real-time information and simulations to render insight-based action (Fuller et al., 2020). Each Digital Twin embeds virtual checkpoints that validate in real-time, evaluate future states and compute alternative scenarios. According to Negri et al. (2017), the virtual model stays aligned and synchronized with the physical model 'twin' via streaming data. Digital Twin technology, when combined with predictive analytics, strengthens a company's ability to proactively manage potential disruptions and assess a range of counteraction plans (Qi & Tao, 2018). A clear and visual representation of the supply chain under different configurations and environments can be created through scenario-based modelling which turns insights into visual scenarios. Comprehensive simulation as described by Barricelli et al. (2019), captures a vast range of scenarios, ensuring that the best-informed decision is made. The improvements garnered in the logistics and manufacturing sectors in the supply chain, considering the context, are super operational performance, reduced risks, and profound enhancement (Caridi et al., 2014; Liu et al., 2020).

The excitement surrounding digital twins (DTs) is palpable given their capabilities pertaining to visibility, operations, and risk management in the supply chain sector. With DTs, tactical and strategic decision-makers have the option to execute preventative measures on supply chain disruptions and bottleneck scenarios far in advance of their escalation (Boschert & Rosen, 2016). Further, DTs are critical to risk management, specifically in modelling and analyzing potentially disruptive scenarios, thus allowing a chain to devise, simulate, and optimize strategies for unanticipated disruptions far in advance (Kritzinger et al., 2018). Beyond risk management, DTs focus on operational data to enhance performance by correcting actions at the underperforming nodes, thus reducing costs and improving service levels (Tao et al., 2018). There is a consensus on the theoretical promise of DTs, but case studies on their application in specific supply chain contexts are absent (Ivanov et al., 2020). These studies, which focus on DTs in a vacuum, seem to overlook solving practical problems and the multidomain integration challenges (Verdouw et al., 2021).

Regardless of the opportunities presented by the development of digital twin technologies, there exists a considerable gap within the literature concerning these technologies and their potential use towards improving the supply chain's resilience. In particular, there is a gap within the literature that creates an in-depth foundational analysis that applies digital twin technologies towards significantly improving the resilience within bounded, dynamically interlinked global supply chains (Jones et al. 2020). Čalić & Dolgui (2020) pointed out the lack of interdisciplinary empirical research that would illustrate the possible resilience enhancement offered by digital twin technology within different sectors. Moreover, the lack of certainty with respect to data interoperability, the incorporation of new twins into legacy systems, and the high recurring costs have created substantial gaps within the research (Zhang et al., 2019). To fully exploit the potential of technology in the intentional development of supply chains that are able to withstand and rapidly rebound from disruptions, these areas of research need to be addressed.

As you develop the conceptual framework, use it to evaluate the phenomenon in light of several important theories. Within this context, digital twins (DTs) showcase the Resource-Based View (RBV) theory, which posits that firms achieve sustainable competitive advantage by uniquely leveraging valuable, difficult-to-obtain, and hard-to-duplicate resources. Complexity Theory adds to the inquiry by considering the supply chains as adaptive systems that change their structure over time in response to perturbations; thus, the findings from

the DH serve as empirical confirmation for the complexity phenomenon. DTs, because of their ability to virtualize and spatially analyze intricate systems, afford specific tools for navigating through the intricate dependencies articulated by complexity theory. Further, systems theory adds to this view through its emphasis on integration and interdependence; by providing the means for real-time observation and control of the myriad interdependent activities that form a supply chain, DTs give systems theory empirical validation. Altogether, the outlined theories offer a coherent answer to how DTs might enhance supply chain resilience to perturbations.

Table 1: Literature Review Matrix: Digital Twin (DT) and Supply Chain Resilience

Author(s) & Year	Focus Area	Key Findings	Theoretical Lens	Relevance to DT
Ali et al. (2020)	ERP Implementation	ERP systems improve supply chain visibility and integration.	Information Systems Perspective	Supports foundational IT infrastructure for DTs.
Handra & Sundram (2023)	HRIS & AI in Defense	AI and HRIS improve operational efficiency.	Digital Transformation	Highlights the impact of AI in digitized systems.
Ibrahim et al. (2017)	Green Logistics Practices	Adoption of green practices enhances sustainability.	Sustainability Framework	Green practices align with DT-enabled optimizations.
Mkumbo et al. (2019)	Performance Measurement in SCM	Integrated practices improve firm performance.	SC Performance Models	Measurement systems can be enhanced through DTs.
Muhammad et al. (2025)	Citizenship & SC Sustainability	Good citizenship supports resilient SCs.	CSR & Sustainability	DTs can support transparency in SC citizenship efforts.
Narayanan et al. (2024a)	Palm Oil SC Sustainability	Certification and awareness improve consumer trust.	Consumer Behavior	DTs enable traceability of certified goods.
Narayanan et al. (2024b)	SC Finance & Working Capital	Multi-dimensional strategies optimize capital.	Finance & Operations	DTs support financial visibility and forecasting.
Sivan et al. (2024a)	Safety in Construction SCs	Integrated safety practices drive sustainability.	Risk Management	DTs can monitor real-time safety compliance.
Sivan et al. (2024b)	Safety Culture in Logistics	Perception surveys guide improvement strategies.	Organizational Behavior	DTs offer platforms for tracking cultural indicators.
Sureshkumar et al. (2024)	AI-Powered Risk Assessment	AI enhances DT for proactive risk control.	AI and Risk Management	Direct integration with DT risk modules.
Wong Chee et al. (2024)	Palm Oil SC Strategy (SWOT-QSPM)	Strategic alignment enhances performance.	Strategic Management	DTs support scenario simulation in SWOT analysis.

The literature review matrix synthesizes critical scholarly contributions on Digital Twin (DT) Technology and its impact on supply chain resilience. Handra and Sundram (2023), as well as Ali et al. (2020), define ERP, Human Resource Information Systems, and Artificial Intelligence as relevant and prerequisite foundational layers, which, if implemented, allow for efficient Digital Twin Technology utilization. Ibrahim et al. (2017) and Muhammad et al. (2025) shift the focus toward sustainability and nationalism, claiming that DTs enhance transparency and process accountability. Narayanan et al. (2024a, c) add to this discussion by integrating consumer trust, financial sustainability, and digital maturity as components of DT-enabled operational effectiveness, explaining also how traceability, predictive analytics and performance dashboards enhance

operational effectiveness. Sivan et al. (2024a, 2024b) concentrate on safety culture, exploring DTs live-monitoring and behavior-tracking functionalities and how these reinforce stringent safety compliance. The anticipatory risk landscape coupled with forecast-calculated strategy is explored by Sureshkumar et al. (2024) and Wong Chee et al. (2024), who contend together that DTs tend to transform complex supply network architectures to be more agile, flexible, and resilient.

3. Methodology

In developing a strategic Digital Twin (DT) application for supply chain resilience, we pursued a stepwise, integrative methodology that yielded a robust conceptual framework. Its design synthesizes, on the one hand, unexplored theoretical assertions distilled from existing literature, and, on the other, empirically grounded perspectives provided by seasoned industry practitioners whose views were cross-queried with scholarly peers. The foundation stage involved a sweeping review focused on DTs, resilience paradigms, and paradigmatic shifts induced by digital transformation. Prior work, including Kamble et al. (2021), had duly noted a DT's capacity to enhance end-to-end visibility, empower anticipatory analytics, and harmonize workflow efficiency. Nonetheless, the survey especially registered misaligned, siloed constructs and an essential absence of an integrative schema that marries DT capabilities to supply chain-endurance objectives. Complementing these literary discontinuities, we engaged Socio-Technical Systems Theory and the Actor-Network Theory, tracing back to Latour's 2005 explications, to interrogate the dynamic dialectic between digital artefacts and human agency within multiscalar supply chain networks (Bostrom & Heinen, 1977). The synthesised theoretical insights guided the framework's assembly by clarifying the interaction topology and guiding structural partitioning within the proposed architecture.

The modern-day unpredictable natural calamities, political calamities, and pandemics serve as stressors toward a business's continual function (Mkumbo et al., 2019). These issues have instigated a shift toward comprehensive study centered around a business's Supply chain and how resilient its systems and processes are, keeping core functions uninterrupted and operative (Handra and Sundram, 2023). Supply chain resilience refers to a system's overall ability to prepare, adjust, and recover proactively while Agile, adaptive, proactive , and reactive core functions remain unhampered, uninterrupted, and undisturbed while supporting core functions uninterrupted. Resilience encompasses four core themes namely agility, adaptability, robustness, and visibility. "Agility" (Dubey et al., 2019) speaks toward the system's ability to refractor and operationally shift to realign to set operational functions and to supply chain imperatives. Longer-term strategic and structural shift towards adaptability (along with other goals) is the hallmark of "adaptability," explained by Kamalahmadi and Parast (2016). Ponomarov and Holcomb (2009) define resiliency as an entity's capacity to continue to function and operate while absorbing external shocks. Agile speaks of decisiveness in change versatility, while technologically supersedes shift adaptive accelerates responsive purposiveness access in the space of Core, the goals of visibility are instant. Muhammad et al., 2025, Narayanan et al, 2024 (a, b) highlight the tech-centered propelling empowerment of real-time tracking of all supply components of the chain and suggest its aiding toward on-the-spot decision making, enabling instant solutions toward resolution acceleration.

The application of Digital Twin technology in modern supply chains can greatly improve their resilience and efficiency. Every Digital Twin acts as a dynamic virtual replica of a physical asset, incorporating real-time data and simulations to generate insights that can be acted upon (Fuller et al., 2020). Digital Twins incorporate virtual checkpoints that, in real time, validate, generate forecasts, and compute alternative scenarios. As Negri et al. (2017) explain, "the virtual model remains aligned and synchronized with the physical twin" through streaming data. Digital Twins, combined with predictive analytics, empower companies to identify possible disruptions and assess a number of pre-emptive mitigation strategies (Qi & Tao, 2018). Such insights can be rendered graphically through scenario-based modelling, which captures different configurations and environments of the supply chain, offering a clear visual representation. A comprehensive simulation that captures a wide range of scenarios is critical, as it maximizes the information available to ensure that the best decision is made, as noted by Barricelli et al. (2019). The improvements Digital Twins offer in Logistics, Manufacturing, and the Supply Chain result in super operational performance and reduced risk (Caridi et al., 2014; Liu et al., 2020).

The enthusiasm revolves around the supply chain industry's operational risk management and process

refinement with the implementation of digital twins (DTs). Tactical and strategic decision makers can mitigate supply chain disruptions and bottlenecks with DTs long before they materialize (Boschert & Rosen, 2016). Furthermore, DTs are crucial in risk management because they model and analyze disruptive scenarios, allowing supply chains to create and optimize simulations of contingent strategies for calculated strategies regarding future disruptions (Kritzinger et al., 2018). Besides risk management, DTs focus on improving performance metrics by overhauling the corrective action processes in the deficient nodes, which reduces operational costs and enhances the overall service level (Tao et al., 2018). There is an overarching consensus on the theoretical promise of DTs, but there is a notable absence of empirical research investigating the practical application of DTs in specific supply chain contexts (Ivanov et al., 2020). These studies seem to overlook the integration across multiple sectors as they focus on the concept of DTs (Verdouw et al., 2021).

Noted gaps in the literature focus on the use of digital twin technologies to improve the resilience of Supply Chains, which is especially concerning given how promising this technology is. Specifically, it is difficult to find literature that deals specifically with the development of foundational frameworks that incorporate digital twin technologies within bounded, dynamically interlinked global supply chains that increase resilience (Jones et al., 2020). Čalić & Dolgui (2020) emphasized the absence of empirical cross-sectoral studies demonstrating the prospective resilience advantages of digital twins within single industries. Furthermore, the gap between the expected and published studies concerning digital twins is also fuelled by insufficiently defined data interdependence, the merging of new twins with the existing twin, and the overall high costs of digital twins (Zhang et al., 2019). Bridging these gaps is crucial to intentionally designing supply chains that are able to withstand and rapidly bounce back from unpredictable disruptions.

The conceptual framework should guide the examination of the phenomenon through the lens of certain theories. The Resource-Based View (RBV) highlights the notion that firms achieve a sustainable competitive advantage through a unique and valuable harnessing of resources that are difficult to obtain and replicate; this most certainly applies to digital twins (DTs). Complexity theory broadens the inquiry by regarding supply chains as adaptive systems that alter their structural configuration continuously over time in response to perturbations; thus, the DH findings serve as the empirical evidence of the complexity phenomenon. Through their ability to virtualize and analytically dissect intricate networks, DTs grant the tools necessary to manoeuvre through the elaborate interdependencies described by complexity theory. Furthermore, systems theory supports this notion by emphasizing integration and interdependence; by providing real-time observation and control of countless interdependent activities that make up a supply chain, DTs aid systems theory. Each of these theories, combined, forms a coherent response to the question of how DTs could enhance the resilience of supply chains to perturbations.

4. Conceptual Framework

The provided framework seeks to explain the role of Digital Twin (DT) technology in the enhancement of supply chain resilience by integrating three core dimensions: inputs, processes, and outcomes. These components describe how DTs engage with supply chain systems to bolster resilience. There is a visual representation of the framework, which shows the interconnections of these dimensions.

Table 2: Specific Variable Names for Conceptual Framework

Variable Type	Specific Variable Name	Description
Independent	Digital Technology Enablers	Includes IoT devices, artificial intelligence, real-time data streams, and simulation tools that enable digital twin functionality.
Mediating	Digital Twin Operational Functions	Encompasses key DT processes such as demand forecasting, risk assessment, scenario planning, and monitoring.
Dependent	Supply Chain Resilience Capabilities	Represents the resilience outcomes, including responsiveness, flexibility, risk mitigation, and robustness.

This given explanation offers a detailed overview of the interactions among the variables within the given scope of the conceptual framework while maintaining the relationships and interdependencies sufficiently clear.

Digital Technology Enablers

This research looks at the entire supply chain integration of the digital twin tools. Their focus is on the subsystems of analytic AI, including sensor networks, real-time data processing, and complex scenario simulators. Propagating the operational state of machinery, vehicles, and inventory systems is achieved through the Internet of Things (IoT) technologies. Xu et al. (2021) called this a version of waking and responsive visibility. Systems are now being designed with AI capabilities that expand beyond the ability to simply respond to stimuli and into proactive order fulfilment, prescient maintenance, and supply bottleneck anticipatory role execution (Jahangirian et al., 2022). To maintain uninterrupted processing of supply chains, both real and ideal, streams of data are ingested without interruption to ensure perpetual optimization. The task of processing the streams is real-time, and the streams themselves are infused with advanced causal impact analysis (Lee et al., 2020). Systems are also capable of adaptive resilient strategy reconstruction, where flexible strategy reconstruction is achieved through quantified resilience, permitting the modelling of recovery strategy computation across vast configuration simulation arrays with detailed optimal plan extrapolation. The use of digital twin technologies facilitates direct interventions, which enable systems to perform autonomous logistics and production through computation of optimal recovery strategy, virtual resilience experimentation, and reconstruction of flexible recovery strategies.

Digital Twin Operational Functions

The use of digital twins in core supply chain processes like risk assessment, forecasting, and planning happens within specific boundaries. Monitoring inventory levels and tracking in real-time sharpens accuracy, thus tighter synchronization of production schedules is possible (Singh et al., 2022). Strengthening risk assessment with real-time dynamic supply chain mapping of weaknesses and calculating the likelihood of certain disruptive events improves forecasting accuracy (Ivanov et al., 2021). The scenario analysis is performed faster due to simulation engines within the twin that allow for quick projection of strategic outcomes and the most resilient risk-mitigation pathways in evasive twin tunnelling (Barricelli et al., 2019). The described digital twin technologies have significantly transformed and improved the situational awareness and responsiveness of adaptive supply chains.

Supply Chain Resilience Capabilities

The focus on measuring supply chain resilience has recently been sparked by the capabilities afforded by digital twins (DTs). Perhaps the most welcomed benefits conferred include heightened responsiveness, operational flexibility, and superior risk shielding. The responsiveness DTs bestow upon the supply chain is operational visibility, and demand or supply sensing communications (Min and Zhou, 2020). Flexibility improves as DTs mitigate and counterbalance disruptions to processes by remixing processes and resource allocation to restore flow and replenish processes (Kamble et al., 2021). Risk shielding, as explained by Verdouw et al. (2021), is reinforced risk shielding as DTs perform pre-emptive analytics and forecasting. Poor forecasting and analytics identify weak points many steps before costly interruptions stand a chance to occur. The aggregate of these benefits underscores the risks averted through DTs and the capacity to transform supply chains into resilient systems that withstand and endure shocks, emerging as stronger systems.

The framework is further enhanced with the following hypotheses.

- DT technology adoption through the IoT and AI increases the visibility of supply chain activities in real-time.
- DT technology implemented in the supply chain featuring advanced capabilities for risk and scenario versatile planning improves supply chain responsiveness and flexibility.
- The use of DT technology improves resilience and diminishes the impact of disruptions on supply chains.

This framework provides the means both conceptually and empirically to analyze the impact of DTs on the enhancement of supply chain resilience.

Discussion

This review develops a framework for assessing the impact of Digital Twin technology upon resilience in a supply chain. This framework encompasses technology enablers and processes and their corresponding resilience outcomes, fulfilling a systematic analytical purpose for both practitioners and scholars who aim to utilize Digital Twins. The next section outlines the model's initial theoretical implications, and afterward, it shifts to practical implications, focusing first on barriers to adoption and subsequently outlining avenues for future research.

Theoretical Contributions

This framework contributes to the literature with respect to the intersection of digital transformation and the resilience of the supply chain. One area of research focus often tends to ignore other relevant areas. In this case, the literature is overly compartmentalized, and this is the gap that this study is trying to address by formulating a cohesive framework using various disparate elements. The framework incorporates drivers such as IoT, AI, and simulation technologies, which aid in understanding the effects of these contemporary tools on the supply chain in greater depth. It is anchored on the socio-technical systems theory, which emphasizes the interplay of technology and human action regarding the employment of complex supply chains (Bostrom & Heinen, 1977). In addition, this framework contributes to the literature on digital resilience by pinpointing certain mediating factors—essentially, real-time monitoring and scenario-based planning—resiliency metrics that are monitored in real time and, in effect, anchor resilience metrics. Likewise, it augments the framework and expands the theoretical discussion by integrating digital technologies into the Resource-Based View, articulating how these technologies become distinctive strategic assets that bestow enduring competitive advantage (Barney et al., 2021).

Practical Implications

This guideline can aid supply chain managers by showing them how to more effectively incorporate digital twin technology to achieve heightened supply chain resilience. With focused attention to monitoring in real time and making accurate forecasts, proactive action can be taken to avert major disruptions. For instance, IoT sensors provide real-time data that reveals errors, bottlenecks, or even the health of the equipment before they become widespread (Tiwari et al., 2022). In parallel, scenario planning through simulations provides decision makers a virtual sandbox to rehearse a gamut of responses to myriad risks, thus improving decision-making in real-life emergencies. Adherence to the guideline strengthens the argument that technology in isolation with no investment in staff training will produce no value and inordinate funds will be rendered as other organizational resources will not be utilized. Adoption of this structured approach increases organizational agility by enabling companies to respond swiftly and smoothly to shifting conditions, thus preserving optimized operations during unpredictable change.

Challenges in Adopting DT Technology

The use of digitized twins in supply chains poses many challenges, one of the most acute being the monetarily-straining sensors, simulation ecosystems, and AI systems (Narayanan et al., 2024a). The lack of qualified engineers exacerbates the issue. Logistics networks that are more conservative in their approaches are, in part, a reaction to the need to safeguard intellectual capital. Supply chains are a treasure trove of proprietary data. Any operational infringement could compromise critical business processes, which would be devastating to a firm's reputation. These breaches are vital for firms to avoid and, thus, supply chains are managed with a very conservative orientation. The challenges posed by the coexistence of legacy systems are no less daunting. These legacy systems have persisted for decades, and due to the novelty of digitized twins, there is a risk of silos if the enhanced systems are unable to interface and collaborate. This is the opposite of the vision of a digitized holistic multiverse (Sundram et al., 2025; Sundram et al., 2018). Such challenges illustrate the relentless supply chain digitization competition.

Future Trends

Future evolution of digital twin technology in supply chains will be driven by tighter integration with other Industry 4.0 pillars, notably blockchain, 5G, and machine learning. Saberi and colleagues (2019) demonstrated that blockchain-derived traceability and security bolster the parallel, continuous data streams that digital twins require. With 5G, the practical benefits expand: improved bandwidth and latency translate into tighter

simulation loops and real-time adjustments (Sharma et al., 2021). Meanwhile, continuous enhancements in machine learning—from anomaly detection to demand sensing—will yield sharper, more granular risk and opportunity assessments. Collectively, these base technologies will reduce the dependence on human data entry and decision-making, moving more processes into closed, self-running loops. A parallel thread worth mentioning is the emergence of digital twins in circular supply chains, where they serve to optimize resource loops and minimize waste (Genovese et al., 2022). We synthesize these observations into a structured conceptual framework that clarifies how digital twins can fortify supply chain resilience. By marrying theoretical constructs with empirical implementation, the framework serves both scholars seeking to advance the literature and practitioners tasked with operational application. Even though challenges such as expense, required expertise, and data protection persist, the continued advancement of Industry 4.0 technologies shows considerable promise. Existing studies indicate that an expanding pool of empirical evidence and ongoing innovation can contribute to more robust and adaptable supply chains Rasi et al., 2022; Razak, Othman, & Sundram, 2015; Selvarajah et al., 2025.

5. Conclusion

The ever-changing global interconnected disruptions along with the intricate configuration of the global supply chain necessitate resilience embedded equally across every operation (Narayanan et al., 2024b; Narayanan et al., 2025). As DT technologies are applied, their fulfillment requirements are still approached. As described in Kristoffersen et al. (2021), DTs enable predictive modelling and scenario simulation which provide 360-degree visibility. This ability of DTs aids in supply chain processes control and enables the pre-emptive adjustment, impact mitigation, and controlled recovery of the processes. These capabilities attest to the realization of constructing agile supply chains capable of enduring and absorbing disruptions while sustaining operations with minimal delays (Delic and Eyers, 2020). The developed conceptual framework enriches the academic discourse by describing theoretical gaps and investigating how DTs impart resilience. This framework contributes to the emerging frontier of DT technology and aims to integrate theoretical and empirical gaps that are grounded in contemporary innovations with timeless practical frameworks.

Based on the work of Singh et al (2021), businesses can achieve sustainable competitive advantage through the use of digital technologies with the help of an emerging technologies integration framework that employs specific resilience strategies. In my view, this framework fills an important gap in the literature by integrating technological capabilities with resilience factors, thus moving the conversation on the supply chain transformation technology (Müller et al., 2021). To the best of my knowledge, no one has empirically tested the framework so far. That said, it is important to note that assessing it within the context of real-world impact and value would require empirical work. We extend the invitation to researchers from all fields to apply the framework in diverse industrial and geopolitical settings in order to broaden its relevance and applicability. Digital technology's impact on demand sensing and risk aversion could be studied with mixed-method frameworks that use rich qualitative case studies and extensive quantitative data (Tortorella & Fettermann, 2018). Concurrently, such studies could evaluate how digitally transformative strategies applied in an interventionist manner strengthen resilience metrics over time. Such studies would strengthen the understanding of how technology enhances supply chain resilience and identify additional avenues for enhancement.

With regard to supply chains, the integration of digital technologies introduces issues such as interoperability, scalability, and concerns related to digital twin technologies. Concerning the digital twin application in supply chains, the frameworks pose the challenge of how their dynamic, evolving, and interdependent systems model relates to the legacy systems and processes in place. Further research could focus on telemetry frameworks, which digitally model shapes as metrics of active spatial geometry that would digitally embed telemetry concerning corporate teamwork alignment metrics. Apart from those efforts, scalability research could investigate the operation of digital twins in complex multi-tiered networks, including their application in supply chains with geographically disparate constituents and the enhancement of efficacy in multi-tiered networks.

What and how supply chains foresee, analyze, react to, and recover from disruptions is determined by the modelling and forecasting of complex systems with digital twins. Outcomes from corporate digital readiness

and the firm's technology, operational practice, and corporate resilience become the focus in assessing the interdependence between these variables. Emphasizing integrated empirical scaling validation while resolving scaling challenges should harness more value with the application of digital twins and optimization in supply chain management. The development of a sustainable economy is anchored on digital twin technology that enhances the critical functions of the supply chain, simultaneously fostering resilience.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Digital Twin for Sustainable Supply Chain in Urban Development: A Conceptual Model for Smart Cities

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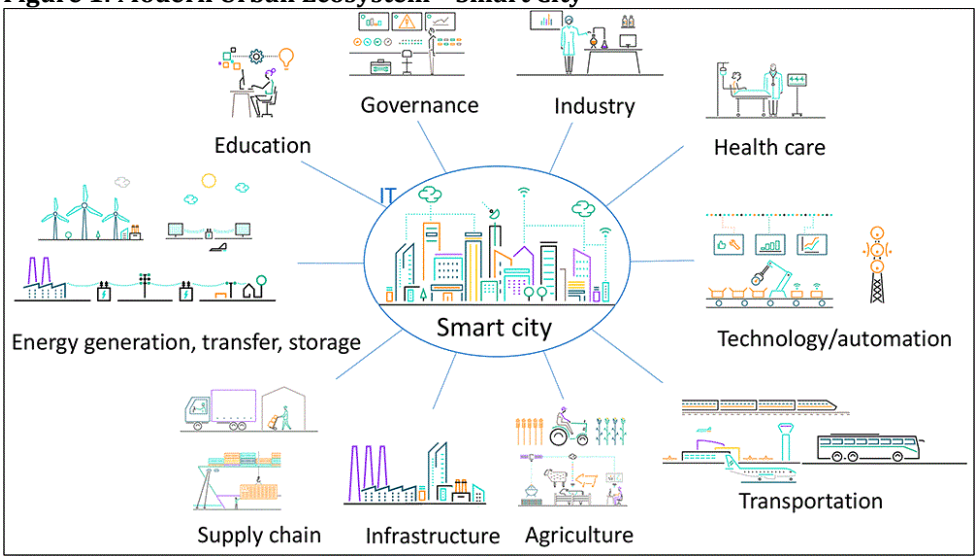
Abstract: The rapid urbanization of the 21st century has intensified the need for innovative solutions to address sustainability supply chain challenges in urban environments. Digital Twin (DT) technology, characterized by its ability to create virtual replicas of physical systems and integrate real-time data, has emerged as a transformative tool in smart city development. This study proposes a conceptual framework that explores the role of DT technology in promoting sustainable supply chains in urban development by aligning environmental, economic, and social dimensions with urban governance. By integrating insights from sustainability science, cyber-physical systems, and smart city initiatives, the framework highlights how DTs can optimize urban systems, improve decision-making, and foster inclusivity. Additionally, it addresses key challenges such as data privacy, interoperability, and scalability, offering a roadmap for future research and implementation. The findings emphasize the potential of DTs to create resilient, efficient, and equitable urban ecosystems, bridging gaps in existing research and providing actionable guidance for policymakers, urban planners, supply chain practitioners and industry stakeholders striving to shape sustainable cities of the future.

Keywords: *Digital Twin, Sustainable Urban Development, Smart Cities, Urban Systems Optimization, Cyber-Physical Systems, Sustainability Supply Chain, Real-Time Data Integration, Urban Governance*

1. Introduction

The unprecedented growth of urbanization has placed immense pressure on cities, compelling them to adopt innovative solutions to ensure sustainable development (Ali, Rajagopal, Sundram, Saihani, & Noranee, 2020; Handra & Sundram, 2023; Rasi et al., 2022; Razak, Othman, & Sundram, 2015; Sundram, Ghapar, Lian, & Muhammad, 2023). According to the United Nations, by 2050, nearly 68% of the global population is expected to live in urban areas, making sustainability a critical objective for city planners and policymakers (United Nations, 2018). The traditional urban planning approaches, often reactive and siloed, are ill-equipped to address the multifaceted challenges of resource management, climate change, and citizen welfare in modern urban ecosystems (see figure 1).

Figure 1: Modern Urban Ecosystem – Smart City



In response, the concept of Digital Twin (DT) has emerged as a groundbreaking technology with transformative potential in urban development. Initially developed for industrial and manufacturing sectors, a Digital Twin refers to the virtual representation of physical assets, systems, or processes that integrates real-time data, advanced analytics, and simulation models (Tao et al., 2018). In the context of urban development, Digital Twin technology offers a unique opportunity to virtually replicate city systems—such as energy grids, transportation networks, and water management systems—thereby enabling predictive analysis, optimization, and improved decision-making (Bilal et al., 2022).

Interest in Digital Twins (DTs) has surged because their live, data-rich models promise exactly what smart-city agendas call for: sharper efficiency, lower carbon footprints, and healthier day-to-day living (Negri et al., 2021). With a DT tracking key assets in real time, city managers can fine-tune energy flows, reroute buses before congestion locks in, and test flood-control options virtually—slashing trial-and-error costs and boosting resilience against climate shocks or rapid population growth. Policymakers also gain a safe "sandbox" for trying out alternative development paths, comparing outcomes long before concrete is poured, and steering governance toward sustainability rather than after-the-fact fixes.

Yet, for all the excitement, DT adoption in urban planning remains tentative. Most published work still zooms in on technical nuts and bolts—sensor grids, IoT gateways, data schemas—while sidelining the environmental, social, and economic pay-offs that ultimately define holistic urban progress (Bolton et al., 2018). To move beyond this narrow focus, the present study positions DT technology as a linchpin for sustainable urban development inside the broader smart-city framework, arguing that real-time feedback, predictive analytics, and scenario modelling must be yoked directly to equity and climate goals.

Accordingly, this paper pursues two aims. First, it unpacks the theoretical roots of DTs, explaining why their cyber-physical architecture uniquely suits the complex, fast-moving challenges of modern cities. Second, it introduces a structured conceptual framework that embeds DT capabilities inside routine planning cycles, demonstrating how live data streams can inform zoning, budget allocation, and infrastructure upgrades with sustainability uppermost. By blending technological, environmental, and social lenses, the model helps close a stubborn gap in current scholarship and practice. In offering this integrated perspective, we hope to equip planners, policymakers, and researchers with a clearer roadmap for tapping DT potential. The framework underscores not only the engineering prowess of Digital Twins but also their alignment with inclusive, climate-resilient governance principles (Narayanan et al., 2024a, 2024b, 2024c; Sureshkumar et al., 2024a; Sureshkumar et al., 2024b; Sundram et al., 2025).

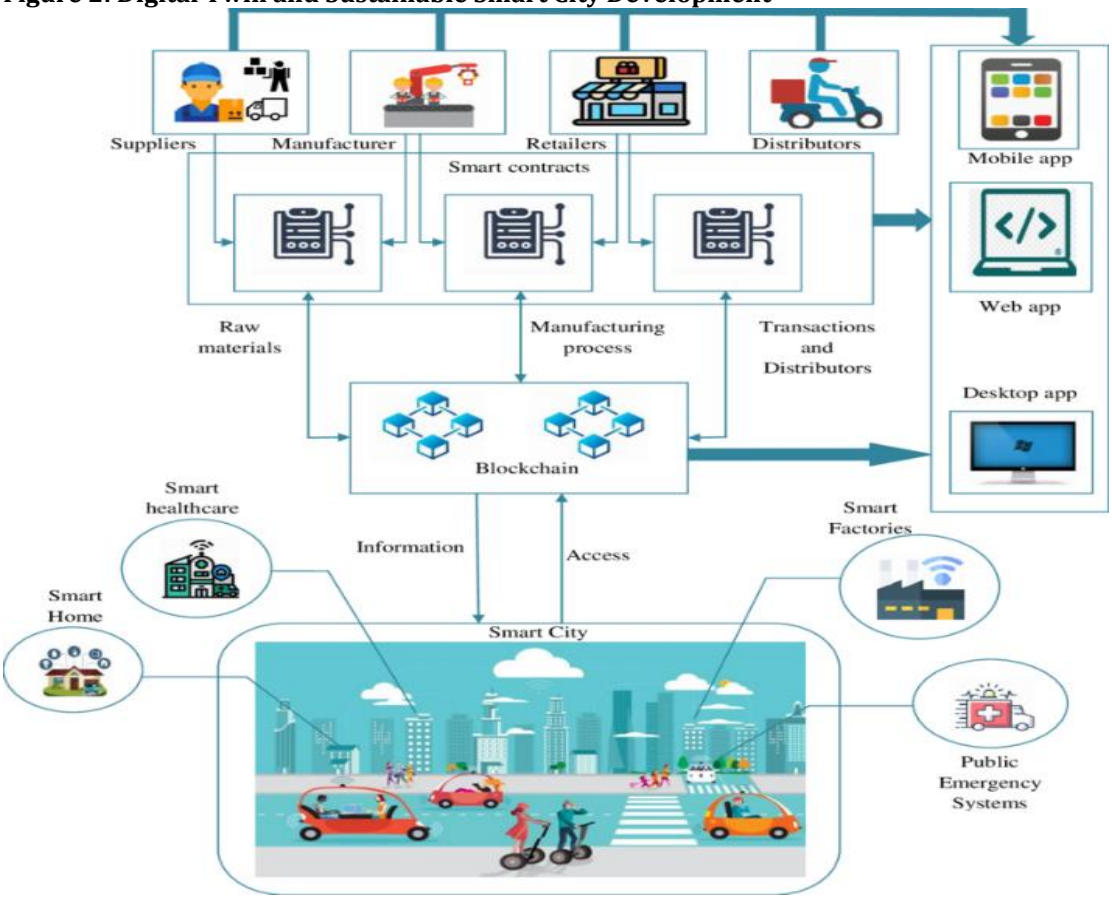
2. Literature Review

Digital Twin (DT) technology first took shape in manufacturing, where Michael Grieves (2014) championed the idea of building a virtual counterpart for every physical product to streamline its entire life cycle. As sensors grew cheaper and cloud analytics more powerful, the basic manufacturing model evolved. Thanks to the Internet of Things, real-time data flows, and artificial-intelligence-driven analytics, DTs now support far more than factory floors; they are increasingly embedded in fields such as urban planning and smart-city management (Qi & Tao, 2022).

Within city development, a DT functions like an ever-updating "living map" that fuses information streams from utilities, transport networks, environmental sensors, and even social media. Urban planners can run "what-if" experiments—closing a road, adding a bus line, or testing flood defenses—and instantly see the ripple effects before a single brick is laid (Bilal et al., 2023). Singapore's nationwide Virtual Singapore platform is a leading proof-of-concept: its 3D city model supports everything from zoning deliberations to disaster-response drills and micro-climate studies (National Research Foundation, 2019).

Smart-city visions ultimately aim to boost liveability, efficiency, and sustainability. DTs push that agenda forward by turning fragmented urban data into a coherent, actionable picture. City managers can, for example, balance energy loads across districts, fine-tune waste-collection routes, or redesign bus schedules to cut both emissions and commute times—all in a risk-free simulation environment (Bolton et al., 2021). When planners layer sustainability metrics onto these models, they can quickly spot the solutions that yield the greatest environmental benefit, whether by trimming energy demand, shrinking landfill inputs, or easing congestion (Negri et al., 2022).

Figure 2: Digital Twin and Sustainable Smart City Development



Although Digital Twins offer impressive possibilities for city management, rolling them out at an urban scale is

far from straightforward. Safeguarding residents' data, agreeing on common data standards, and stitching together information that arrives in wildly different formats all remain stubborn hurdles (Verdouw et al., 2021). Urban environments are also messy and interdependent, so their digital replicas demand advanced modelling techniques and hefty computing power. Current research, therefore, concentrates on building tougher data-integration frameworks, boosting system-to-system compatibility, and ensuring that DT platforms can expand without breaking under the weight of city-wide datasets (Qi & Tao, 2022).

As summarised in Table 1, most published work still views DTs through a technical lens—rooted in their manufacturing origins (Grieves, 2014; Tao et al., 2018)—and celebrates their ability to drive efficiency, sustainability, and strategic planning in smart-city initiatives (Negri et al., 2021; Qi & Tao, 2022). What is often missing, however, are deeper explorations of social impacts and governance issues, signalling fertile ground for future inquiry. Practical examples like Virtual Singapore demonstrate DT's real-world use, while regional studies (Ibrahim et al., 2017; Narayanan et al., 2024) highlight sustainability and digital integration in Malaysian supply chains. The current study fills the gap by proposing a holistic DT framework that includes environmental, economic, and social sustainability, aligning with urban governance goals.

Table 1: Literature Review Matrix

Author(s)	Year	Focus / Key Constructs	Methodology	Key Findings	Gaps Identified	Relevance to Current Study
Grieves	2014	Origin of the Digital Twin (DT) concept in manufacturing	Conceptual	DT for lifecycle management	Limited urban application	Foundation for DT in the urban context
Tao et al.	2018	Three-dimensional DT framework (physical, virtual, connection)	Conceptual	Synchronization for optimization	Technical focus, lacks sustainability integration	Supports technical architecture for DT systems
Bolton et al.	2018, 2021	Urban resilience and infrastructure planning using DT	Review	DT helps optimize infrastructure	Overlooked social sustainability and inclusivity	Informs socio-technical integration in the framework
Negri et al.	2021, 2022	Role of DT in smart manufacturing and sustainability	Literature review	DTs enhance resource efficiency	Weak socio-economic integration	Validates DT for sustainability in smart cities
Qi & Tao	2022	DT applications in smart cities and manufacturing	Systematic review	Cross-sector DT adoption	Interoperability, data integration issues	Reinforces DT's adaptability to smart cities
Verdouw et al.	2021	CPS and DT integration in smart cities	Conceptual	Need for standardization and data security	Lack of scalable models	Highlights interoperability issues
Bilal et al.	2022, 2023	DT for urban planning and construction	Empirical & Conceptual	DT improves real-time monitoring and planning	Limited socio-technical frameworks	Shows DT viability in real-world city projects
National Research Foundation	2019	Virtual Singapore (city-wide DT)	Case Study	Used for planning, disaster mgmt, and sustainability	Limited academic model development	Strong practical evidence for DT potential
Ibrahim et al.	2017	Green logistics practices in Malaysia	Case Study	Factors influencing green practices	Focused on logistics, not full urban systems	Regional insight on sustainability
Narayanan et al.	2024	Supply chain sustainability in palm oil & digital risk management	Quantitative	SC resilience, AI & risk tools	Not integrated with urban governance	Establishes supply chain-tech-policy links

The application of DT technology in urban development represents a significant advancement in the pursuit of

smart and sustainable cities. By providing a virtual platform for modelling, monitoring, and optimizing urban systems, DTs offer valuable tools for city planners and policymakers (Ibrahim, Sundram, Omar, Yusoff, & Amer, 2017; Muhammad, Narayanan, Ghapar, Chew, & Sundram, 2025; Wong Chee, Sundram, Bakar, & Narayanan, 2024). However, realizing their full potential requires overcoming existing challenges through continued research and collaboration among stakeholders. Figure 1 can be viewed through the lens of a Digital Twin concept for sustainable urban development by showing how real-time data flows—captured from suppliers, manufacturers, and distributors—feed into a blockchain layer and then inform various smart city services (e.g., smart healthcare, public emergency systems). In a Digital Twin framework, these data streams create a virtual replica of urban processes, allowing city planners and stakeholders to simulate, monitor, and optimize resources. By integrating supply chain operations with city infrastructure and services, the system enables sustainable decision-making, streamlined logistics, and agile responses to real-world events. Ultimately, the comprehensive digital view afforded by blockchain and IoT sensors supports a more resilient, efficient, and eco-friendly smart city ecosystem.

Table 2 identifies that the existing Digital Twin literature focuses on technical or industrial applications, often overlooking urban governance and holistic sustainability. Moreover, the regional focus is skewed toward developed countries, leaving a gap in Southeast Asian contexts. This study addresses these gaps by proposing a comprehensive DT framework tailored for smart city planning, incorporating environmental, economic, and social dimensions, and contextualized for Malaysian urban development.

Table 2: Research Gap Mapping Table

Area	Existing Focus	Gap Identified	How the Current Study Addresses It
DT in Manufacturing	Strong technical models	Limited urban or governance integration	Expands the DT application to urban planning
Smart Cities	Focus on technology & infrastructure	Lacks inclusivity and sustainability balance	Integrates social, economic, and environmental goals
Urban Governance	Underexplored in the DT context	Missing in most DT frameworks	Proposes DT for inclusive governance
Regional Implementation	Mostly Western/developed contexts	A few Southeast Asian case studies	Incorporates Malaysian and regional perspectives

3. Theoretical Background

Digital Twin (DT) technology has leaped far beyond its shop-floor origins. What began as a way to shadow products through their life cycles in manufacturing now shapes everything from surgical theatres to freight corridors and metropolitan master plans (Tao et al., 2018). At its heart, a DT is a "living" mirror of a physical asset: sensors stream real-time data into a virtual model, allowing engineers and managers to predict how the real system will react to stress, wear, or sudden change (Negri et al., 2021). Because the virtual and physical stay in lock-step, the model becomes a safe sandbox for trial runs and "what-if" experiments that would be risky—or impossible—in the real world.

When we talk about using DTs for greener, smarter cities, two larger ideas frame the conversation. Smart-city thinking treats data as a city's nervous system, using it to trim waste, cut emissions, and uplift everyday life (Bolton et al., 2018). Cyber-physical-systems (CPS) theory adds another layer, explaining how computational intelligence, ubiquitous connectivity, and the built environment meld into an interactive whole—the very fusion that powers a Digital Twin (Bilal et al., 2022). Together, these perspectives give scholars a solid scaffold for testing DTs in real urban settings (Selvarajah et al., 2025; Narayanan, Rui, Sundram, & Irwan, 2025; Sundram et al., 2018). Conceptual tools such as Tao et al.'s (2018) three-space DT model—physical, virtual, and the real-time bridge between them—explain how a city can keep constant watch over bridges, subways, and power grids, while sustainability research urges analysts to judge every DT roll-out against environmental, economic, and social yardsticks (Bilal et al., 2022).

Yet notable blind spots remain: most studies still obsess over sensors and data pipes, with scant attention to jobs, equity, or civic trust (Negri et al., 2021). Rarely do researchers ask whether virtual replicas might bridge—or widen—digital divides (Bolton et al., 2018), and few link DT metrics directly to climate-resilience targets or governance reforms. Our study, therefore, weaves insights from smart-city literature, CPS theory, and sustainability science into one conceptual model, showing step by step how Digital Twins can toughen urban resilience, curb resource waste, and broaden access to city services. By anchoring DT adoption in wider sustainability goals, the model offers both a practical roadmap for planners and a richer, more inclusive agenda for future scholarship on Digital Twins and tomorrow's cities..

4. Conceptual Framework

Development of Ideas

Our framework places Digital Twins squarely at the crossroads of smart-city ambition and sustainable-development necessity, arguing that a city's most pressing problems—resource pinch-points, climate shocks, and social inequities—can be tackled more deftly when a real-time virtual replica stands ready to guide decisions. We start by mapping the pain points in core urban systems such as power grids, bus lines, drainage networks, and housing stock, then show how a DT's sensor-fed simulations and what-if models turn raw data into foresight. Because the twin rests on a stack of IoT devices, cloud platforms, and advanced analytics, it closes a feedback loop: live conditions flow in, predictive insights flow out, and officials adjust operations before small glitches grow into crises (Mkumbo et al., 2019; Selvaraju et al., 2019; Zulfakar et al., 2019). Crucially, the framework ties every DT intervention to the three pillars of sustainability—trimming emissions and waste (environmental), stretching budgets through smarter maintenance and investment (economic), and spotlighting underserved neighborhoods so benefits land where they are needed most (social). In doing so, it casts Digital Twins not merely as high-tech dashboards, but as engines of resilience and inclusivity for twenty-first-century cities.

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Key Constructs and Relationships

In our framework, Digital Twin (DT) technology functions as the city's analytical "brain," continuously ingesting real-time data from thousands of IoT sensors to create a high-fidelity virtual replica of physical infrastructure. This living model enables predictive analytics and simulation, allowing planners to test scenarios—such as heatwaves, traffic surges, or water-pipe failures—without real-world risk. Integrated directly into the three pillars of sustainability, the twin helps curb emissions and optimize energy and waste flows (environmental), flags cost-saving maintenance windows and uncovers efficiency opportunities (economic), and exposes service gaps so resources can be distributed more equitably (social). Insights generated in the virtual space flow back to urban systems—power grids, transport networks, water management, housing—guiding real-time adjustments that tighten performance, bolster resilience, and enhance inclusivity. This constant loop between sensing, modelling, and action turns the city into an adaptive organism, steadily learning from each cycle and advancing toward holistic, sustainable governance.

Discussion

Building on earlier scholarship that touts Digital Twins (DTs) as the nerve-center linking physical assets with their virtual counterparts (Tao et al., 2018; Negri et al., 2021), our framework agrees that IoT connectivity and advanced analytics sit at the heart of the twin concept—but it deliberately pushes the conversation well past cables and code. By placing the three sustainability pillars — environmental stewardship, economic vitality, and social equity — at the very core of the model, we recast DTs as catalysts for climate resilience and fair resource allocation rather than as mere efficiency tools.

Unlike Tao et al.'s life-cycle-focused manufacturing lens, our approach positions DTs to tackle city-scale governance puzzles: How can real-time flood simulations guide zoning? Which districts should receive priority upgrades to energy grids? And who benefits first when a new transit route is proposed? The framework also layers in socio-economic factors, making it adaptable to cities at different stages of digital maturity and income levels—a gap left largely untouched by models tailored to highly connected, affluent urban centres (Sivan et al., 2024a; Sivan et al., 2024b; Vatumalae, Rajagopal, & Sundram, 2020). In short, this paper keeps the technical backbone of DT theory intact but widens the lens to show how the same technology can serve broader sustainability and equity ambitions in cities across the globe.

Implications for Theory

Most studies still treat Digital Twins as clever bundles of sensors, software, and servers. Our framework pushes the conversation further: it casts DTs as linchpins for building cities that thrive environmentally, prosper economically, and nurture social equity all at once. By folding the classic three pillars of sustainability into the discussion, we move beyond "how fast can the twin update?" toward "whose lives get better when it does?" In doing so, the framework knits together ideas from smart-city research, cyber-physical systems, and sustainability science, showing how real-time data streams and predictive models can feed directly into day-to-day governance. Put simply, it offers scholars and practitioners a richer, multidimensional lens for studying—and eventually deploying—Digital Twins across a wide range of urban settings.

Practical Implications

From a practitioner's standpoint, our framework turns Digital Twins into more than a clever dashboard—it makes them a day-to-day guide for running a city. Urban planners can rehearse an energy-saving traffic-light schedule overnight, see its impact on rush-hour gridlock by breakfast, and fine-tune it before commuters hit the road. Water authorities might model leaks in a digital main hours before they burst in the real one, sparing neighbourhoods a boil-water notice. Transport agencies can test new bus routes on the twin to spot knock-on effects—emissions, wait times, even noise—long before a single detour sign goes up.

Industry players also stand to gain. Infrastructure firms can "listen" to bridges, tunnels, and rail beds through their twins, scheduling maintenance when early wear signs appear rather than after costly failures. Energy companies can balance load and decentralised generation in near real time, while tech vendors can carve out niches by tailoring DT platforms to specific urban subsystems—storm-water networks today, district cooling tomorrow.

For policymakers, the framework's greatest promise may lie in equity. Because a Digital Twin can visualise who gets clean air, fast internet, or frequent buses—and who does not—it equips officials to close service gaps instead of widening them. In short, the twin becomes a civic X-ray: revealing hidden fractures, testing remedies virtually, and helping decision-makers deliver smarter, fairer, and more sustainable cities.

5. Conclusion

In conclusion, this paper constantly focuses on the essence, which is what this study's conceptual framework argues Digital Twins (DTs) can offer to the sustainability playbook for smart cities. By fusing live sensor feeds, predictive algorithms, and scenario "dress rehearsals," DTs help officials spot weak links before they snap, shave waste from daily operations, and make room for voices that usually stay outside the planning room (Verdouw et al., 2021; Qi & Tao, 2022).

What sets this model apart is how it weaves DT muscle into all three pillars of sustainability at once. Environmentally, a twin can test whether rerouting garbage trucks or dimming streetlights after midnight trims carbon without hurting safety. Economically, it can run cost-benefit drills on everything from bus-lane redesigns to rooftop-solar incentives—long before budgets are locked in. Socially, the same platform can surface "heat maps" of service inequity, helping planners channel investment into the neighbourhoods that need it most (Negri et al., 2022). Crucially, real-time feedback loops let residents nudge the system: imagine commuters flagging a jam on an app and watching traffic lights retune on the twin within seconds (Bolton et al., 2021).

Why does this matter? Because cities everywhere are being asked to grow, decarbonise, and stay livable—all at once. The current research canon still circles mechanical questions—How do we wire the sensors? How much cloud space do we need?—while largely sidestepping the bigger puzzle of how DTs can foster a fairer, more resilient urban future. By laying out concrete links between twin technology and sustainability goals, this study pushes the conversation beyond gadgets toward governance, equity, and long-term payoffs (Bilal et al., 2023).

In short, we're offering both a new lens and a roadmap: a way to see Digital Twins not just as high-tech toys but as civic workhorses that can help cities think, adapt, and thrive in real time. The next step—testing the

framework on the ground—should reveal just how far these mirrored worlds can take us toward the sustainable city of tomorrow.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Hypnotherapy Meets Supply Chain: A Novel Approach to Negotiation Mastery

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Abstract: Negotiation is a vital component of supply chain management, requiring both strategic thinking and emotional intelligence to navigate complex, high-stakes interactions. Traditional supply chain negotiation programs focus on tactical skills but often overlook the psychological challenges that can undermine negotiation performance. This conceptual paper proposes the integration of hypnotherapy—a psychological technique known for enhancing relaxation, focus, and behavioral change—into supply chain negotiation training. Drawing from literature in supply chain strategy, emotional intelligence, and clinical hypnotherapy, the paper presents a novel framework for applying hypnotherapy techniques such as guided relaxation and visualization during pre-negotiation preparation, active negotiation, and post-negotiation reflection. The potential benefits include improved emotional regulation, heightened mental clarity, and reduced cognitive biases, which together contribute to more effective and confident negotiations. While the paper acknowledges cultural and ethical considerations, particularly in Asian contexts, it argues that hypnotherapy offers a valuable tool for enhancing negotiation mastery in modern supply chain environments. Future empirical research is recommended to validate the proposed framework and assess its practical impact.

Keywords: *Supply Chain Negotiation, Hypnotherapy, Emotional Intelligence, Cognitive Bias, Emotional Regulation, Conceptual Framework, Stress Management*

1. Introduction

Negotiation is a fundamental aspect of supply chain management, involving a complex interplay of strategy, communication, and relationship management (Ali, Rajagopal, Sundram, Saihani, & Noranee, 2020; Handra & Sundram, 2023; Rasi et al., 2022; Razak, Othman, & Sundram, 2015; Sundram, Ghapar, Lian, & Muhammad, 2023). In an increasingly competitive and globalized market, the ability to negotiate effectively is critical to achieving favorable outcomes. Traditionally, supply chain negotiation training has focused on tactical approaches such as contract terms, pricing strategies, and stakeholder management. However, as the business environment becomes more complex and high-pressure, the psychological aspects of negotiation, including emotional regulation and cognitive clarity, have gained attention.

Hypnotherapy, a psychological tool traditionally used in therapeutic settings to promote relaxation and behavior modification, offers a novel approach to addressing the mental and emotional challenges of negotiation. Hypnotherapy operates by inducing a state of deep relaxation and heightened concentration, making individuals more receptive to suggestion and better equipped to manage stress and emotional impulses (Barber, 2001). This paper proposes integrating hypnotherapy techniques into supply chain negotiation training to enhance focus, emotional regulation, and overall negotiation effectiveness.

This conceptual paper explores the potential of using hypnotherapy in supply chain negotiations. It examines how hypnotherapy techniques, such as guided relaxation and visualization, can be applied before, during, and after negotiation processes to improve mental clarity and decision-making. Additionally, it discusses the benefits and challenges of incorporating hypnotherapy into traditional supply chain negotiation programs, providing a new perspective on supply chain negotiation mastery.

2. Literature Review

The Role of Negotiation in Supply Chain Management

Negotiation is a critical component of supply chain management, influencing various aspects such as pricing, delivery schedules, contracts, and long-term partnerships. Effective negotiation is essential for securing favorable terms, managing risks, and fostering long-term relationships with suppliers and partners (Narayanan et al., 2024a; Narayanan et al., 2024b; Narayanan et al., 2024c; Sureshkumar, Narayanan, Ghapar, Chew, & Sundram, 2024a). As globalization and market volatility increase, so does the complexity of negotiations in the supply chain, requiring negotiators to possess not only technical expertise but also strong emotional intelligence and communication skills (Thomas et al., 2015). Traditional negotiation strategies often focus on achieving optimal financial and operational outcomes, but recent studies emphasize the importance of soft skills, such as emotional control, trust-building, and empathy, in determining negotiation success (Thompson, 2009). In particular, emotional regulation has emerged as a critical skill for negotiators who must manage stress and avoid cognitive biases that can undermine their decision-making (Goleman, 1998). These challenges highlight the need for innovative training methods that address both the tactical and psychological aspects of negotiation, particularly in the high-pressure environments of supply chain management (Rosendahl et al., 2023).

Psychological Challenges in Negotiation

Research on the psychology of negotiation suggests that emotional and cognitive factors significantly impact the behavior and outcomes of negotiators. Cognitive biases such as anchoring, overconfidence, and the endowment effect can distort a negotiator's perception of value and lead to suboptimal decisions (Bazerman, Curhan, & Moore, 2000). Emotional states like stress, frustration, and anxiety can further impair cognitive performance, leading to impulsive or irrational choices (Thompson, 2009). Emotional intelligence (EI), particularly the ability to recognize and manage emotions, has been identified as a key factor in successful negotiations (Goleman, 1998). High EI allows negotiators to maintain emotional composure, think strategically, and build rapport with their counterparts, all of which contribute to achieving favorable outcomes (Mayer, Caruso, & Salovey, 2016). However, traditional negotiation training often lacks a focus on developing these psychological skills, leaving a gap in the preparation of negotiators for high-stress situations (Thompson, 2009).

Hypnotherapy as a Tool for Enhancing Negotiation Skills

Hypnotherapy is a psychological technique that involves inducing a state of focused attention and deep relaxation, making individuals more receptive to suggestions and behavioral modification (Spiegel, 2007). Traditionally used for therapeutic purposes, hypnotherapy has been shown to reduce stress, improve concentration, and enhance emotional control, making it a promising tool for professional applications such as negotiation (Barber, 2001). In recent years, hypnotherapy has been successfully applied in various professional contexts, including sports psychology and executive coaching, to improve mental performance and emotional regulation (Hasan & Vasant, 2023). For instance, hypnotherapy has been used to help athletes manage anxiety and improve focus during competitions, suggesting its potential for use in similarly high-pressure situations like supply chain negotiations (Wark, 2011). Several studies have demonstrated the efficacy of hypnotherapy in enhancing cognitive function and emotional resilience, both of which are critical for negotiation success (Rosendahl et al., 2023). By inducing a state of relaxation, hypnotherapy can help negotiators manage the stress and anxiety that often accompany high-stakes discussions, allowing them to think more clearly and make more rational decisions (Thompson, 2009). Visualization exercises, a common technique in hypnotherapy, can also be used to mentally rehearse successful negotiation outcomes, boosting confidence and performance during actual negotiations (Spiegel, 2007).

Integrating Hypnotherapy into Supply Chain Negotiation Training

While the potential benefits of hypnotherapy in negotiation are promising, its application in the field of supply chain management remains underexplored (Ibrahim, Sundram, Omar, Yusoff, & Amer, 2017; Muhammad, Narayanan, Ghapar, Chew, & Sundram, 2025; Wong Chee, Sundram, Bakar, & Narayanan, 2024). Existing negotiation training programs typically focus on tactical skills such as information gathering, persuasion, and problem-solving, but they often neglect the psychological preparation needed to handle the emotional and cognitive challenges of negotiation (Thompson, 2009). Integrating hypnotherapy into these programs could

provide a more holistic approach to training, addressing both the technical and emotional dimensions of negotiation. Hypnotherapy could be particularly useful in the pre-negotiation phase, where it can be employed to reduce anxiety and mentally prepare negotiators for the task ahead. Techniques such as guided relaxation and visualization can help negotiators enter the negotiation with a calm and focused mindset, allowing them to think strategically and avoid emotional reactions (Wark, 2011). During the negotiation itself, hypnotherapy techniques can be used to maintain emotional control and enhance concentration, helping negotiators stay focused on key issues and avoid being derailed by stress or frustration (Barber, 2001).

Cultural and Ethical Considerations in Hypnotherapy for Negotiation

The integration of hypnotherapy into professional settings, like supply chain negotiation, also raises important cultural and ethical considerations. In some cultures, particularly in Asia, hypnotherapy may be viewed with skepticism or as an alternative practice that is not widely accepted in corporate environments (Hashim, 2012). As such, introducing hypnotherapy into supply chain negotiation may require sensitivity to cultural norms and values. Ethically, there may be concerns about the use of psychological techniques to influence negotiation outcomes. While hypnotherapy is intended to improve emotional regulation and mental clarity, some may perceive it as a form of manipulation. It is therefore essential to ensure transparency and consent when incorporating hypnotherapy into professional supply chain training programs (Hasan & Vasant, 2023). Table 1 highlights the theoretical grounding from psychology, negotiation, and clinical hypnotherapy, showing how these disciplines intersect in your proposed framework.

Table 1: Literature Review Matrix

Author(s)	Focus Area	Key Contributions
Goleman (1998)	Emotional Intelligence	Introduced EI as a vital skill in professional success, including negotiation contexts.
Thompson (2009)	Negotiation Psychology	Emphasized emotional regulation and cognitive biases in high-pressure negotiations.
Barber (2001)	Hypnotherapy Basics	Defined hypnotherapy and its behavioral influence through suggestion and relaxation.
Spiegel (2007)	Hypnosis in Brain & Body	Explained neurobiological mechanisms and benefits of hypnosis for focus and control.
Rosendahl et al. (2023)	Meta-analysis on Hypnosis	Provided empirical support for hypnotherapy in improving mental/emotional performance.

3. Methodology

This conceptual paper is primarily based on desktop research and an extensive literature review to explore the integration of hypnotherapy into supply chain negotiation training. The methodological approach focuses on gathering, analyzing, and synthesizing existing academic and industry resources to propose a theoretical framework for using hypnotherapy techniques to enhance negotiation outcomes. The methodology comprises four key components: desktop research, literature review and framework development.

Desktop Research

Desktop research was conducted to gather secondary data on both hypnotherapy and supply chain negotiations. Academic databases such as Google Scholar, JSTOR, Emerald Insight, and ScienceDirect were used to collect scholarly articles and publications. Industry reports, white papers, and relevant case studies from reputable sources like McKinsey & Company, Deloitte, and TED Learning Malaysia were also included to capture the practical applications of negotiation strategies in supply chain management.

Key areas of focus in desktop research:

- Existing negotiation strategies in supply chain management (Zachariassen & Arlbjørn, 2011).
- The role of emotional intelligence and psychological preparation in negotiation (Goleman, 1998; Thompson, 2009).
- The efficacy and applications of hypnotherapy in various fields (Rosendahl et al., 2023; Spiegel, 2007).

Literature Review

A systematic literature review was conducted to identify relevant studies in both supply chain management and hypnotherapy. The literature was reviewed for its relevance to psychological aspects of negotiation, emotional intelligence, and the application of therapeutic techniques in professional settings. The review process involved analysing peer-reviewed articles, conference papers, and books to understand the relationship between emotional regulation and negotiation success, as well as the potential for hypnotherapy to improve these skills (Thompson, 2009; Mayer, Caruso, & Salovey, 2016).

Steps in the literature review process:

- Identification of key concepts: Defining essential concepts such as emotional intelligence, cognitive biases in negotiation, and hypnotherapy techniques (Barber, 2001; Goleman, 1998).
- Inclusion and exclusion criteria: Priority was given to studies published after 2000 that focus on emotional intelligence, negotiation strategies, and hypnotherapy applications. Older sources were used to provide a foundational understanding.
- Synthesis of findings: The review synthesised findings from various studies to build a cohesive argument for integrating hypnotherapy into negotiation training (Rosendahl et al., 2023; Hasan & Vasant, 2023).

Table 2: Research Gaps Identified

Area	Existing Focus	Identified Gap
Negotiation Training	Tactical skills like price negotiation, persuasion	Lacks integration of mental and emotional preparation
Emotional Intelligence	Underutilized in SCM-specific contexts	Needs deeper inclusion in supply chain training frameworks
Use of Hypnotherapy	Mostly seen in therapy or sports coaching	No application in the supply chain negotiation
Cultural Relevance	Limited studies in Asian professional contexts	Requires localization and cultural sensitivity

Table 2 supports your paper's originality by identifying clear academic and practical gaps your conceptual model addresses. Despite the increasing complexity of global supply chains, traditional negotiation training in the field remains narrowly focused on tactical elements such as pricing, contract terms, and stakeholder strategies. These frameworks overlook the psychological dimensions that significantly impact negotiation performance, particularly stress management, emotional regulation, and cognitive clarity. The absence of mental preparation tools reflects a longstanding bias in supply chain management (SCM) research toward rational models of behaviour, disregarding decades of evidence from behavioural psychology. This paper addresses that gap by proposing the integration of hypnotherapy, a scientifically supported method for enhancing focus and emotional control, into the preparatory and reflective phases of supply chain negotiations.

Another notable gap lies in the underutilization of emotional intelligence (EI) training within supply chain negotiation contexts. While EI is widely acknowledged in leadership development and human resource disciplines, it has yet to be systematically embedded in SCM negotiation training. This is a missed opportunity, given that EI skills—such as empathy, emotional awareness, and impulse control—are directly correlated with improved negotiation outcomes. Traditional SCM models often treat EI as a soft, untrainable trait, whereas this paper introduces hypnotherapy as a practical intervention that can help negotiators cultivate EI attributes in a structured and repeatable manner. Finally, the paper identifies a critical contextual gap: the lack of cultural adaptation and ethical sensitivity in applying psychological tools such as hypnotherapy in professional environments, especially in Asian settings. In countries like Malaysia, hypnotherapy may be perceived as an alternative or non-scientific approach, creating resistance among corporate stakeholders. By explicitly acknowledging this barrier and proposing transparent, ethical practices—including informed consent and cultural customisation—the proposed framework not only contributes conceptual novelty but also ensures implementation feasibility. In doing so, it moves beyond theory and into the realm of practical, culturally sensitive negotiation enhancement.

Development of a Conceptual Framework

Based on the findings from the literature review, a conceptual framework was developed to outline how hypnotherapy techniques can be integrated into supply chain negotiation programs (Selvarajah et al., 2025; Narayanan, Rui, Sundram, & Irwan, 2025; Sundram et al., 2018). The framework is designed to address three key phases of negotiation—pre-negotiation preparation, active negotiation, and post-negotiation reflection—and how hypnotherapy can enhance performance at each stage. These are the core elements in your conceptual model, showing how hypnotherapy could enhance negotiation performance at various psychological levels.

Framework Development Process:

- Pre-negotiation preparation: Hypnotherapy techniques such as guided relaxation and visualisation exercises are proposed to help negotiators mentally prepare for discussions, reducing anxiety and boosting confidence (Spiegel, 2007; Wark, 2011).
- During negotiation: Emotional regulation techniques from hypnotherapy can help negotiators maintain focus and manage stress, leading to more strategic decision-making (Barber, 2001).
- Post-negotiation reflection: Hypnotherapy can facilitate a debriefing process where negotiators reflect on their performance and identify areas for improvement, using visualization to reinforce positive outcomes (Hasan & Vasant, 2023).

Table 3: Conceptual Framework Constructs

Construct	Definition
Hypnotherapy	A psychological technique using relaxation and suggestion to influence behavior.
Emotional Regulation	Managing emotional responses effectively, especially under stress.
Cognitive Bias	Systematic deviations from rational judgment that affect decisions.
Negotiation Phases	Stages of a negotiation: pre-negotiation, active engagement, and post-review.

Table 3 shows the core elements of the conceptual model, depicting how hypnotherapy could enhance negotiation performance at various psychological levels.

4. Discussion and Implications

Negotiation in the supply chain involves a delicate balance between achieving business objectives and managing relationships with suppliers, partners, and customers. Traditional negotiation training emphasises the importance of preparation, strategy, and communication, but it often overlooks the emotional and psychological challenges that negotiators face, especially in high-stress situations. According to Thompson (2009), negotiations are not purely rational exchanges; they are influenced by emotions, cognitive biases, and social dynamics.

One of the key psychological challenges in negotiation is emotional regulation. High-pressure negotiations can trigger stress, anxiety, and frustration, which may cloud judgment and lead to suboptimal decision-making. Research shows that negotiators who can manage their emotions tend to perform better and are more likely to achieve win-win outcomes (Bazerman, Curhan, & Moore, 2000). Emotional intelligence, particularly the ability to remain calm and composed, plays a critical role in successful negotiations (Goleman, 1998).

Cognitive biases, such as anchoring, confirmation bias, and overconfidence, can also affect negotiation outcomes. These biases often lead negotiators to make decisions based on incomplete or inaccurate information, resulting in missed opportunities or unfavorable deals (Thompson, 2009). To overcome these psychological barriers, negotiators need tools that help them maintain focus, control emotions, and approach negotiations with a clear, strategic mindset.

Challenges and Limitations

While hypnotherapy presents several potential benefits for improving negotiation outcomes, there are notable challenges and limitations (see Table 4):

- Lack of Empirical Research: Currently, there is limited empirical evidence on the effectiveness of hypnotherapy in business negotiations. Most studies focus on therapeutic and sports psychology settings.

Therefore, further research is needed to validate its application in supply chain negotiations (Barber, 2001).

- Adoption Resistance: Hypnotherapy is often associated with alternative medicine, and its adoption in corporate environments may face resistance, particularly in conservative or traditional industries. Companies may be reluctant to integrate hypnotherapy into their negotiation training due to misconceptions about its effectiveness.
- Cultural Barriers: As mentioned earlier, cultural perceptions of hypnotherapy may vary. In some regions, particularly in Asia, there may be a need to adapt hypnotherapy practices to align with local norms and values (Hashim, 2012).

Table 4: Negotiation Challenges in Supply Chain

Challenge	Impact on Negotiation
Stress and Anxiety	Impairs composure and reduces rational decision-making.
Overconfidence Bias	Leads to overestimating one's negotiation position.
Anchoring Bias	Causes fixation on initial numbers, limiting flexibility.
Emotional Outbursts	Damages relationships and communication during negotiation.
Low Focus	Reduces the ability to strategically respond in real-time interactions.

Cultural and Ethical Considerations

When introducing hypnotherapy into business settings, it is essential to consider the cultural acceptance of such techniques. In some cultures, hypnotherapy may be viewed with skepticism or as an alternative practice that is not widely accepted in corporate environments. In regions like Malaysia, where negotiation practices often reflect hierarchical and indirect communication norms, the use of psychological tools such as hypnotherapy may need to be adapted to align with cultural expectations (Hashim, 2012). There are also ethical implications related to the use of hypnotherapy in business negotiations. Some might argue that using psychological techniques to influence negotiation outcomes could be seen as manipulative. Therefore, transparency about the use of such techniques is important to maintain ethical standards and trust in negotiations. Negotiators should be aware of these concerns and ensure that hypnotherapy is used as a tool for personal development rather than manipulation (Wark, 2011).

5. Conclusion

The integration of hypnotherapy into supply chain negotiation training offers a novel approach to mastering the psychological challenges of negotiation (Mkumbo, Ibrahim, Salleh, Sundram, & Atikah, 2019; Selvaraju, Bhatti, Sundram, & Azmir, 2019; Zulfakar, Chan, Jie, & Sundram, 2019). By enhancing emotional control, mental focus, and confidence, hypnotherapy provides negotiators with valuable tools to achieve better outcomes. However, while the potential benefits are significant, further research is needed to validate the effectiveness of hypnotherapy in business contexts and to address any ethical or cultural considerations. As supply chains become more complex and globalized, innovative approaches such as hypnotherapy may offer a competitive edge in negotiation performance (Sivan et al., 2024a; Sivan et al., 2024b; Vatumalae, Rajagopal, & Sundram, 2020). While this paper is based on desktop research and a literature review, it acknowledges the limitations inherent in conceptual research. The primary limitation is the lack of empirical evidence directly linking hypnotherapy to negotiation outcomes in the supply chain context. Additionally, cultural barriers to the acceptance of hypnotherapy in professional settings, especially in Asia and Malaysia, are acknowledged (Hashim, 2012). Future empirical studies will be needed to test the proposed framework in real-world supply chain negotiation settings (Narayanan, Ghapar, Chew, & Sundram, 2024b; Sundram, Narayanan, & Irwan, 2025**;** Zachariassen & Arlbjørn, 2011).

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Supply Chain Karma Score (SCKS): A Conceptual Framework for Measuring Ethical Footprint in Global Supply Chains

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Abstract: Despite the widespread use of ESG metrics, GRI guidelines, and supplier audit frameworks, current approaches to ethical performance measurement in supply chains often lack depth, consistency, and cultural relevance. These tools frequently prioritize investor transparency or compliance checklists while neglecting long-term moral accountability and relational stakeholder impacts. Global supply chains now sprawl across continents and cultures, yet most ethical audits still treat them as static checklists. To close this gap, the study introduces the Supply-Chain Karma Score (SCKS)—a culturally rooted framework that borrows the Eastern idea of karma to track how today's sourcing decisions echo through tomorrow's social, environmental, and governance outcomes. The scorecard grades firms across five intertwined arenas: Labour Karma, Planet Karma, Governance Karma, Equity Karma, and Resilience Karma. Each dimension pairs practical metrics with a cause-and-effect timeline, shifting the focus from box-ticking compliance to dynamic, consequence-based accountability. The SCKS stands on three theoretical pillars: stakeholder theory, which expands moral duty beyond shareholders; the Triple Bottom Line, which balances people, planet, and profit; and virtue ethics, which asks who a company becomes when no auditor is watching. By fusing moral philosophy with systems thinking, the framework offers a holistic, scalable way to diagnose ethical risk, benchmark sustainability, and steer strategic procurement. For scholars, the SCKS opens fertile ground for empirical tests of how ethical "karma profiles" influence resilience, reputation, and value creation over time—especially in emerging economies where formal governance is thin. For managers and policymakers, it provides an actionable dashboard that translates lofty values into day-to-day decisions. In turning karma into a measurable construct, this study invites a re-imagining of responsible supply-chain management for an interconnected, ethically complex world.

Keywords: *Supply Chain Ethics, Karma Score, Stakeholder Theory, Triple Bottom Line, Sustainable Procurement, Supply Chain Governance, Responsible Supply Chain Management.*

1. Introduction

In recent decades, global supply chains have come under increased scrutiny due to their ethical and environmental implications, particularly in areas such as labor practices, environmental degradation, and corporate governance (Ali, Rajagopal, Sundram, Saihani, & Noranee, 2020; Handra & Sundram, 2023; Rasi et al., 2022; Razak, Othman, & Sundram, 2015; Sundram, Ghapar, Lian, & Muhammad, 2023). While frameworks such as ESG (Environmental, Social, and Governance) ratings, GRI (Global Reporting Initiative), and various certification schemes attempt to quantify ethical performance, they often fall short of offering a holistic view that integrates moral accountability with long-term reputational and operational consequences (Cheng et al., 2014; Hahn & Kühnen, 2013). This fragmentation has led to calls for new metrics that can more intuitively capture the interconnected, moral dimensions of supply chain practices (Gold & Heikkurinen, 2021).

Picture karma as the universe's spreadsheet: every choice we make drops a line item into a running balance that will come back with interest—good or bad. In Hindu and Buddhist traditions, that balance sheet stretches across lifetimes; in a supply-chain context, it stretches across continents. When a buyer squeezes a factory on

price or, conversely, pays a living wage, that decision plants a seed that will sprout later as trust, risk, or reputation. Viewed this way, a company's logistics map becomes a moral landscape where trucks, servers, and shipping lanes carry ethical cargo as surely as physical goods. Scholars of corporate responsibility call for this broader reckoning, arguing that bottom-line success now sits alongside moral and ecological accountability (Crane & Matten, 2016).

Enter the Supply-Chain Karma Score (SCKS)—a "what-goes-around-comes-around" gauge for global commerce. Instead of ticking boxes on a static ESG worksheet, the SCKS tracks how today's sourcing, production, and delivery choices ripple forward into tomorrow's stakeholder reactions and regulatory spotlights. Its ethos dovetails with stakeholder theory, which says everybody touched by a firm's actions deserves fair treatment (Freeman et al., 2004), and with the Triple Bottom Line, which gives equal billing to people, planet, and profit (Elkington, 1997). In short, the SCKS hands managers a karmic compass: follow the readings, and you're less likely to sail into reputational storms of your own making.

This paper aims to develop a conceptual framework for the SCKS by identifying and organizing key ethical dimensions into a structured, actionable model. Specifically, the paper addresses the following questions: (1) What constitutes 'karma' in the context of global supply chains? (2) How can the concept of karma be operationalized into measurable ethical performance dimensions? (3) In what ways can this score complement or enhance existing sustainability metrics? By proposing a multidimensional model grounded in ethical theory and sustainability literature, this study contributes to the ongoing discourse on responsible supply chain management and ethical performance assessment.

2. Literature Review

Ethical Supply Chain Management

The growing complexity and globalization of supply chains have amplified concerns over ethical misconduct, ranging from exploitative labor practices to environmental harm and supplier corruption. Ethical Supply Chain Management (ESCM) emphasizes the integration of moral considerations into procurement, sourcing, and logistics decisions (Carter & Jennings, 2002). These practices often intersect with sustainability objectives but extend further into the realm of fairness, justice, and stakeholder well-being (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**).**

Despite the growing prominence of ethical sourcing certifications (e.g., Fair Trade, SA8000), current mechanisms for evaluating ethical performance remain disparate and inconsistent across industries and regions (Amaeshi et al., 2008). ESG (Environmental, Social, and Governance) metrics, for example, have gained traction among investors, yet these are often criticized for their lack of standardization, opacity, and limited predictive power on ethical violations (Chatterji et al., 2016). Furthermore, ethical audits in supply chains have been shown to lack reliability, often failing to capture the hidden layers of misconduct in multi-tier networks (LeBaron et al., 2017). This suggests a need for new metrics that move beyond compliance checklists and instead embrace holistic and systemic ethical accountability, especially one that resonates with culturally and morally grounded frameworks (Selvarajah et al., 2025; Narayanan, Rui, Sundram, & Irwan, 2025; Sundram et al., 2018).

The Concept of Karma in Business and Supply Chains

The notion of karma**,** originating from Eastern philosophies such as Hinduism and Buddhism, represents a moral law of cause and effect, where actions—good or bad—accumulate and yield consequences over time. When adapted to business, karma can symbolize a moral feedback loop in which unethical actions eventually return as reputational damage, regulatory penalties, or loss of stakeholder trust (Rao, 2011). In corporate sustainability discourse, this concept aligns with the idea of corporate moral responsibility**,** where firms are held accountable not just for economic performance but also for social and ecological outcomes (Crane & Matten, 2016). Recent literature also explores how "karma capitalism" or "spiritual capitalism" can help shape more mindful, ethical decision-making in business operations (Sheth, 2017). Although this stream of thought remains underexplored in mainstream supply chain literature, the symbolic power of karma offers a culturally embedded lens to assess long-term ethical consequences (Ibrahim, Sundram, Omar, Yusoff, & Amer, 2017; Muhammad, Narayanan, Ghapar, Chew, & Sundram, 2025; Wong Chee, Sundram, Bakar, & Narayanan, 2024).

Translating karma into a quantifiable ethical score represents a novel theoretical contribution, especially for regions like Southeast Asia, where the term holds both spiritual and cultural legitimacy. By embedding this concept in supply chain assessment, the Supply Chain Karma Score (SCKS) seeks to bridge spiritual ethics and institutional governance.

Theoretical Foundations: Stakeholder Theory, TBL, and Virtue Ethics

Eliminate or strip away the legal fine print and look at what really guides responsible supply chains: *people, planet, and character*. The Supply-Chain Karma Score (SCKS) stitches these ideas together by leaning on three big bodies of thought. First, Stakeholder Theory reminds us that a firm's moral duty extends well beyond shareholders; the ripples of every purchase order touch factory workers, surrounding communities, and even future generations who inherit the environmental bill (Freeman et al., 2004). Second, Triple Bottom Line thinking widens the scorecard from one column of profits to a balanced ledger of *people, planet, and profit*—with the "planet" and "people" columns carrying equal weight (Elkington, 1997). Finally, virtue ethics in operations asks not just *what* a company does but *who it is becoming*: are managers cultivating habits of fairness, courage, and care that endure when no auditor is watching? (Melé, 2009). Taken together, these theories give karmic logic a hard-headed business frame: every action plants a seed, and the SCKS tracks which seeds grow into trust and resilience—and which sprout future headaches.

3. Conceptual Framework of the Supply Chain Karma Score (SCKS)

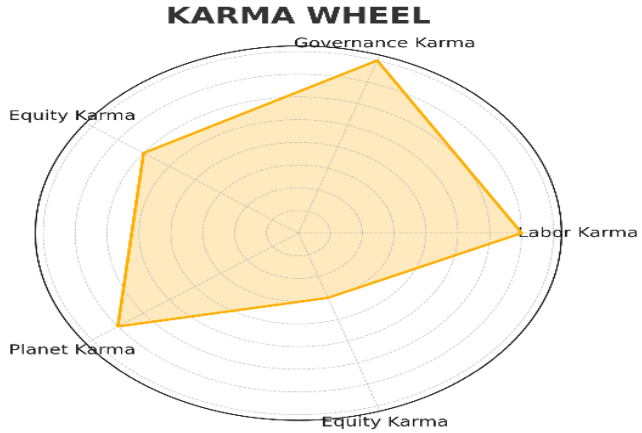
Defining Supply Chain Karma

Basically and commonly, the Supply-Chain Karma Score (SCKS) is a moral seismograph: instead of recording earth tremors, it measures the ethical shock waves that ripple through a company's value chain long after each decision is made. Think of every sourcing decision as a stone tossed into a pond: the ripples may start small, but they eventually lap up on distant shores. That is the spirit of karma borrowed here—every move in procurement, production, or distribution sets off consequences that soon show up as glowing headlines, activist petitions, regulatory knock-and-talks, or, if you get it right, a sturdier, more shock-proof network (Sheth, 2017; Silvestre et al., 2020). This systems view explodes the old habit of checking boxes just to say, "we're compliant." A single corner cut on wages might seem invisible today, yet it can erode supplier morale, fuel social-media outrage, and jam factory lines years later. The Supply-Chain Karma Score turns ethics into a living cause-and-effect ledger, reminding firms that every upstream shortcut or downstream blind spot is a karmic IOU waiting to land in the balance sheet of trust. The SCKS builds upon and extends existing ESG and CSR frameworks by embedding intention, behavior, and consequence into its structure. It is conceptually grounded in Stakeholder Theory (Freeman et al., 2004), the Triple Bottom Line (Elkington, 1997), and virtue ethics (Melé, 2009), and is tailored to address ethical lapses often overlooked in multi-tier supply chains.

Dimensions of the Supply Chain Karma Score (SCKS)

The SCKS comprises five interrelated dimensions, each reflecting a unique domain of ethical accountability. These dimensions are not mutually exclusive but are intended to offer a holistic view of karma accumulation within a supply network (see figure 1).

Figure 1: Karma Wheel



Labor Karma

This dimension reflects the ethical treatment of workers across the supply chain, particularly regarding human rights, workplace safety, living wages, and freedom of association. Labor exploitation remains prevalent in global supply networks, especially in industries such as electronics, textiles, and agriculture. The ethical mistreatment of labor may not have immediate financial repercussions, but reputational scandals (e.g., forced labor exposés) often emerge years after such practices begin (LeBaron et al., 2017). The Labor Karma dimension focuses on the ethical treatment of workers throughout the supply chain, and its assessment relies on several key metrics. Firstly, the percentage of suppliers audited for labor rights reflects the extent to which a company actively monitors and evaluates its supplier base for compliance with labor standards. A robust Labour Karma profile rests on four inter-locking indicators. First, wide supplier-audit coverage is the clearest proxy for effective due-diligence practice; OECD guidance urges risk-based audits deep into the chain to unveil hidden labour abuses (OECD, 2021). Second, even isolated findings of child or forced labour at tier-3 or tier-4 suppliers can trigger lawsuits, investor divestment, or sudden production halts (Fair Labor Association [FLA], 2025; Hinrich Foundation, 2025). Third, accessible worker-grievance mechanisms—confidential helplines, multilingual hot-lines, independent remediation panels—significantly raise remedy rates and deter abuse when implemented well (UNRBHR, 2024). Fourth, paying living wages, not merely statutory minima, stabilises supplier workforces and signals genuine social equity; the Anker methodology and Global Living Wage Coalition benchmarks provide widely accepted yardsticks (Anker & Anker, 2017; Global Living Wage Coalition, 2022). Taken together—and complemented by evidence that trust-based, ethically grounded buyer–supplier relationships weather shocks better (Foerstl et al., 2010)—these metrics let firms judge labour practices not just against legal compliance but against a broader standard of moral responsibility and systemic fairness (Sustainalytics, 2025).

Planet Karma

The Planet Karma dimension tracks how responsibly a company stewards the natural world along every link of its supply chain. A headline indicator is CO_2-equivalent emissions per product unit, which reveals the carbon intensity of sourcing, production, and logistics; firms that monitor and cut this number demonstrate accountability for their climate footprint (Cheng, Ioannou, & Serafeim, 2014). A second signal of environmental maturity is the share of inputs drawn from circular-economy streams—materials that are recycled, remanufactured, or otherwise kept in closed loops—because moving away from extractive, linear models reduces pressure on finite resources (Geissdoerfer et al., 2017). Governance across the supplier network matters, too: a high rate of ISO 14001–certified suppliers shows that environmental processes are audited and standardised beyond the focal firm's walls (Jack, Ren, & Zhang, 2021). Operational metrics such as the percentage of water or energy conserved or recycled highlight day-to-day resource stewardship, while a running tally of environmental incidents—spills, illegal discharges, deforestation events—captures exposure to regulatory fines and reputational blow-back (Rahman, Ali, & Khan, 2023). Taken together, these data points reveal whether a company is merely offsetting today's impacts or embedding environmental care into its strategic core. Under tightening climate regulations, firms that score poorly on Planet Karma risk stranded assets, compliance penalties, and consumer backlash, whereas those that excel build reputational capital and buffer their supply networks against ecological shocks (Cheng et al., 2014).

Governance Karma

Governance Karma is the supply-chain's immune system—the set of guardrails that keeps corruption, fraud, and shady side-deals from infecting day-to-day sourcing. It starts with a living procurement ethics code, one that spells out exactly how buyers should act and how suppliers should be treated. That code is backed by routine anti-corruption "health checks," counting how many vendors undergo bribery or fraud screening each year (Amaeshi et al., 2008). A second defence layer comes from outside eyes: independent third-party audits that prove those internal rules work off the page and on the warehouse floor. Just as crucial is a whistle-blower hotline that shields employees, contractors, and even far-flung suppliers who speak up—sending a clear signal that the organisation values truth over retaliation. And before any contract ink is dry, structured due-diligence protocols probe for red flags in prospective partners, catching ethical risks before they metastasise (Sivan et al., 2024a; Sivan et al., 2024b; Vatumalae, Rajagopal, & Sundram, 2020). Taken together, these safeguards reveal the depth of a firm's governance spine. Get them right and you head off the bribery scandals, contract breaches, and blacklistings that drain cash and cripple reputations; neglect them and those same threats slip in through the back door—turning minor lapses into multi-million-dollar lessons.

Equity Karma

The Equity Karma dimension gauges how fairly—and inclusively—a firm conducts its sourcing, with particular attention to marginalized suppliers, SMEs, and historically under-represented groups. A pivotal indicator is the share of contracts or spend directed toward local, indigenous, women- or minority-owned businesses, an established proxy for economic empowerment and equitable market access (Pagell & Wu, 2009). Contractual fairness likewise matters: short payment terms, transparent pricing, and accessible dispute-resolution clauses signal just treatment, whereas protracted delays or opaque pricing structures often trap smaller suppliers in cash-flow crises (Silva, Ruel, & Sousa-Filho, 2024). Investment in supplier-development programs—such as training or technology transfers—further demonstrates a commitment to levelling capability gaps rather than merely shifting risk downstream (Yawar & Seuring, 2017). Finally, evidence of shared-value initiatives (e.g., local hiring, community knowledge-transfer schemes) shows that the firm is co-creating long-term benefits with the communities embedded in its supply chain. Collectively, these metrics transform equity from a symbolic gesture into a measurable, actionable commitment and, by embedding inclusivity in procurement routines, foster the trust-based relationships that underpin resilient, ethically robust supply networks.

Resilience Karma

Picture a supply chain built like a braided rope: strands of factories, ports, and data pipes woven together by trust. The Resilience Karma gauge tells managers how strong that braid is when the world yanks hard—be it a pandemic, a trade war, or a 500-year flood. Firms that cultivate ethical habits—paying fairly, sharing forecasts, honouring contracts—build the kind of trust that keeps information zipping along the rope and lets partners pivot in sync. Opportunistic buyers, by contrast, weave a rope of brittle threads that snap at the first jolt (Foerstl et al., 2010). A supplier-diversification index—a glance tells you whether the melody depends on a soloist or a full brass section. Next, battle-tested business-continuity plans act like rehearsed set-lists, mapping out who jumps in when a key supplier drops out, saving both profits and paycheques. A stout ratio of long-term contracts to spot buys signals deep relational capital—the kind that lets partners cut each other slack when freight lanes clog or prices spike. History plays its part: firms that kept prices fair and honored POs during the COVID-19 free-fall have already proven their moral stamina. Layer on joint contingency drills—no-blame dry-runs where every player practices swapping parts—and you get a culture in which collaboration outruns finger-pointing. Bundle these cues together and you can hear how tightly ethics is woven into the risk score: a flexible braid that bends with the next shock instead of snapping.

Table 1: Supply Chain Karma Score (SCKS) – Dimensions and Indicative Metrics

Karma Dimension	Definition	Indicative Metrics / Indicators
Labor Karma	Ethical treatment of workers throughout the supply chain	- % of suppliers compliant with fair labor standards - Frequency of labor rights violations - Existence of grievance redress mechanisms - % of tier-1 and tier-2 suppliers audited for labor practices - Ratio of living wage vs. minimum wage
Planet Karma	Environmental responsibility in resource usage and emissions	- CO_2 emissions per product/unit - % of materials sourced from circular economy streams - Supplier environmental compliance rates (ISO 14001, etc.) - % of water/energy recycled or conserved - Number of environmental incidents reported
Governance Karma	Transparency, anti-corruption, and compliance mechanisms in sourcing	- Existence of procurement ethics code - % of suppliers evaluated for anti-corruption - Third-party audit coverage - Whistleblower protections in place - Supplier onboarding through due diligence

Karma Dimension	Definition	Indicative Metrics / Indicators
		protocols
Equity Karma	Fairness, inclusivity, and empowerment across the supply chain	- % of contracts awarded to SMEs or indigenous/local suppliers - Ratio of procurement spend on women/minority-owned businesses - Contractual fairness (e.g., payment terms, price stability) - Investment in supplier development/training programs - Shared value initiatives (e.g., local hiring, skills transfer)
Resilience Karma	Ethical preparedness and adaptability to disruptions and change	- Supplier diversification index - Business continuity plans covering key suppliers - % of long-term vs. spot contracts - History of ethical sourcing during crisis periods (e.g., COVID-19) - Stakeholder collaboration during risk events

Table 1 outlines the five dimensions of the Supply Chain Karma Score (SCKS), each representing a key area of ethical responsibility. The indicative metrics serve as practical tools to assess and monitor ethical performance across labor, environment, governance, equity, and resilience within global supply chains.

Scoring and Weighting the SCKS

Each Karma dimension can be operationalized through a weighted scorecard approach. Firms may use expert judgement, stakeholder input, or analytical methods such as the Analytic Hierarchy Process (AHP) to assign weights based on strategic importance. The overall SCKS could be represented visually through a Karma Wheel, radar chart, or composite index (0–100), enabling easy benchmarking across industries or geographies. The proposed SCKS framework provides a novel lens to evaluate the moral consequences of supply chain behavior, emphasizing causality, long-term accountability, and systemic ethics. By integrating labor, environmental, governance, equity, and resilience perspectives into one coherent score, SCKS aspires to become both a diagnostic and decision-making tool for ethical supply chain strategy. Table 2 provides a hypothetical scoring rubric guideline for practitioners or researchers to begin rating SCKS components quantitatively.

Table 2: Suggested Scoring Rubric for SCKS Dimensions

Dimension	Metric Example	Weight (%)	Scoring Scale (0–5)	Criteria Description
Labor Karma	% of suppliers audited for labor practices	20%	0–5	0 = <10%; 5 = >90%
Planet Karma	CO_2 emissions per unit	20%	0–5	0 = No tracking; 5 = Verified reduction goals met
Governance Karma	Existence of an ethics code	20%	0–5	0 = None; 5 = Enforced with monitoring
Equity Karma	% of contracts to SMEs or minorities	20%	0–5	0 = <5%; 5 = >30%
Resilience Karma	Supplier diversification index	20%	0–5	0 = High dependence; 5 = Broad and balanced spread

4. Discussion

Rethinking Ethics Through a Consequence-Based Lens

Decades of *ad hoc* audits and boiler-plate supplier codes have delivered more optics than outcomes. Bartley's (2018) landmark study shows how many of these programmes amount to "rules without rights": they document compliance for external audiences yet leave underlying power imbalances untouched. Subsequent reviews of audit practice echo that verdict, describing widespread "symbolic decoupling" in which factories pass inspections while subcontracted units continue to impose excessive hours or restrict freedom of association (Rahim, Kuruppu, & Islam, 2022; Kuruvilla & Judd, 2024).

The Supply-Chain Karma Score (SCKS) tackles this performance gap by shifting the analytic lens from snapshot indicators to longitudinal accountability. Instead of asking whether a site clears a one-day audit, it tracks how procurement choices ripple through wages, community well-being, and ecological resilience over time. This systems-oriented stance aligns with calls from relational-governance scholars, who argue that only multi-tier, trust-based monitoring can dismantle persistent abuses embedded in subcontracting networks (Soundararajan & Brammer, 2018). By making cause-and-effect explicit—and visible to cross-functional teams—the SCKS turns ethical governance from a compliance tick-box into a continuous strategic discipline.

Managerial Integration of the Karma-Based Model

The SCKS turns ethics from an after-the-fact audit into a forward-looking management capability. When a company sees its Labour Karma score slump, it receives an early warning that wage disputes, safety violations, or activist scrutiny could be looming—well before failure hits the headlines or regulators issue fines. Because each karma dimension is mapped to operational data streams, cross-functional teams in procurement, compliance, and enterprise risk can read from the same dashboard and embed ethical targets into everyday KPIs. Evidence suggests that this kind of integration pays off. Early work by Giménez and Tachizawa (2012) showed that supplier-assessment tools coupled with collaborative remediation improve both social performance and supply-chain efficiency, underscoring the commercial value of "ethical visibility." More recent studies report similar gains: a large-sample survey of Malaysian manufacturers found that weaving viability and resilience metrics into routine supply-chain design boosted overall firm sustainability during the COVID-19 crisis (Zahari et al., 2023) while a global review concluded that ethical–sustainability alignment often translates into competitive advantage and market differentiation (Esan, Ajayi, & Olawale, 2024). From the market side, Holloway (2025) shows that consumers reward transparent, ethically sourced brands with higher trust and a willingness to pay a premium, directly linking ethical supply-chain practice to brand equity and long-term profitability. In short, the SCKS operationalises these insights: it supplies clear metrics, puts them on the desks of people who make daily trade-offs, and in doing so helps firms transform ethics from a compliance cost into a strategic asset.

Broadening the Ethical Benchmarking Landscape

The SCKS widens the lens of ethical benchmarking well beyond the investor-focused orientation that still dominates many ESG ratings. Because it is anchored in culturally resonant ideas of balance and reciprocity, the framework can be localized to regions such as Asia and Africa, where communal ethics shape everyday business practice (Jamali, Karam, Yin, & Soundararajan, 2017). By adding equity and resilience as explicit karma dimensions, the SCKS invites managers to weigh social-justice concerns (e.g., supplier diversity and inclusive procurement) alongside a firm's ability to bounce back from shocks—two themes that are still marginal in most mainstream scorecards (Silva, Ruel, & Sousa-Filho, 2024; Yuan, Dai, & Ma, 2025). In doing so, it reframes ethical benchmarking from a compliance exercise into a roadmap for building supply networks that are both fairer and more shock-tolerant.

Challenges in Implementation

Translating the Supply Chain Karma Score (SCKS) from concept to reality is anything but straightforward. The first obstacle is data integrity: reliable ethical metrics are hardest to obtain in the very places where scrutiny matters most—lower-tier suppliers embedded in informal economies. Sustainable-sourcing research keeps running into the same wall: suppliers can game patchy audits, and half-filled spreadsheets rarely line up, making genuine verification a nightmare (Egels Zandén & Lindholm, 2015). An even trickier problem sits under the hood—boiling thick, value-laden dilemmas down to a single digit. One-number ratings feel tidy, but they

smudge nuance and invite each analyst's biases to creep in. A fairer path will almost certainly lean on participatory math: weighting formulas co-designed with stakeholders, or fuzzy-logic engines that leave room for shades of grey (Zolfani et al., 2018). Done right, those tools can keep the score both credible and richly textured—precise enough for dashboards, yet supple enough to reflect real-world moral trade-offs.

Theoretical Enrichment and Future Research Pathways

Setbacks aside, the SCKS still nudges supply-chain ethics onto a more ambitious playing field. It stitches together cause-and-effect thinking, stakeholder theory, and systems logic to spark what Sethi and Schepers (2014) call *moral imagination*—the knack for sketching supply-chain blueprints that aim higher than audit checklists or quarterly margins. That opens a research goldmine: scholars can now stress-test the karma score across industries or track firms over time to see whether better scores mean fewer PR meltdowns, lower supplier churn, or faster bounce-backs aftershocks. Pinning down those links would do more than validate the SCKS; it would show, in hard numbers, how ethical discipline fortifies resilience—exactly the evidence critics have been demanding to prove that "doing good" pays off (Koberg & Longoni, 2019).

Implications

Theoretical Implications

Traditional ethics tools freeze-frame a company's behavior at the instant of disclosure; the Supply-Chain Karma Score (SCKS) shoots an entire time-lapse instead. By wiring a cause-and-effect timeline into every metric, it joins the systems-thinking wing of sustainability research, which treats organizations as fluid networks rather than static checklists (Ahi & Searcy, 2015; Silvestre, 2015). The scorecard also blends moral languages—Eastern karma and Western stakeholder consequentialism—so it can travel across cultures without losing meaning (Lu et al., 2013; Robertson et al., 2021). Instead of a blunt ethical/unethical toggle, the SCKS tracks shifting thresholds in labor conditions, environmental care, governance clarity, social equity, and resilience, allowing researchers to map how these threads twist together over a supply chain's lifetime. That level of detail invites new questions: Which ethical-score "fingerprints" predict faster recovery after a shock? How do they shape brand legitimacy or partner loyalty as a network matures? (Beske-Janssen et al., 2015). In short, the SCKS swaps black-and-white snapshots for a high-resolution film of ethics in motion.

Managerial Implications

Managers and executives can easily witness a live "karma dashboard" that pulses with real-time data. If the Labor Karma gauge suddenly drops into the red, it is an early siren that wage disputes or safety lapses are brewing deep in the supplier base—weeks before inspectors or journalists catch wind of them. Acting on that alert, managers can reroute orders, dispatch remediation teams, and sidestep the costly cascade of fines and headlines that usually follow (Foerstl et al., 2010). Because every karma pillar plugs into existing procurement, risk-management, and sustainability feeds, cross-functional teams finally share one language of ethics; they can thread precise, value-based targets straight into KPIs instead of taking them on as an afterthought. Publishing these same metrics in ESG or integrated reports makes ethical performance as trackable as revenue growth, keeping pace with investor analytics and rising due-diligence rules (Mani et al., 2018). More broadly, when social criteria become part of the operating code—reviewed in stand-ups, tied to bonuses—employee morale climbs and stakeholder trust deepens, flipping ethics from a compliance drag into a genuine competitive lever (Yawar & Seuring, 2017). The payoff is clearest in high-pressure arenas like fashion, agri-food, and electronics, where embedding karma scores into sourcing portals or digital-twin models lets buyers see the ethical risk of every purchase order at a glance—and choose wisely.

Policy and Regulatory Relevance

Mounting transparency mandates—most notably the European Union's Corporate Sustainability Due Diligence Directive (CSDDD)—signal that public regulators, NGOs, and multilateral agencies now need assessment tools that go beyond checklist compliance. The Supply Chain Karma Score (SCKS) answers that call by converting broad ethical principles into context-aware governance blueprints. Because its indicators can be recalibrated to local cultural norms, the framework is especially attractive to emerging economies in Asia and Africa that aim to deepen intra-regional trade while still protecting social and environmental thresholds (De Backer et al., 2015). As supply networks are rewired through reshoring and near-shoring strategies, culturally attuned, karma-informed metrics help firms secure legitimacy in new host regions and foster trading relationships that are at once inclusive, resilient, and ethically

defensible (Touboulic & Walker, 2015). By supplying a rigorously defined, adaptable language for moral performance, the SCKS bridges the gap between formal regulation and the dynamic realities of day-to-day supply-chain operations, thereby sharpening the precision and local resonance of sustainability governance.

5. Conclusion and Future Research

Picture a supply chain that stretches from an artisanal cocoa farm in Ghana to a boutique chocolatier in Paris, weaving its way through dozens of ports, warehouses, and intermediaries along the journey. Each hand-off introduces fresh social, environmental, and governance risks that a once-a-year compliance audit can barely scratch, let alone control. The Supply Chain Karma Score (SCKS) tackles this blind spot by shifting our gaze from box-ticking to consequence-tracing: its multi-dimensional dashboard follows the moral ripple effects of every procurement decision, drawing on Eastern ideas of karmic causality and stakeholder-centred corporate ethics to keep the timeline—as well as the bottom line—in view (Sheth, 2017; Silvestre et al., 2020; Huq et al., 2016). In translating this "karma reasoning" into empirical indicators, the SCKS invites scholars to fuse the usually siloed worlds of sustainability, ethics, and operations strategy (Gold et al., 2020; Koberg & Longoni, 2019).

Conceptually, the scorecard blows past the tired good-versus-bad binary. By braiding systems thinking, stakeholder analysis, and virtue ethics, it grades firms across five intertwined threads—labour rights, ecological care, transparent governance, social equity, and resilience—capturing the messy trade-offs real managers face (Touboulic & Walker, 2015; Ahi & Searcy, 2015). That fluidity answers long-standing calls for a theory that respects shifting power balances, institutional quirks, and the tier-upon-tier sprawl of modern value chains (Zorzini et al., 2015; Beske-Janssen et al., 2015). Because its logic can flex to local moral vocabularies, it also sets the stage for richer North–South conversations about what "ethical" really means (Lu et al., 2013; Robertson et al., 2021).

Of course, the framework still lives mostly on paper. Turning it into a working tool will take fresh empirical muscle: Delphi panels to set weightings, fuzzy-logic engines to handle grey areas, multi-criteria decision analysis for context-by-context tuning (Govindan & Bouzon, 2018; Zolfani et al., 2018). Researchers could road-test the score in garments, chips, or coffee industries with wildly different risk signatures—to see how portable and predictive it is (Mani et al., 2018; Huq et al., 2016). Long-run studies, meanwhile, might reveal whether high karma scores shield firms from supplier churn, reputation shocks, or supply disruptions (Soundararajan & Brammer, 2018; Gold et al., 2020).

Regulators and investors will also shape its fate. Embedding SCKS metrics in sectoral benchmarks—or even public-procurement rules—could help close the enforcement gaps that plague many emerging economies (Silvestre, 2015; Jamali et al., 2017; Egels-Zandén & Lindholm, 2015). In the end, the SCKS is more than a yardstick: it's a call to upgrade our moral operating system, nudging global commerce away from extractive quick wins and toward a practice of reciprocal accountability. If adopted at scale, that shift could redefine value creation itself—from a one-way street into a feedback loop where ethical foresight, cultural fit, and practical utility all reinforce one another (Mkumbo, Ibrahim, Salleh, Sundram, & Atikah, 2019; Selvaraju, Bhatti, Sundram, & Azmir, 2019; Zulfakar, Chan, Jie & Sundram, 2019).

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Impact of Gamified 4Ps Marketing Mix Strategies on Teaching and Learning Effectiveness

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Abstract: Significant advancements in teaching and learning tools have been made possible as a consequence of the incorporation of game design elements into the educational setting. In this particular study, every group of students must respond to all statements based on the Marketing Mix Board Game. This is done in an effort by the lecturers to establish a learning environment that is both interesting and interactive. 100 students were asked to fill out a questionnaire in order to gather information about their perceptions, levels of engagement, and overall satisfaction with the Marketing Mix Board Game. The Marketing Mix Board Game is specifically highlighted as an engaging and entertaining assessment instrument for the goal of reinforcing the concepts of the marketing mix. This is done in order to highlight the importance of the marketing mix in their studies and working life. As a result of the study that was carried out, it was discovered that the students who participated in the study indicated perceptions that are statistically insignificant concerning the use of gamification in teaching and learning settings. The students think that gamification is a method that may be utilized to integrate into the teaching and learning effectiveness inside the classroom in a way that is both pleasant and successful in terms of positive engagement. After considering this, the implementation of gamification could potentially assist students in acquiring a more profound comprehension of the marketing mix methodologies, which would ultimately result in enhanced student results and performance.

Keywords: *Gamified Marketing Mix, Teaching and Learning, Perception, Engagement, Satisfaction*

1. Introduction and Background

Gamification tools and technology have changed the way we learn over time and in different situations, putting more focus on learning through these methods than through traditional ones (Alabbasi, 2018). More students are less interested and focused on class because lecturers keep using traditional teaching methods, where they give lectures using slides or textbooks and students mostly listen and take notes (Munuyandi et al., 2021). The student participation in the planning, delivery, monitoring, and assessment of higher education programs is the subject of a comprehensive study that has been conducted (Scott, 2008). This effort includes conducting a study on the full experience of graduating from university, which encompasses more than just teaching in the classroom. In addition, comprehending students' perceptions and expectations in order to make them easier to comprehend, more aligned, and manageable by distinctive learning from teaching through the utilization of a variety of active learning methods rather than passive learning methods, and by encouraging total student participation.

The implementation of contemporary pedagogical strategies in higher education equips lecturers with multiple resources that enhance student engagement and motivation. Gamification enhances student engagement with learning by incorporating games and fostering competitiveness among colleagues. Gamification in education, particularly in addressing diverse topics and scenarios, can be characterized as a catalyst for fun and motivation, encouraging students to maintain their involvement with the subject to enhance both engagement and satisfaction (Aleksic-Maslac et al. 2017). Krunić et al. (2015) and Fotaris et al. (2016) stated that gamification employs the same aspects and perhaps more than non-game contexts in education to impact student behavior, to strengthen their desire to learn with enjoyment, enhance competitiveness, foster interpersonal interactions, and provide motivation. This demonstrates a compelling rationale for utilizing the advantages of gamification in education. Gamification has found widespread application in diverse subjects in higher education, including marketing, medicine, and theoretical contexts. Notably, gamification is increasingly being employed within educational settings to enhance student motivation and engagement, as evidenced by previous studies (Razali et al., 2020; Rahayu et al., 2022). Lo (2010) had stated that if educators want to become effective, less-than-optimal learning environments should be redesigned to include a variety of learning

activities and opportunities shown to foster achievement of the desired learning outcomes. Additionally, educators should provide evidence of student learning by assessing students' understanding and their demonstration of desired results.

It is crucial to be effective and deliberate while creating a teaching and learning environment that needs gamification. Some important things to think about are making sure that the gamification parts fit with the curriculum, using good instructional design principles, choosing game mechanics that are fun and suitable, managing time well, that often called "perseverance and playfulness", and dealing with possible problems that might come up during the design process. A lecturer may have already specified the course learning outcomes, assessment methods, and general educational objectives of the course. So, any gamification features that are included should not just be small additions; they should complement and build on these foundations. Gamification that works should assist students in reaching their learning goals by motivating them to grasp key subject information, get more involved, and connect what they learn with what they already know. Also, all questions should be made so that students can show that they have learned these things in a relevant way through gamification (Sylvester, 2024).

2. Literature Review

Perception: Gamification in education enhances and expedites the learning process and analytical thinking and is considered a focused teaching and learning strategy (Harman et al., 2014). The foundation is that students perceive the learning process as a game, rendering their cognitive engagement highly enjoyable. Given the contradictory results from other studies about students' perceptions of gamification in education, additional research is essential. Pilar et al. (2016) and Huotari and Hamari (2012) describe gamification as 'the process of augmenting the capacity to acquire experiences, depending upon the player's perception. Earlier investigations have mainly concentrated on students' views regarding the implementation of gamification in educational settings, particularly in language studies (Fithriani, 2021; Cruz & Guayara, 2021) and scientific disciplines (Hursen et al., 2019; Jones et al., 2019; Rahayu et al., 2022). For example, Fithriani (2021) and Jones et al. (2019) found that most of the people they talked to thought that using gamification tools like "Kahoot" to learn English and biology was a good idea. The results showed that adding gamification can make students more interested in learning and more motivated to do so. Pitoyo et al. (2020), Razali et al. (2020), Handoko et al. (2021), and Zainudin et al. (2023) all say that students like Quizizz and consider it to be a fun and interesting way to learn. Students think that gamification is a better way to teach than traditional methods, which makes them more interested in and excited about learning. At the same time, there are positive changes in behavior and more interaction in a competitive setting, which makes the learning experience more fun and motivating. Previous studies have shown that there are conflicting results about how students feel about gamification in learning when it comes to motivation and engagement. Rahayu et al. (2022) had examined students' impressions of gamification in the context of business, extending the exploration beyond language and science-related courses. Meanwhile, Lugo (2022) indicates that students' assessments of the course's general usability correlate with their satisfaction and learning outcomes and that a more coherent and structured course layout is linked to increased student satisfaction. Extensive research exists about students' experiences, appreciation, and perceptions of the educational processes in which they engage, along with the factors that shape their evaluations of these teaching and learning processes (Barbera et al., 2013). As a result, it is hypothesized that
H1: Perception significantly impacts student satisfaction in the context of a gamified 4Ps marketing mix

Engagement: Engagement reflects students' passion and emotional investment in learning activities (Alsawaier, 2018), especially in the domains of intrinsic motivation and cognitive engagement (Alsawaier, 2018; Rahayu et al., 2022). A crucial element of learning engagement is cognitive engagement, defined by students' persistent efforts to comprehend a subject and their long-term commitment to learning (Rahayu et al., 2022). A combination of robust motivation and elevated cognitive engagement yields an effective learning experience (Alsawaier, 2018). Students exhibit improved and enhanced engagement and comprehension when utilizing Quizizz, wherein the integration of established concepts with innovative concepts can be implemented in practical scenarios. The students participated in active inquiry and response with one another and the lecturer, collectively addressing problem-based case study topics. Quizizz has helped students think critically and take responsibility for their learning. (Zainudin & Zulkiply, 2023) Gamification in teaching and learning encourages behavioral, emotional, and cognitive engagement by making lessons more captivating and

interactive, allowing students to work together with their peers and explore the material in new and exciting ways. This method encourages students to work together to share knowledge and solve problems, which improves their social and communication skills. Gamification also changes the traditional role of teachers from just giving out information to being facilitators who help and improve the learning experience, creating a more student-centered and participatory classroom environment (Adipat et al., 2021). Pitoyo et al. (2020) did a study that shows that students are drawn to the competitive side of Quizizz, which encourages them to participate and think critically, which makes them much more excited. One of the best things about Quizizz is that it can connect what students learn in business classes to real-life situations. This conclusion parallels the results reported by Alsawaier (2018), which demonstrated that gamification promotes cognitive engagement. When students revisit previously addressed problems and independently address comparable issues, they exhibit cognitive engagement, actively participating in the processes of reasoning, interpretation, and application of knowledge pertinent to business principles. It is essential to recognize that not all gamification strategies have demonstrated efficacy in enhancing student motivation and engagement. Hanus and Fox (2015) indicate that students engaged in gamified learning sessions exhibited a decrease in motivation and engagement over time. As a result, it is hypothesized that:
H2: Engagement significantly impacts student satisfaction in the context of a gamified 4Ps marketing mix

Satisfaction: In this study, student satisfaction refers to "the learning experience." One of the most important roles of an educational institution is to offer relevant learning experiences to the students. In the study conducted by Aleksic-Maslac et al. (2017), 67% of students expressed satisfaction with gamification, rating it a score of 5. Moreover, the students articulated their favorable perceptions of gamification in the classroom, as it allowed them to engage with their lectures through enjoyable games, thus offering supplementary motivation. Student satisfaction is a subjective assessment by students regarding the degree to which the learning environment facilitates academic achievement. Elevated student satisfaction signifies that intensive pedagogical approaches effectively promote cognitive engagement in teaching and learning. Key factors in student satisfaction may pertain to the roles of lecturers and students, which could be fundamental to student learning (Lo, 2010). Students expressed high satisfaction with Quizizz due to its motivational and interactive features. Consequently, it is imperative that the primary gamification elements, namely points, incentives, leaderboards, and varying difficulty levels, are closely associated with enjoyable experiences. Reward points cultivate competitiveness and achievement, while prizes like power-ups offer rapid feedback and reinforce successes. The questions, categorized by difficulty, can inspire students to challenge themselves and engage more profoundly with the learning content (Zainudin & Zulkiply, 2023). Student satisfaction is complex, requiring students to subjectively evaluate the diversity of their expectations and educational experiences. Interaction, particularly between lecturers and students, is the vital determinant of perceived learning results. The proficient utilization of synchronous and asynchronous tools has resulted in enhanced engagement (Baber, 2020). The study by Adipat et al. (2021) examines the enhancement of students' educational experiences through the integration of gamification with academic material. Well-constructed educational games incorporating themes like curiosity, challenge, and control may foster an immersive atmosphere that promotes active engagement, problem-solving, and teamwork. Students perceive gamification favorably because of its participatory characteristics and its correlation with their everyday experiences. Gamification markedly improves student engagement, promotes independent inquiry and collaborative learning, and converts lecturers into facilitators of knowledge. Additionally, students express greater pleasure with their learning when games offer rapid feedback and monitor progress. Despite problems such as high equipment expenses and diminished physical activity, the motivational and educational advantages of gamification render it a potent instrument for improving perception, engagement, and happiness in the educational process.

3. Research Methodology

The group of 100 students engaged in the Marketing Mix Board Game as an instructional activity, particularly for those who have studied the marketing mix. Five classes are engaged, each containing four groups and consisting of 5 students per group. The classes were chosen according to the students' prior instruction on the marketing mix; hence, cluster sampling was employed to choose the sample for this study (Mohd Yusof, 2025; Putra Priyatmojo, 2021). The entire classes were selected as the sampling units (clusters), rather than randomly selecting individual students from all classes. The questionnaire has been adapted from Bencsik et al. (2021) and Putra Priyatmojo (2021), with 18 questions: 7 items designed to evaluate student perception, 5

items concentrating on student engagement, 5 items assessing student satisfaction, and one open-ended question. This study employs a 4-point Likert scale, with strongly agree (4) as the highest rating and strongly disagree (1) as the lowest. This methodology seeks to attain a profound comprehension and a holistic perspective on students' perceptions, engagement, and satisfaction about gamification in the context of learning marketing mix strategies via the Marketing Mix Board Game.

4. Results and Discussion

Mean and standard deviations: By presenting the overall mean and standard deviations for all statements, the quantitative data on students' perceptions, engagement, and satisfaction in learning marketing mix using the Marketing Mix Board Game were provided. Overall, the results for the overall mean were clustered around the values of 3.59 and 3.76, which indicated that the students agreed with the statements while they were participating in the Marketing Mix Board Game. The overall standard deviation for students' perception, engagement, and satisfaction indicates that the data were grouped around the mean with the values of 0.43, 0.367, and 0.398, respectively.

Table 1: Overall Means & Standard Deviation for Students' Perception, Engagement and Satisfaction

Variables	Total Sample, N	Mean	Standard Deviation
Perception	100	3.5986	.43202
Engagement	100	3.7640	.36667
Satisfaction	100	3.7460	.39884

The results displayed in Table 2 were about students' perceptions; seven items were developed to assess students' insight into participating in the Marketing Mix Board Game activity and their comprehension of the marketing mix aspects. Students are expected to comprehend and be directed by clear goals and purposes, while also acquiring enjoyable, practical, and useful experiences related to the lessons. In conclusion, the three highest means of 3.69, 3.68, and 3.67 indicate that students perceive the Marketing Mix Board Game, an interactive learning tool, as positive, providing valuable knowledge and an enjoyable experience.

Table 2: The Level of Students' Perception (Adapted from Badrolhisam et al, 2019)

	Results		
Statements	Rank	Mean	Standard Deviation
I believe this board game activity will help me gain valuable knowledge and skills in marketing	1	3.69	.465
I think this activity will be relevant and beneficial to my marketing studies	2	3.68	.469
I anticipate enjoying this interactive learning experience	3	3.67	.4.73
I am excited to participate in the marketing mix board game activity	4	3.66	.590
The goals and purpose of this marketing mix board game activity are clear to me	5	3.65	.470
I feel confident in my understanding of the relevant chapters before playing the game	6	3.55	.716
I feel ready to engage in strategic decision-making during the board game activity	7	3.49	.577

In Table 3, the students must choose the statements presented in the Likert scale regarding their engagement with the gamified 4Ps marketing mix utilizing the board game. This section presents five statements designed for students to select if they concurred with on the Marketing Mix Board Game activity, which was an engaging and exciting experience that effectively met its objectives. Additionally, it is important to ascertain whether the activity was entertaining and if the students would agree to recommend it as a valuable enhancement to their marketing studies. In conclusion, the two highest means of 3.81 and 3.78 indicate that students express positive engagement with the Marketing Mix Board Game, which they enjoy; the games were participatory, and they would recommend them to others.

Table 3: The Level of Students' Engagement (Adapted from Badrolhisam et al, 2019)

	Results		
Statements	**Rank**	**Mean**	**Standard Deviation**
I enjoyed participating in the marketing mix board game activity	1	3.81	.394
I would encourage the marketing mix board game activity to other students	2	3.78	.416
The board game activity was highly engaging and interactive	3	3.77	.423
The objectives of the marketing mix board game activity were successfully achieved	4	3.74	.441
I gained valuable knowledge about relevant chapters from the board game activity	5	3.72	.451

The results shown in Table 4 were regarding student satisfaction. Five items were developed to assess student satisfaction after they participated in the Marketing Mix Board Game. The statements included an assessment of whether the Marketing Mix Board Game activity offered a satisfactory and suitable educational experience, functioning as an engaging and effective method for acquiring marketing knowledge while encouraging efficient team communication. In conclusion, the two highest means of 3.79 and 3.77 indicate that students are satisfied with the Marketing Mix Board Game, as the activity was a beneficial and satisfying educational experience.

Table 4: The Level of Students' Satisfaction (Adapted from Badrolhisam et al, 2019)

	Results		
Statements	**Rank**	**Mean**	**Standard Deviation**
I am satisfied with the complexity of the game, which was manageable	1	3.79	.409
I am satisfied with the overall experience of playing the marketing mix board game	2	3.77	.423
I am satisfied with the time spent playing the marketing mix board game, which was worthwhile	3	3.75	.435
The marketing mix board game activity was an enjoyable way to learn about marketing	4	3.72	.451
I am satisfied that the game fostered efficient communication within my team.	5	3.70	.482

Analysis of Variance: The ANOVA table summarizes the results of a multiple linear regression analysis conducted to assess the impact of student satisfaction in the context of a gamified 4Ps marketing mix. The regression table indicates that the model significantly explains the variability in the dependent variable. The F-statistic of 160.630, accompanied by a p-value of 0.00, underscores the statistical significance of the overall model. The ANOVA results indicate that the regression model is significantly effective in explaining the impact of students' satisfaction within a gamified 4Ps marketing mix.

Table 5: ANOVA

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	12.096	2	6.048	160.630	.001
Residual	3.652	97	.038		
Total	15.748	99			

Multiple Regression Analysis: The multiple regression analysis presented in Table 6 examines the impact of students' satisfaction in the context of a gamified 4Ps marketing mix. The findings indicate that the students' perception and engagement exhibit varying levels of significance in students' satisfaction. The unstandardized B value for perception is B = 0.019, suggesting an insignificant impact of student satisfaction within a gamified

4Ps marketing mix, contributing merely 0.019 when controlling for other factors. The standardized beta coefficient of β = 0.20 indicates a small effect, while the t-value of t = 0.40 and p-value of p = 0.69 suggest that this perception is statistically insignificant. This suggests that students' perceptions might not impact their satisfaction regarding a gamified 4Ps marketing mix. Their initial perception reflects a limited confidence in comprehending the relevant chapters before the activity, coupled with a willingness to participate in the marketing mix board game.

Students' engagement has an unstandardized B value of B = 0.95, indicating that for each unit increase in engagement, there is an expected increase of 0.95 in satisfaction, while holding other factors constant. The standardized beta coefficient of β = 0.88 indicates a strong impact, suggesting that student engagement is a significant factor. The t-value of 17.45 and p-value of 0.00 indicate strong statistical significance. This highlights that engagement significantly influences student satisfaction within a gamified 4Ps marketing mix. Gamification in teaching and learning enhances behavioral, emotional, and cognitive engagement by promoting active participation, peer collaboration, and dynamic exploration through interactive and immersive experiences.

Table 6: Summary of Multiple Regression Analysis

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients B	t	Sig.
(Constant)	.071	.297		.239	.812
Perception	.019	.047	.020	.400	.690
Engagement	.959	.055	.881	17.455	.000

Open-Ended Question: The open-ended findings in Table 7 provided further insights into the experiences that students had with the Marketing Mix Board Game activity. Students are required to answer, "Describe your experience during the Marketing Mix Board Game in the class." This is the only open-ended question that has been developed. The responses were presented in addition to the quantitative results that were reported in the previous table section. Several of the students emphasized particular areas that they found to be particularly fascinating, such as the elements that involved strategic decision-making and real-world scenarios they encountered.

Other students made suggestions for enhancements, such as the inclusion of a wider variety of case studies and directions that were more understandable. These qualitative findings supplement the quantitative data by indicating not only what the students felt but also the reasons why they felt that way. This provides a crucial finding for assessing the overall teaching and learning effectiveness for the students. Because of the open-ended feedback, game-based learning tools need to undergo constant improvement in order to better accommodate the requirements of a wide range of learners.

Table 7: Summary of Open-Ended Question

Theme	Descriptions
Fun and Engagement	Students overwhelmingly described the activity as "fun," "exciting," and "enjoyable." Words/phrases: “so fun,” “funnnn,” “exciting,” “entertaining,” “delightful,” “best experience.”
Knowledge and Learning Enhancement	Many students reported improved understanding and knowledge retention of marketing concepts. Comments like: “gain more knowledge,” “help understand chapters,” “learned more about marketing,” “concepts came to life.”
Teamwork and Collaboration	Students highlighted the importance of group interaction and team dynamics. Comments included: “shared ideas,” “worked together,” “teamwork is important,” “bond with classmates.”
Motivation and Emotional Experience	Affective responses such as happiness, pride, and reduced stress were common. Phrases: “I felt so happy,” “nervous but happy,” “release tension,” “memorable,” “proud.”

Game Design Feedback	A few students gave constructive criticism about how to improve the game. Example: "Should have more time," "put questions on numbers," "got out of control due to excitement."
Inclusivity and Missed Participation	At least one response reflected non-participation but still perceived value. Insight: "I didn't attend but saw the video – it looked effective and exciting."

5. Recommendations

Marketing Mix Board Game uses a game-based learning approach that greatly and completely increases the participation of both students and teachers. This game gets people involved by combining the 4Ps of marketing with interactive questions. This turns theoretical ideas into an interesting and interactive experience. The competitive nature of the board game keeps students' attention and motivation up, turning learning into a fun challenge. Students worked in groups, for instance, to decide how to price a product launch, which sparked lively debates and made everyone excited. The gamified approach encourages intrinsic motivation (Scot, 2008; Glover, 2013; Kangas et al,2017; Rivera & Garden, 2021) by letting students actively participate instead of just passively taking in information. Students should ask short questions about marketing plans or make choices that will help them beat other teams in releasing products. Also, using digital tools or mobile apps (Kangas et al,2017) to make things more interactive for students who are good with technology.

The Marketing Mix Board Game helps people learn and teach by using methods like active recall, gaining knowledge, and critical thinking. Students must use their knowledge of basic marketing concepts to answer questions, solve case-based problems, and make choices that will affect the success of their team. This process not only brings together what students learn and teach, but it also links theory and practice (Sylvester, 2024). The design of the Marketing Mix Board Game makes it easier for students to connect information from different chapters, which helps them learn and remember what they learned for a long time. So, the lecturers need to improve the question bank so that it fits with the goals of the course and includes the levels of Bloom's Taxonomy. Add a short debrief after each round to explain why the right answers were given. This will help reinforce the teaching and learning goals right away.

Organized group roles and interactions with other players make collaborative learning (Camilon et al, 2021; Yu, 2021; Mathur et al, 2024) the most important part of the gamification. Students work together in groups to think about and agree on marketing mix strategies, which helps them improve their ability to work together and communicate. Members take turns being team leader, researcher, and spokesperson, which ensures that everyone has an equal say. Active discussion helps students understand what they are learning, work through different points of view, and improve their skills. It is a good idea to have structured reflection sessions where each team member has to give feedback or make a contribution to make sure that all points of view are heard.

This Marketing Mix Board Game has a very positive emotional effect (Kangas et al, 2017) on students. It creates a pleasant and helpful learning environment that helps people relax. Using Marketing Mix Board Games as a teaching method is unique, which makes students more interested and excited, and brings the class together. Positive feelings, like being engaged and happy about getting the right answers, make the experience more effective for teaching and learning. Students often say they feel more energized and connected to the subject, which shows that the board game helps them think more deeply about the marketing concept and feel more connected to it. Instead of focusing on competition, it is better to focus on teamwork by giving points for things like "best collaboration" or "most innovative strategy," as well as points for individual successes.

The Marketing Mix Board Game is successful because it is well-organized and makes sense. Each round has a time limit, which makes students think quickly and work well together. A structured question bank that is organized by topic helps make sure that the questions are in line with the learning outcomes and do not repeat themselves. It is suggested that you let people choose their difficulty levels based on how well they do in the group. Give teachers instructions on how to help students and suggestions on when to change the pace based on their needs and energy levels.

This Marketing Mix Board Game has been carefully designed to meet a wide range of needs and educational settings. The questions go from multiple choice to open-ended, which lets students with different learning

styles take part in a meaningful way. The teachers are clear and easy to understand, so all students can understand the game, no matter how much they already know. Suggested that students who are not present should also be accommodated through makeup sessions or other activities that help them meet the learning goals. This all-inclusive plan makes sure that everyone has equal access to educational outcomes and helps everyone feel like they belong. There have been steps taken to make sure that all students can play the game. These steps include clear instructions and a variety of question types to fit different learning styles (Sunitha, 2021; Marthur et al, 2024; Benosa et al, 2024). When students have trouble with language, they often have trouble with how questions or terms are formed. Give students vocabulary cards or a glossary of important marketing terms. Also, make sure that students who can't be there or who are far away can fully participate and benefit from the experience by offering an online or offline version of the game.

Conclusion

The outcomes of this study highlight the transformative potential of gamification, notably through the utilization of gamified 4Ps marketing mix strategies on teaching and learning effectiveness by using Marketing Board Games, in the process of improving the learning experience of students. Despite the fact that the views of gamification among students did not demonstrate a direct influence that was statistically significant on satisfaction, the findings of the study demonstrated a substantial positive association between student engagement and satisfaction. This highlights the fact that the effectiveness of gamification tactics is more significantly dependent on the level of student participation than it is on the attitudes or initial expectations of the students. A dynamic, fun, and collaborative learning environment is created through the use of the board game format, which contributes to a better grasp of the notion of the 4P marketing mix. Students shared their viewpoints that not just demonstrating passion and motivation while playing the game, but also obtaining a greater understanding of marketing mix strategies, linking academic content with real-world applications.

This is a significant achievement for the students. Consequently, this highlights the significance of experiential learning approaches that encourage critical thinking, decision-making, and collaboration among individuals. In addition, qualitative feedback indicates that the game encourages positive feelings, a sense of belonging, and constructive dynamics within the team. These affective benefits make a major contribution to the total learning experience, which suggests that emotional engagement has to be taken into consideration alongside cognitive outcomes when assessing the success of teaching.

Having said that, this study also draws attention to areas that require more development. Interactive design and continual development are crucial for sustaining relevance and inclusivity, as indicated by suggestions such as better instructions, broader case studies, time modifications, and improved question quality. These suggestions imply that it requires continuous improvement. The goal of these enhancements should be to suit a wide range of learning styles, levels of comfort with technology, and verbal abilities among students.

In conclusion, the gamified 4Ps marketing mix strategies are an effective instructional instrument that encourages learning that is centred on the student, stimulates engagement, and enhances satisfaction. Lecturers can transition from a passive learning model to an active learning model by including game elements that are linked with the teaching and learning into the delivery of the course. This transition will result in an increase in the level of knowledge retention and practical understanding. To ensure that gamification tactics in business and marketing education have the greatest possible educational impact, future implementation should place a priority on purposeful design, continual feedback, and flexibility.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

What Is the Target Population for Agricultural Entrepreneurship in Malaysia's Agricultural Economic Sector? A Systematic Literature Review

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Abstract: The emerging trends of sustainability and globalization have driven changes in traditional agriculture dominated by aging farmers with low-tech industries. This scenario seems to have changed with new and diverse phenomena focusing on the agent who can adopt these changes. Hence, the new opportunity-based view of the entrepreneurship concept and youth as relevant agents within the new context in the agriculture sector. Numerous previous scholars have concentrated on typical entrepreneurship research; however, they have mainly neglected agricultural entrepreneurship within the agriculture sector. The study aims to investigate agricultural entrepreneurship within the target group in Malaysia through a comprehensive literature review. The articles reviewed were used from the Scopus, ScienceDirect and Google Scholar databases. We analysed 15 papers that focus on agricultural entrepreneurship research in Malaysia, which were published in Malaysia between 2014 to 2024, in order to contribute significantly to existing literature. The finding shows that the growing and promising agriculture entrepreneurship, mainly in intention and behavior, has become a crucial role among youth towards it. This study presented a descriptive finding and a thematic analysis focused on a groomed group of Youth Agropreneurs to adopt the changes into the agriculture sector. The paper concludes by setting up the agenda for future researchers in the field to address research gaps.

Keywords: *Target Population, Agricultural Entrepreneurship, Agriculture Sector, Malaysia, Systematic Review.*

1. Introduction and Background

A service-oriented industry drove Malaysia's economy, while the agriculture sector remains an important backbone as the third-ranked government economic driver. Importantly, it provides food for the Malaysian population and it is functioning to upgrade the socio-economic status of society and a stable economy (Musa & Ab. Aziz, 2022). By 2050, global food demand is anticipated to increase substantially, propelled by the growing world population. However, Malaysia's agriculture sector lags, ranking 8th out of 10 ASEAN countries in terms of GDP contribution, trailing Myanmar, Cambodia, Laos, and Vietnam (DOSM, 2021). Additionally, under the National Transformation Program, the sector has seen a growing reliance on non-citizen workers IMF, 2018), further exacerbating labor shortages Mat Lazim et al., 2020), with an aging workforce dominating the industry by 67.9% as reported by DOSM (2020). This group often lacks technological skills and knowledge (Yusoff et al., 2017). Conversely, the rate of unemployment among graduates in Malaysia stood at 3.8% in 2019 EPU, 2020), suggesting an opportunity to engage this group in the agriculture sector as youth groups remain low, with only 15% of young people involved (Mat Lazim et al., 2020; MAFI, 2021). Aligned with the recent and ongoing trend of advancements in modern agricultural technologies have the potential to transform traditional farming practices into modern, technology-driven methods. This transformation could attract young individuals to participate in agriculture by offering entrepreneurial opportunities that require knowledge, skills, and the ability to manage risks effectively.

Globalization, the environmental, economic and social changes have changed and therefore, entrepreneurship needs to be broadened into the agriculture sector to promote opportunities and to address these challenges. Agricultural entrepreneurship is necessary to improve agricultural development (Firus et al. 2020). This is a new concept of mixed agriculture and entrepreneurship known as agricultural entrepreneurship for redefining new and modern agriculture, which currently is gradually getting attention among policymakers, researchers and academicians. Agricultural entrepreneurship originated from the general concept of entrepreneurship. According to previous studies, agricultural entrepreneurship is able to promote Precision Agriculture, Artificial Intelligence, and Internet of Things (IoT), which is relevant for youth. It has become a motivator for young people to embrace innovation, enhancing the capabilities of young farmers (Adeyanju et al., 2021) and has led

to involvement in agricultural entrepreneurship (Ray et al., 2022). Significantly, Malaysian researchers highlighted Malaysian government aims to strengthen youth participation in the agriculture sector Ambad et al., 2021), and more studies are recommended to be conducted, which involve the young generation in Malaysia towards agricultural entrepreneurship. As a result of the lack of agricultural entrepreneurship studies, mainly in the Malaysian context (Abdullah et al., 2014).

A strong new entrepreneurship concept in the agriculture sector as a means to secure food by the involvement of youth, which is guided by the National Entrepreneurship Policy NEP, 2030. 13 ministries have collaborated to support and encourage youth into entrepreneurship through entrepreneurship training and programs particularly among youth graduates and youth Agropreneur to empower the agriculture sector in Malaysia, (MOA, 2018). Significantly, Malaysia had established Youth Agropreneur Unit in 2013 under Malaysia's agricultural and Food Industries (MAFI) as significant forces aims to increase youth participation in agriculture sector by shaping newer breed of future youth Agropreneur below age of 40 which particularly in Malaysia's agriculture-based and tourism businesses, as we as in crop farming, livestock, marketing, technology and innovative concept (Kadir, 2014). On the other hand, developing agropreneurs among youth needs to create their interest, awareness and exposure about agriculture and entrepreneurship through education in schools and universities as well. Entrepreneurship may be learnt and developed Drucker, (1985); Gorman et al., (1997); Yusoff et al., (2016), whereas entrepreneurship education can enhance the learner's intention to pursue entrepreneurship as guided under Malaysia National Higher Education Action in 9 Malaysian Plan to focus developing entrepreneurial skills among students in higher learning institutions (Mohd et al., 2012; Mohamed et al., 2011). Strong support by the government and training programs led to the growth of success of youth agropreneurs (Abdullah & Nor, 2024; Mohd et al., 2012). Therefore, 'youth' is the group population that is targeted towards agricultural entrepreneurship in Malaysia since their still young, energetic, high-tech, and entrepreneurial needs must be groomed, which cannot depend on an ageing farmer anymore.

Various entrepreneurship-related activities and initiatives, organized to promote entrepreneurship as well as to produce entrepreneurial graduates and more graduate entrepreneurs. Therefore, multiple groups of youth, such as university students, graduates and agropreneurs, have been found in agricultural entrepreneurship literature across different types of research methods, which warrants a further investigation under behavioral studies, which consists in terms of individual intention and translates into actual behavior. Behavioural intention pertains to an individual's likelihood of executing a specific behaviour, but the concrete outcome of the decision-making process is also considered through the intention is the actual execution which involving employing different group research populations accordingly. This is crucial for future researchers to take an opportunity of the ideas of agricultural entrepreneurship, perceiving from intention or actual behaviors, with identifying the best target population for agricultural entrepreneurship research in the future. The study is at an individual level, which consists of individual intention and translates into actual behavior. Significantly, this study aims to explore the relevant target population in agricultural entrepreneurship research by systematic literature review to identify the most suitable target population for entrepreneurship in the agriculture sector, as many diverse youth groups and different behavioural study contexts have been discussed by previous researchers.

2. Significance of the Study

The idea of entrepreneurship had emerged to face the challenges in the current agriculture sector. It is a new context of agricultural entrepreneurship which has been driven by globalization and it is very crucial for the future development of this sector (Fitz-Koch et al., 2017; Dias, 2018). It offers a new paradigm of entrepreneurship in agriculture, World Bank (2015); Condor, R. (2020), which is not restricted to established countries but is also new to developing countries. Entrepreneurship offers opportunities towards agricultural sustainability, which leads to an increasing number of publications over the years among researchers (Normandie, 2021; Wahyudi & Kiminami, 2021). It showed a significant growth of agriculture entrepreneurship research from the late 1990s to the early 2000s (Normandie, 2021). Nevertheless, mainstream entrepreneurship research has largely ignored the agricultural sector (Fitz-koch et al., 2017).

Specifically, the authors emphasized behavioral studies as an increasing trend in conducting individual and behavioral studies (Shariff, S. et al. 2022). According to Sayed (2023), agricultural entrepreneurship is the

creation and management of agricultural businesses through exploiting opportunities to innovate in production, marketing, distribution and managing financial and human resources efficiently. The behavioural intention of students in agriculture learning institutes was the primary focus of their specific research in agricultural entrepreneurship studies by Malaysian researchers, namely, Yusoff et al. 2016), Mohammad Nor et al. 2015), Abdullah and Naem Sulaiman 2013).

The behavioral studies involve a long-term process, which begins to form behavioral intention until it's translated into actual behavior. Due to that, two categories of behavioral studies have been conducted separately. As such, the early stage of entrepreneurship is formed, which involves conscious and predicted behavior Krueger et al., 2000), commonly known as behavioral intention studies. Therefore, behavioral intention is under the conscious mind, which does not act immediately, and it is not sufficient to measure actual entrepreneurship (Carsrud and Barnback, 2011; Saeed et al., 2014), such as taking risk behaviorally to venture creation, which has a long-term effect. Another hand, the actual behavioral translation is about the action's individual takes, through crucial roles in shaping the outcome, which originates from the 'intention'.

'Youth' is a common group of people who are targeted in agricultural entrepreneurship behavioral studies. Youth are regarded as the most important predictors of planned behaviour. Bagozzi et al., (1989) concerning behavioural purpose, for instance, university student, graduates' general youth while the actual behavioral which closely related to the group of entrepreneurs is business owner, self-employed, sole-trader, farmer and starter with role of behavior McClelland, (1967) and now, agropreneur is new population group is emerging of agricultural entrepreneurship literature in Malaysia. These are individual people who own and manage a business who undertake entrepreneurial behavior towards risk, and opportunity in selecting job options as a result of behavioural factors, as refer to pindado and sanchez, (2017), which under responsibility known as agripreneur, entrepreneurial farmers and agricultural entrepreneurs across different terms in the literatures (Otache, 2017). It presents new job opportunities to take on new roles as an agropreneur for the new shape of the agriculture sector. Significantly, earlier research discovered that agricultural entrepreneurship has been fostered among youth by developing necessary skills to improve the success of youth-owned farm firms (Adeyanju et al., 2021). Agripreneurship has emerged as a catalyst for youth to adopt innovation in addressing agricultural concerns. Ray et al. (2022), to address aging farmers in Malaysia (Ahmad, 2020). As of now, the total youth population in Malaysia is estimated at 14.9 million IYRES (2022), and the government takes them as a serious concern into agricultural policy and agenda to promote a new agricultural entrepreneurship concept in Malaysia. Overall, 'Youth' is a common group population toward agricultural entrepreneurship found in the Malaysian literature, despite the individual group term diversification as the above to become which warrants to do more investigation and identification, mainly by a systematic literature review. This is because a wider definition of youth has been found in the literature, which does not have a universal definition of youth and it differs between countries, such as Indonesia considers those aged 19 to 39 to be young farmers, less than 40 years are identified as young farmers in the European United (Hamilton et al., 2015). The United Nations defines youth as those aged 15 to 24. However, none of these studies provides a specific group of youth towards agricultural entrepreneurship behavioral studies categories.

Significantly, Systematic Literature Review (SLR) can reduce biases, fill the research gap and increase research validity. A comprehensive, structured review is well-organized and clear (Higgins et al. 2011). Some SLR had conducted under agricultural entrepreneurship studies, such as Dias et al. (2018) employed a co-word bibliometric technique utilising only Scopus Journals, identifying entrepreneurial behaviour and skills, entrepreneurial strategies, and community and entrepreneurial action as the three principal approaches in the domain of agricultural entrepreneurship. Another study by Condor et al. (2020), a systematic review on entrepreneurship in agriculture using Scopus databases to understand what entrepreneurship means in agriculture, which involved quantitative and qualitative studies. A thorough literature review provides an overview of the progression of agricultural entrepreneurship research from a youth perspective via descriptive analysis, which includes the factors determination, group of youth, research methodology and theories that were applied by prior research (Syaukat et al., 2022). Therefore, the study wants to analyze the various youth groups (categories) since these are unclear, to derive future agricultural entrepreneurship studies. The author would be closely investigating different research methodologies, objectives of study, the behavioral studies category (intention or actual behavior), which can provide clues for the differences of the target research population to employ in 10 years of Malaysian literature from 2014-2024. The study develops an SLR based

on common terms on the emergence of group youth into the new agricultural entrepreneurship context with various terms such as among students, graduates, farmers, agricultural entrepreneurs and agropreneurs. The reason the study's SLR is based on this specification, it helps the government or organization to plan strategies to bring the role of youth into the realm of agricultural entrepreneurship. In addition, it is increasing the empirical studies' contribution that focus on significant youth participation in the agriculture sector, despite agricultural challenges in Malaysia. Lastly, this recent SLR helps to describe current trends of how youth in diverse groups suit the types of agricultural behavioral studies, which provide recommendations to future researchers that warrant this recent SLR to conduct further investigation.

3. Methodology

A Systematic Review protocol is employed to obtain a comprehensive description through a systematic review, which considers the rationale, hypothesis, and methods to follow. The study, informed by the Reporting Standards for Systematic Evidence Syntheses (ROSES) by Haddaway et al. (2018), serves as a collaborative initiative that establishes a comprehensive framework for ensuring evidence synthesis reports encompass the creation of a research question, a systematic search method that includes identification, screening, eligibility evaluation, quality rating, and data extraction and analysis.

Roses

The ROSES procedure offers guidance for conducting systematic reviews utilising extensive databases of scientific literature based on specified linked phrases. The advantages of ROSES methods would be applied across all multidisciplinary, more flexible methods for quantitative, qualitative and mixed methods in contrast to PRISMA guidelines, primarily centred on the healthcare sector (Haddaway et al., 2018). This guide commenced with (1) searching, (2) screening, (3) critical quality evaluation, (4) data extraction, and (5) the production of findings, as outlined by Haddaway et al. (2018) and Lockwood et al. (2015), to ensure quality control, transparency, and mitigate bias risk. Consequently, the research question was constructed to direct the review process utilising PICO methodologies as outlined by Lookwood et al. (2015). Within this structure, 'P' symbolises the problem or population, 'I' indicates the interest, and 'Co' denotes the context. Subsequent to the three systematic screening procedures, which include identification and screening, eligibility will be explained and followed by quality appraisal of finalized articles by Hong et al. (2018), will be placed between the main author, co-author and a qualitative studies expert.

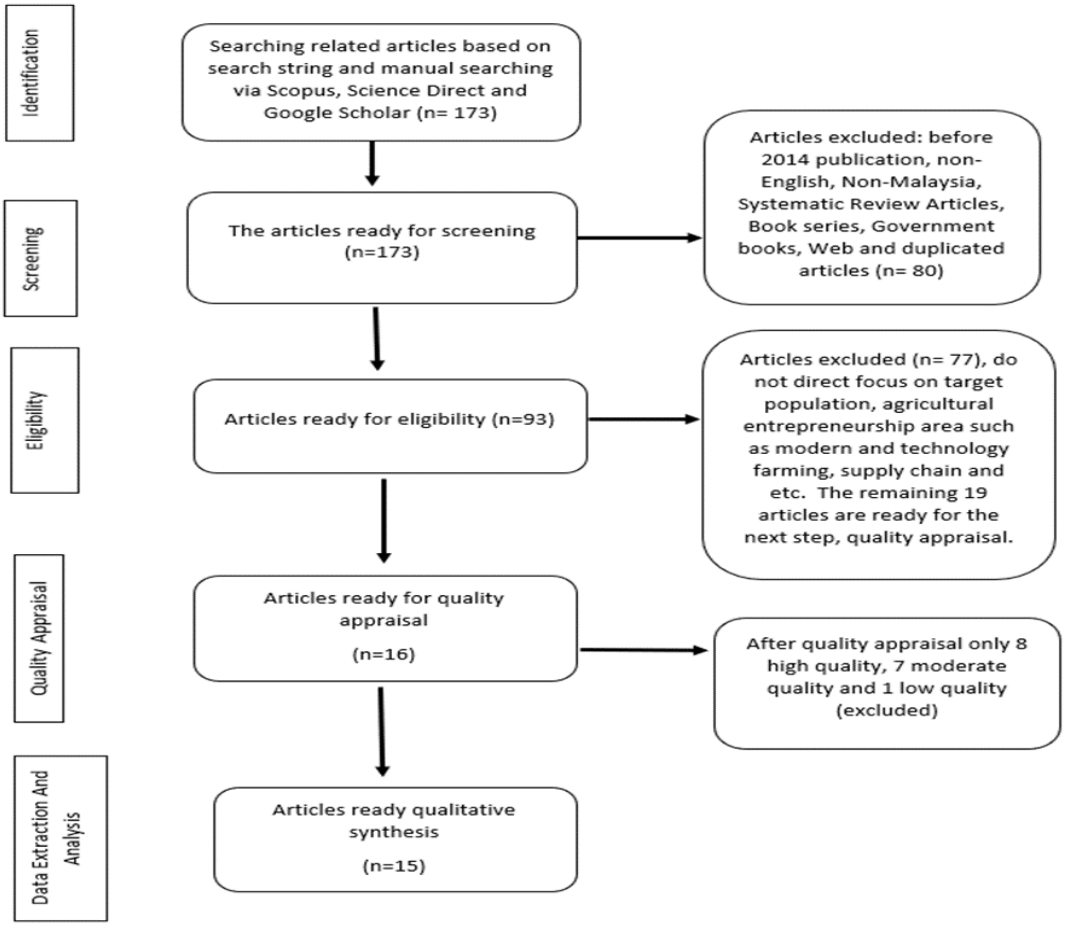
Research question formulation

Refer to the PICo concept, the main research question is guided by the current target of the youth population as (population), agricultural entrepreneurship as (interest) and behavioral studies as (context). The keywords and symbols for the search functions in the Scopus, Web of Science, and Google Scholar databases include wildcards, phrase searching, truncation, and Boolean operators. So, the research question is "What is the target group population towards Agricultural Entrepreneurship in Malaysia"? Secondly, the research question is also driven by the Sustainable Development Goals (SDG) to secure food for the increasing world population by 2050 through sustainability promotion, sustainable economic growth and productive employment are targeted to be achieved (UN, 2015). Particularly, Malaysia aims to emphasize the new concept of agricultural entrepreneurship under the Malaysia Plan, National Entrepreneurship Policy NEP (2030), which was introduced from the Ninth Malaysia Plan until Twelve. Thirdly, a growing number of agricultural entrepreneurship research has been conducted from the late 1990s until the early 2000s, in which Malaysia has a low number of publications as compared to the Netherlands country which is leading (Normandie, 2021). It is very important to review due to the lack of existing literature on the target population towards agricultural entrepreneurship in Malaysian studies.

Process of Systematic Searching

Subsequently, the three systematic review procedures employed after formulating research questions are identification, screening and eligibility, and the application of inclusion and exclusion criteria, Shaffrill et al. (2021), as presented in Figure 1.

Figure 1: Process of Systematic Searching



a. Identification

The authors used keyword searching processes through PICo methods: Youth, Agricultural Entrepreneurship and Behavioral Studies, as prompted by research questions, who is the target group of Malaysian youth for agricultural entrepreneurship? The authors constructed a search string by integrating Boolean Operators, Truncation, Wildcards, Field Codes, and phrase searching techniques Haddaway, (2018); Shaffril et al., (2024), using synonyms, related terms from previous studies were employed using search string created, keyword search, online thesaurus and dictionaries from three largest databases for 10 years back from 2014 to September 2024 (Table 1). Scopus, Web of Science and Google Scholar were utilised for literature searches to identify articles and thus for reviewing purposes on the target group of the youth population towards agricultural entrepreneurship in Malaysia. Web of Science and Scopus are the major databases, covering 49 million multi-disciplinary scientific literature of book series, open access journals, books and reports. The high impact indicator and the most exhaustive sources of publication are the reasons why both databases are selected for literature searches (Pranckute, 2021). Moreover, the weight Cite Score of Scopus and Impact Factor from Web of Science make better quality articles to refer to based on their reference metrics. Scopus is also free for access to journals and includes factor metrics (Pranckute, 2021). Additionally, the authors also consider reviewing and including articles from Google Scholar as additional sources of databases, as suggested by Haddaway et al. (2015), disputing the issues of lack of referencing and quality journals. The extensive availability of open-access papers, along with the diversity in subject areas, languages, and document kinds, reflects a low strength score as stated by Haddaway et al. (2015), Alotaibi & Johnson (2020), and Martin-Martin et al. (2018). Nonetheless, Google Scholar is incorporated as a search tool for review databases, demonstrating the importance of utilising several search methodologies (Shaffril et al., 2021; Cooper et al., 2018). The consideration of reviewing articles from different databases of Google Scholar would become more open,

diversified and the largest comprehensive database would be found in the finding diversification and perspectives (Shariff, S. et al., 2022).

Therefore, the authors combine main keywords using the search function of Boolean Operators and phrase searching and review using a manual hand-searching for the next search for three different databases. To sum up, the authors retrieved 173 potential articles in this identification stage. The main keyword search is identified using the search string as follows:

Table 1: Systematic Review Process Search String

Databases	Keyword used
Scopus	TITLE-ABS-KEY (“Agriculture’ OR “Agricultural” AND “Entrepreneurship” OR “Agricultural Entrepreneurship” OR “Entrepreneurship in Agriculture” AND “Malaysia”)
Web of Science	TS = (("Agriculture" OR "Agricultural") AND (" Entrepreneurship" OR "Agricultural Entrepreneurship" OR "Entrepreneurship in Agriculture") AND ("Malaysia"))
Google Scholar	Entrepreneurship Agricultural OR Entrepreneurship in Agriculture OR Agripreneurship OR Agro-preneurship AND Malaysia

b. Criteria for Inclusion and Exclusion in Screening

The second stage is the manual screening process for duplicate items and followed by inclusion and exclusion criteria. The inclusion databases encompass research articles and exclude systematic reviews, book series, books, chapters in books, and conferences that are proceeding according to a specific maturation timeline for 10 years, which indicates a sufficient period for revolutionary research (Rayet et al., 2012; Alexander, 2020). It is one possible way to have more articles related to reviews. Kraus et al. (2020) also agreed that the articles published from 2015 to 2020 are ensuring the research field is at a maturity level. The diverse results of review analysis generated across more and diverse database sources would increase the level of intensity of research production.

The greater the number of papers discovered across diverse database sources, the more favourable the review analysis outcomes and the heightened intensity of the current research output. Articles encompassing qualitative, quantitative, and mixed methodologies were chosen for examination to ensure a diverse array of perspectives. Articles that have been published in English are selected as the most common language preferences by the journal and to avoid confusion and to maintain a high index quality of social sciences articles are referred to retain the quality despite proceeding. Furthermore, the articles that were chosen provide primary data rather than secondary data. Focusing on Malaysian research due to growing trends towards agricultural entrepreneurship from the 1990s and in the early 20th century, Normandie (2021) and which was supported by Malaysia's National Policy to strengthen the new context of agricultural entrepreneurship, creates opportunities for employment for possible groups of people, which has been often discussed by Malaysian researchers. Therefore, the author’s belief is that it is very important to review agricultural entrepreneurship from behavioural studies and to find the target population that can participate in agricultural entrepreneurship only in Malaysia. In total, 80 articles were excluded from the review process due to these criteria, which resulted in 93 articles continuing to the next eligibility process.

Table 2: The Criterion of Eligibility and Exclusion Articles

Criterion	Eligibility	Exclusion
Type of Literature	Journal (research articles)	Journal (systematic review), book series, book chapter, conference proceedings
Language	English	Non-English
Timeline	Between 2014 to 2024	<2014
Indexes	The Web of Science's Art and Humanities Index, Emerging Sources Citation Index, and Social Science Citation Index	Science Citation Index Expanded (Web of Science)

Countries and territories	Malaysia	Non-Malaysia

c. Eligibility

The authors evaluated all chosen articles to confirm and meet the inclusion criteria and research question. The review articles by screened and discuss abstract, title and methodology are discussed when necessary. In total, 77 items were excluded because to do not match on inclusion criteria of the agricultural entrepreneurship context in Malaysia, such as not focusing on behavioural studies and research population, which the study focuses on organization, strategy and the challenges. Sixteen papers (16) were determined to be suitable for the next stage of quality assessment.

Quality Appraisal

These 16 selected articles had been evaluated to ensure the minimal risk of bias, maintain the quality, integrity and ensure high satisfaction. Therefore, quality appraisal has been suggested by (Shaffril et al., 2020; Haddaway et al., 2018). All authors read independently of all selected articles, discuss and meet to mutual judgment. The evaluation was performed with the Mixed-Method Appraisal Tool (MMAT), measuring scale, instrument, and checklist on all selected articles to ensure articles' quality. MMAT permits the evaluation of all common methodological types of research, including qualitative, quantitative, random, non-random, and mixed methods enquiries, as delineated by Hong et al. (2018).

Firstly, authors must conduct a quality evaluation on methodology and analysis approach by examining the whole paper to guarantee consistency and answering the research topic based on the five (5) major criterion assessment questions of MMAT. The enquiries encompassed (1) the formulation of a precise and relevant research topic, data collection pertinent to the research issue, (2) sufficient data collection, (3) appropriate evaluation of results and analysis, (4) relevant sampling methodology, (5) appropriate measuring device or statistical analysis. A total of eight articles fulfilled all criteria, while five articles matched at least four criteria, two articles met at least three criteria, and one qualitative piece was eliminated because its findings do not adequately answer research questions and the study only fulfilled two criteria. The article must satisfy two components of the screening criteria: (1) answer to two sets of questions, (2) select the appropriate study category, and (3) address each criterion to confirm the article's quality by choosing from three options: 'Yes', 'No', and 'Do not know/comment'. Affirmative responses suggest the author's confidence in the article's quality to fulfil the criteria, and conversely. While 'Do not know' answer, if they were uncertain about the quality of the articles. As a result, the high (4 criteria fulfilled) and moderate quality (3 criteria fulfilled) articles were reviewed. The low quality (one or two criteria fulfilled) would not be included in the next review process. Overall, 15 articles were eligible for the next inclusion review. Specifically, authors identified 11 articles that were ranked as high, fulfilled 5 and 4 criteria, 3 articles were moderate as they fulfilled 2 criteria and 1 article was low in quality **(see Appendix).**

Data Extraction and Analysis

All the selected articles were reviewed using qualitative synthesis to present results on thematic analysis regardless of the articles in the form of quantitative, qualitative and mixed methods. Diversified views and perspectives produce the strength merits for quality, rigor and transparency of these articles (Hong et al., 2018). The thematic analysis approach, by interpreting and representing data from qualitative studies, is employed (Flemming et al., 2019; Nowell et al., 2017). Consequently, the authors employed inductive thematic analysis to construct a theme and subtheme that addressed the primary research objectives.

Thematic Analysis entails the identification, analysis, organisation, description, and reporting of themes derived from extracted data, hence facilitating the presentation, interpretation, and representation of extensive data sets (Nowel, 2017). The extracted data must be presented in a statement (qualitative description) that outlines the similarities, relationships, and categorised patterns about the data set (Braun & Clarke, 2019). This extracted pattern data is important to notify and thus to identify the target population that is relevant towards agricultural entrepreneurship by a Malaysian researcher, which is organized in table form (Tables 4 & 5). Authors consider reviewing from the abstract, result, discussion, conclusion and if needed they also consider other sections in articles by frequent reading. Through frequent reading, authors compile data based on similarities and relationships Kiger & Varpio, 2020) among authors to ensure groups of themes are

matched. Authors also discussed any inconsistencies in findings or ideas that associate a group of themes until mutual agreement emerged. As a result, two main (2) group themes had developed: Youth (behavioural intention) and Youth Agropreneur (actual behaviour). Each developed theme also produces a sub-theme according to the research objective and research methodology, such as behavioural intention; university students, university graduates, Gen Y, and Youth in general, while actual behavioural, graduate agropreneur, Paddy farmer, women entrepreneur in the agriculture sector and agrotourism entrepreneur who are involved in agricultural activities. Most of the articles' reviews focus on Youth as a group population towards agricultural entrepreneurship in Malaysia. The following process is continued by theme validations from one qualitative synthesis expert and an agricultural expert. In all, this expert agreed with all group themes, which represent the target population towards agricultural entrepreneurship in Malaysia. Data similarities and relationships were identified for each theme as they were presented in Table 5, as a result of the primary themes and sub-themes within the target population of agricultural entrepreneurship.

4. Research Findings

Out of 15 articles being selected for systematic review, 10 of them are quantitative research and 5 articles are qualitative studies focusing on Behavioural studies in Malaysia. Four articles were published in 2022, while two were published in 2024; the publications of 2021 have 3 research articles; the years 2020, 2016, 2015 and 2014 have an article publication of each year and 2019 have 2 article publications. In summary, the total of 9 articles had focused on Agricultural Entrepreneurship Intention, and the study identified that the target group population was employed according to the context. One article had an extended investigation from the Agricultural Entrepreneurship Intention to 6 months of longitudinal time (by two-time frame) between students in the final year and after students graduated, as shown as short-term to actual behavioural. At last, 5 articles close to actual behavioural in real agricultural entrepreneurship in Malaysia. Generally, most of the articles focus target group of youth towards agricultural entrepreneurship, but it is involving with diversifying youth such as students, final year agricultural students, business and entrepreneurship students, graduates, public university students, youth agropreneurs, young farmers, youth, paddy farmers, women entrepreneurs and agrotourism entrepreneurs. Overall, all these groups of the target population towards agricultural entrepreneurship differ according to the types of behavioural studies and research objectives.

The new spirit of 'Agri-preneurship' development has enhanced individual desire to operate their firms (Alex, 2011). As a result, agriculture requires entrepreneurship to enhance productivity and profitability, Bairwa et al., (2014), despite the growing unemployment, aging farmers, and foreign workers in the agriculture sector. Indeed, countries need individual entrepreneurs who can manage a business with the intention and thus to expanding the business with the necessary skills towards achieving the goal. Basically, behavioural studies started to form agricultural entrepreneurship intention, whereas to prepare the individual through cognitive, psychological abilities and capabilities to have a tendency towards agribusiness venture creation and thus drive actual behaviours. The differential target research population was identified by an examination of the selected papers and the various study methodologies presented in the subsequent table.

In Table 3, the definition of youth differs based on the countries. Most Malaysian scholars define youth as individuals aged between 15 and 40 years who are relevant to agricultural entrepreneurship. This is important to have a clear definition of the target population of such a group of 'Youth' to help future research in further investigation.

Table 3: Definition of Youth

	Universal Definition
United Nation	Youth who are aged 15 to 24 years, but these youth have very low entrepreneurial skills.
International Labor Organization ILO, 2020	Individuals aged 15 to 24
Malaysian literature and Malaysian institutions	

Abdullah and Sulaiman et al 2013	Youth denote young boys and girls who are dynamic and contribute to national growth.
Malaysia National Youth Development Policy 1997	Youth refers to anyone aged between 15 and 40 years.
Malaysian Youth Council, 2007	Individuals aged between 15 and 40 years
Malaysia Youth societies and Youth Development Act 2007 (YSYDA, 2007)	Individual youth who are aged between 15-40 years old
Bahaman et al., 2010	Youth denotes individuals, regardless of gender, who are in a stage of life characterised by vigour and vitality, both mentally and physically. They serve as the foundation for economic development among individuals aged 15 to 24 years.
Silva, et al. 2009	Youth encompass those aged 15 to 40 years.
Malaysia Youth Policy 2015	Individuals aged 18 to 30 are classified as youth; yet, this clause in the statute remains unamended. In Malaysia, the age limit has been raised to 40 years.
Mahmud & Othman 2020	The government still refers youth up to 45 years old who are suitable for the entrepreneurship development program at peak life-maturity and the experience phase.
Isa et al., 2018	Youth agropreneurs are 40+ included in practice way to diversify the entry age into the agriculture sector, which aligns with the government policy alignment, for instance, the rural development strategy and the entrepreneurial program participant.

Source: a combination of the Youth definition by previous studies

Refer to Table 3, the global concept of youth refers to individuals aged between 15 and 25. Conversely, the definition of youth in Malaysia encompasses a broader age range, specifically individuals aged 18 to 40, which is frequently emphasised in various government programs, policies, and incentives. Nonetheless, the latest article presents an expanded definition of youth, extending it to individuals aged up to 40, with a maximum of 45 years, which the study considers pertinent, as individuals at this stage possess a significant level of maturity in both life and professional experiences. This study identified that the target demographic for Malaysian agricultural entrepreneurship includes individuals aged 18 to 45, focusing on both behavioural intention and actual behaviour of youth. This encompasses short-term and long-term behavioural studies, which warrant further investigation to address the existing research gap.

Table 4: Articles reviewed on target population, research methods and research objectives (table continued on the next page

No.	Authors	Target Population for Agricultural Entrepreneurship	Research Methods (QN/QL)	Research Objectives
1	Ambad et al. (2024)	Undergraduate students in public and private universities in Malaysia	QN	The impact of Holland's career theory and EEM on Agropreneurial intention

2	Gabriel, W. W. E & Irving, T. S. H (2024)	students enrolled in agricultural programs, attendees of agricultural seminars, subscribers to farming journals, participants of agricultural online communities, together with professionals deeply integrated in the field, including farmers, agropreneurs, and agronomists	QN	TBC variable drive individual Agripreneurship intentions and the perspectives of those either profoundly engaged in or actively involved in agricultural pursuits.
3	Che, N. (2022)	Final-year students of a Malaysian public university enrolled in business, entrepreneurship, and agro-preneurship programs.	QL	Factors of Agro-Entrepreneurial Intention
4	Abu Bakar et al. (2022)	Youth aged 15-40 years	QN	Youth Intention on Agricultural Entrepreneurship
5	Abdullah, F. A. & Abu Samah, B. et al. (2014)	Students in the Agriculture Learning Institute	QN	The inclination toward agricultural entrepreneurship
6	Ambad et al. (2021)	Malaysian youth aged 18 to 30 in Sabah, encompassing all public and private higher education institutions in Kota Kinabalu.	QN	Youth's intention to be involved in Agro-preneurship
7	Mohammad, N et al. (2015)	All youth (aged 15 to 40) in peninsular Malaysia, including the southern, northern, east coast, and central regions	QN	Youth's Inclination towards Agricultural Entrepreneurship
8	Waktu, S. et al., (2020)	Youth in Sabah	QN	Agro-preneurship Intention
9	Mat, T et al., (2022)	Public University students	QN	The correlation between social standing, job security, and entrepreneurial intention in agribusiness.
10	Musa et al., 2021	Higher Learning of Agricultural Institution students in Malaysia	QL	Factors affecting the Agro-preneurial intention
11	Yusoff et al. (2019)	Generation Y agriculture students from six Malaysian public higher education institutions	QN	To investigate factors that influence agro-preneurial intention and behaviours (activities)
12	Zainol et al., (2021)	Graduate Agropreneur in Melon Manis Terengganu (MMT) fertigation farming	QL	Establishing the Graduate Agropreneur Model
13	Kamaruzaman et al., (2019)	Paddy farmer	QL	Agro-Innovation – Path to Agricultural Entrepreneurship: Feasibility Study
14	Tan, Y., W. & Abdullah, A., R. (2022)	Agricultural entrepreneur/Agrotourism entrepreneurs	QL	Agritourism Entrepreneurs on The Other Side: Motivation and Challenges
15	Haimid et al., (2016)	Women entrepreneurs in the agriculture sector/women agriculture entrepreneurs	QL	Female Entrepreneurs in the Agricultural Sector: Issues and Challenges

Table 5: Table Summary of Target Population towards Agricultural Entrepreneurship

No.	Authors	Target Population towards Agricultural Entrepreneurship		
		Behavioural Intention		Actual Behavioural
		Students, universities, and agricultural students	Youth	Farmer, Agropreneur
		1	2	3
1	Ambad et al. (2024)	/		
2	Gabriel, W. W. E & Irving, T. S. H (2024)	/		
3	Che, N. (2022)	/		/
4	Abu Bakar et al. (2022)	/		
5	Abdullah, F. A. & Abu Samah, B. et al. (2014)		/	
6	Ambad et al. (2021)	/		
7	Mohammad, N et al. (2015)		/	
8	Waktu, S. et al. (2020)		/	
9	Mat, T et al. (2022)		/	
10	Musa et al. 2021	/		
11	Yusoff et al. (2019)	/		
12	Zainol et al (2021)	/		
13	Kamaruzaman et al (2019)			/
14	Tan, Y., W. & Abdullah, A., R. (2022)			/
15	Haimid et al. (2016)			/

According to Tables 4 and 5, the behavioural studies consist of two categories: agricultural entrepreneurship, behavioural intention and actual behaviour. During the review, most of the articles had conducted Agricultural entrepreneurship intention, such as Ambad et al. (2024); Gabriel & Irving (2024); Che (2022); Abu Bakar et al. (2022); Abdullah & Abu Samah et al. (2014); Ambad et al. (2021); Mohammad et al. (2015); Waktu et al. (2020); Mat et al. (2022); and Musa et al. (2021).

The first theme of the target research population is among university students, graduates, Gen Y, and Youth. The only review articles had integrated the investigation from intention to actual behaviour, namely (Yusoff et al. 2019). Hence, the specific final year agricultural students were used as the research population due to the data collection involving two different times between the last semester of students and 6 months after they graduated, in order to see the agri-preneurship intention-behaviour. However, the long-term effect of intention on actual agro-preneurial activity was limited to a period of six months, which could not convincingly demonstrate a modest causal influence. Consequently, future research should extend the longitudinal timeframe beyond six months, as suggested by Yusoff et al. (2016), to establish improved outcomes. Nevertheless, a study was conducted to understand Theory of Behavioural Control (TBC) to stimulate individual Agri-preneurship intentions and the viewpoints of those either profoundly interested in or actively engaged in agricultural endeavours, which the author believes had employed many research populations, as shown in the table.

The second theme of the target population consists of actual people who are currently involved in agricultural entrepreneurship, such as the Graduate Agropreneur of Melon Manis in Terengganu, Paddy Farmer, women agriculture entrepreneurs and agritourism entrepreneurs. As evidence of numerous studies reviewed under agricultural entrepreneurship behaviour represented by three articles, which mainly focus on getting preliminary data from qualitative methods, such as Zainol et al (2021); Kamaruzaman et al (2019); Tan &

Abdullah (2022) and Haimid et al. (2016). All these articles have investigated the motivation and the challenges in agricultural activities, the Graduate Agropreneur Model, Path to Agricultural Entrepreneurship by feasibility study, interview, observation and case study. Therefore, these reviewed articles were required to have first-hand data from real phenomena.

According to the above finding, the groups of youth agropreneurs, youth, graduates and agriculture students in higher educational institutions are becoming the target population under the entrepreneurial skills and behavioural studies, either in intention or behavioural categories, towards agricultural entrepreneurship. Research objectives are also important to consider which groups are suited to the research. Therefore, some studies have investigated in terms of the intervention of entrepreneurship education and training approaches for these groups of the population. They are still young and less likely to become agropreneurs; therefore, this intervention would help and enhance their entrepreneurial skills and behaviour in the agriculture sector.

Overall, Youth generally still stand as become main focus of researchers towards agricultural entrepreneurship studies, which is based on the research objective accordingly. Those who are can be a potential towards agricultural entrepreneurship participation, as the indicator to the 'behavioural intention' will be employ individual youth as student, graduates, Gen Y. Most of reviewed articles had used university students and none of them employ, school students and vocational students which will future research to focus on agricultural entrepreneurship behavioural intention since the vocational school has agricultural programs. On the other hand, various individuals involved in the agriculture sector n such as women, agrotourism entrepreneurs, graduates and paddy farmers, as the target population in actual behavioural studies, share similarities who are individuals who are involved in agricultural activities. Nevertheless, it still depends on the research objectives of the investigation. For instance, if the study seeks to examine the elements affecting agri-preneurship intentions, factors influencing to become an agropreneur, training towards entrepreneurial intention, characteristics of agropreneurs and perceptions that suit the target population could be students, youth, and even farmers. Another hand, most of the actual people who manage agriculture business, such as farmers, agropreneurs, and program participants, are eligible for after-training and program evaluation. Overall, the basic understanding of the target population towards agricultural entrepreneurship behaviour can refer to the above discussion.

Discussion

The labour shortage in the agricultural sector, particularly among local workers, is a longstanding issue that is anticipated to exacerbate if reliance on foreign labour continues without implementing any reforms. So, the new dimension of agricultural entrepreneurship areas can change into dynamic, flexible and adaptable, primarily referring to individuals who will respond to these changes. As evidence of reviewed studies, the growing number of agricultural entrepreneurship studies resulted in a finding for the specific individual group used as a research target population. There are two categories of the relevant target research population towards agricultural entrepreneurship areas that have been identified based on the types of research methods and research objectives.

From quantitative research is often to do hypothesis testing, identify pattern, determination of factors and market prediction using numerical data collection, measuring and analysing using statistical methods such as study about Agricultural Entrepreneurship Intention which refer to research subject among Malaysian youth (15 to 40 years) by Abu Bakar et al. (2022); factors influencing inclination toward agriculture entrepreneurship among students in agricultural learning institutes' by Abdullah & Bahaman (2014); unravelling agripreneurship activities had directed among final semester Gen-Y of agricultural students of six Malaysian Public Educational Institutions by Yusoff et al., (2019); Agro-Entrepreneurial Intention by factors determination among Agri-business students in Malaysian public university by Che et al (2022); the effect of Planned Behaviour Theory on Agro-preneurship Intention among Youth in Sabah Waktu, S. et al. (2020); Youth Inclination Towards agricultural entrepreneurship among youth who age 15 to 40 years in Peninsular Malaysia Mohamad (2015). In addition, studies who are conducted by Ambad et al. (2024) also was investigated Agro-preneurial intention by career choice theory and entrepreneurial event model among undergraduates students from public and private university; and similar authors also explored the factors influencing intention to become Agropreneur towards Youth in Sabah by Ambad et al (2021) and the last study

done about the relationship between social status and job security towards agribusiness entrepreneurial intention among university students Mat et al (2022).

Overall, most of the above studies were targeted at the research population among university students, youth or generation Y, mainly focused on agricultural entrepreneurship behavioural intention investigation. As such, the research relates to the cognitive, skills and knowledge preparedness before they actively participate in real agricultural entrepreneurship goals. On the other hand, A quantitative study encompassing various research subject populations was conducted by Gabriel & Irving (2024), including agricultural program students, attendees of agricultural seminars, subscribers to farming journals, members of agricultural online communities, and professionals deeply entrenched in the sector, such as farmers, agropreneur, and agronomists towards influencing intention and action of agricultural entrepreneurship on decoding agripreneurship to comprehend the determinants influencing entrepreneurial purpose in agriculture which is involves the investigation towards the intention, perspective and action.

Conversely, a qualitative research project that seeks to understand and interpret social phenomena in depth and complexity of human behaviour, attitudes and interaction than quantifiable measurement by using methods of interviews, observation and analysis of text and visual data. Among these selected articles, according to Musa et al. (2021) were employed 20 UPM of agricultural students with a number of entrepreneurial experiences in investigate entrepreneurial intentions in the agriculture sector. Consistently, the qualitative research on the motivation and challenges of exploration in the agriculture sector among Agrotourism, Tan and Abdullah (2022); women entrepreneurs as research population by Haimid et al. (2016); a feasibility study about Agro-Innovation Path to Agricultural Entrepreneurship by Kamaruzaman et al (2019) among Paddy Farmers. Establishing a graduate Agropreneur Business Model for food security among successful graduate agropreneur Melon Manis Terengganu via field visit, observation and case studies. This recent business model on Melon Manis Terengganu fertigation farming is integrated with the current business environment to venture into high technology farming and therefore, the potential population of this agriculture sector are among new generation farmers, young, energetic and knowledgeable agropreneurs (Zainol et al. 2021). To conclude, the target research population is about individual people who are currently managing their agricultural business. Most of them are entrepreneurs across multiple concepts and areas, such as agrotourism business owners and female entrepreneurs in the agricultural industry, agricultural students with a number of entrepreneurial experiences, graduate agropreneurs, and paddy farmers. It is very important to have first-hand data information of individuals involved in agricultural activities, which can represent the preliminary study that relates to agriculture perspectives, which differ from those of individuals who are not involved in this sector, but they are still potential candidates for agriculture participation.

Generally, the target of the research population towards agricultural entrepreneurship is youth, with diverse agricultural areas. The authors' belief youth are the possible target population, as the growing trends of agricultural entrepreneurship studies have been employed and many prior studies have supported. On the other hand, the consideration of the target population also refers to the research objectives, such as the determination of factors for agricultural entrepreneurship inclination, indicators of entrepreneurial skills, and cognitive and knowledge would be investigated among youth from different versions of students, graduates, agropreneurs, farmers, women and so on. Nevertheless, if the research objectives focus on the assessment of entrepreneurial education and training towards individual cognitive and psychological performance would consider all youth which includes, including students, farmers, agropreneurs, graduates and others. Another hand, the assessment of entrepreneurial training and education on business performance would refer to the research population among real people in agricultural participation, such as farmers and agropreneurs. To sum up, most of the reviewed articles had focused on agricultural entrepreneurial inclination, which would employ the potential of the younger generation as a research population. However, more actual behavioural research that focuses on youth agropreneurs is encouraged for future research to fill in, since there is a lack of contribution in the existing literature.

Significantly, previous studies revealed that youth were a target potential population to engage in agricultural entrepreneurship that was 71 percent estimated to be interested in it (Mohammad, 2015) and become agricultural entrepreneurs to run agribusiness in the future (Abdul & Naem, 2013). According to the ILO (2020), Youth Agropreneur is relevant as the growing trends of youth into entrepreneurship as the main driver

to adopt change; to embrace innovation, Ray et al. (2022); overcome the unemployment problem, Silva et al. (2009); Bakar et al. (2022). Malaysia was on the right track towards agricultural entrepreneurship, while the Youth Agropreneur Unit was established in 2013 under (Malaysian Agricultural and Food Industry. MAFI is a significant force that aims to increase youth participation in the agriculture sector by shaping more new breed of future Agropreneur in Malaysia, which more young, energetic, high-tech, and entrepreneurial must be groomed. It was supported that the future agropreneur should be groomed within this sector, mainly among the youth, Yusoff (2017), to augment the quantity of youth agropreneurs in the future Malaysian agricultural sector (Mat et al. 2022). It was resulting in the number of Youth Agropreneur participation still low and discouraging, which currently accounts for only 15 percent in Malaysia (Johari et al., 2022; MAFI, 2021).

5. Conclusion

The target population in Malaysian studies consists of youth such as final year students, specific agricultural university students, business and entrepreneurship students, students with entrepreneurial experience, and university graduates, which almost all Malaysian agricultural entrepreneurship research had investigated from the perspectives of individual intention and inclination. However, there is a study done on the connection between individual intention and actual behaviour by using the proxy indicator of actual action and conducted using a longitudinal study. This result indicates, longitudinal studies are lacking and more future researchers are encouraged to fill the research gap. On the other hand, graduate entrepreneurs, women entrepreneurs, agrotourism entrepreneurs, and paddy farmers were also listed as the target population in agricultural entrepreneurship based on actual behaviour. Refer to reviewed Malaysia studies, most articles under qualitative study, which aim to understand the preliminary phenomena, perspective and actual environment in this agricultural sector. Another hand, these target populations can apply to factor behavioural analysis studies because it involves individual cognitive and psychological investigation. Overall, most of the target population had discussed either behavioural intention or actual behaviour, mostly among youth, which is very relevant to carry out agricultural entrepreneurship and make a change in the existing agriculture sector. The study significantly noted that the age range for youth participation might extend to 45 years, as this age represents a peak in life maturity and job experience, rather than being restricted to 40 years. This is due to many government programs, such as entrepreneurship initiatives, which can be fulfilled by this group of youngsters, leading to broader engagement and thus increasing the number of youth agropreneurs in Malaysia. This study identified that the target demographic for Malaysian agricultural entrepreneurship includes individuals aged 18 to 45, focusing on both behavioural intention and actual behaviour of youth. This encompasses short-term and long-term behavioural studies. Therefore, the future researcher is encouraged to employ youth as the research target population towards individual behavioural intention and action to conduct more longitudinal studies among emerging contexts of Youth Agropreneur in Malaysia, nowadays, to fill the research gap towards agricultural entrepreneurship in the Malaysian context.

Conversely, an increasing number of researchers are urged to investigate the target population of agropreneur, agripreneur, agribusiness entrepreneur, or agriculture entrepreneur among youth as a research target of population that focuses on agricultural entrepreneurship in the actual behavioural category. This area of study still has a minimal amount of literature compared to the behavioural intention study. Nevertheless, the growing number of research studies has found that the youth participation in agriculture indicates that youth are the main pillars of economic drives and development and they should be groomed to adopt the changes in agriculture to modern, automated mechanisms as integrated with entrepreneurship, which can create better employment opportunities for them. Therefore, the government intervention and support mainly through entrepreneurial education and training, is able to strengthen youth participation towards agricultural entrepreneurship in Malaysia, as now, Malaysia is expected to augment the population of youth agropreneurs in the future. Therefore, the authors had suggested focusing on the target population among 'youth agropreneurs' towards agricultural entrepreneurship participation. The impact of entrepreneurial education and training evaluation on individual and business performance is becoming an increasing research trend to fulfill as new contributions in the literature.

Limitations, further research and implications

This systematic review has limitations, primarily due to the lack of empirical findings. The review relies on synthesizing previous literature through a systematic process, which may not fully capture the practical way

of agricultural entrepreneurship. This limitation highlights the need for future researchers to focus specifically on identifying the right target population for agricultural entrepreneurship since many diverse Youth categories have been found in the literature with varying behaviours, intentions, and actual practices, making it essential to explore these dimensions more comprehensively. As of 2025, the inclusion of recent literature is necessary to address the current research gaps. Updating the body of work with the most recent studies will provide a more accurate and relevant understanding of the topic, ensuring that the findings are aligned with the evolving trends and challenges in the agricultural sector. The implications of this study are significant. By providing a foundation for future research, it can guide scholars in contributing to this emerging field through empirical studies that validate and expand upon the findings. Additionally, this research has practical implications for encouraging greater youth participation in the agriculture sector. Besides, practically, it helps policymakers identify effective strategies and interventions to attract younger individuals to engage in modern, technology-driven agriculture, addressing both labor shortages and the need for innovation in the sector.

Acknowledgement: I wish to express my gratitude for the support of my supervisors at Universiti Sains Malaysia (USM).

Statement of conflict of interest: The authors assert that this research was conducted devoid of any personal, commercial, or financial conflicts of interest and disclose no conflicting interests with the sponsors.

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A. Appendix of The Methodological and Analysis Assessment Criteria

Sources: Hong et al. (2018)

Research Design	Assessment criteria
Screening question (for all types)	S1: Are there clear research questions? S2: Do the collected data allow addressing the research question?
Qualitative	QA1 – Is the qualitative approach appropriate to answer the research question? QA2- Are the qualitative data collection methods adequate to address the research question? QA3- Are the findings adequately derived from the data? QA4- Is the interpretation of results sufficiently substantiated by data? QA5- Is there coherence between qualitative data source, collection, analysis and interpretation?
Quantitative randomized controlled trials	QA1- Is randomization appropriately performed? QA2- Are the groups comparable at baseline? QA3- Are there complete outcome data QA4- Are outcome assessors blinded to the intervention provided? QA5- Did the participants adhere to the assigned intervention?
Quantitative (descriptive)	QA1- Is the sampling strategy relevant to address the research question? QA2 – Is the sample representative of the target population? QA3- Are the measurements appropriate? QA4- Is the risk of nonresponse bias low? QA5 – Is the statistical analysis appropriate to answer the research question?
Quantitative (non-randomised)	QA1- Are the participants representative of the target population? QA2- Are the measurements appropriate regarding both the outcome and intervention (or exposure)? QA3- Are there complete outcome data? QA4- Are the confounders accounted for in the design and analysis? QA5- During the study period, is the intervention administered (or exposure occurs) as intended?
Mixed methods	QA1- Is there an adequate rationale for using a mixed methods design to address the research question? QA2- Are the different components of the study effectively integrated to answer the research question? QA3- Are the outputs of the integration of qualitative and quantitative components adequately interpreted? QA4- Are divergences and inconsistencies between quantitative and qualitative results adequately addressed? QA5- Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?

QA = Quality Assessment; QN(RCT)= Quantitative (Randomized Control Trial); QN (D)= Quantitative descriptive; QN (NR)= Quantitative non-randomised; QL Qualitative; MX Mixed-Method; C Can't tell.

A.1. The 15 Methodological and Analysis Assessment Criteria articles Categories

Study	Research Design	S1	S2	QA1	QA2	QA3	QA4	QA5	Number of criteria fulfilled	Inclusion in the Review
Ambad et al. (2024)	QN(D)	/	/	/	/	/	/	/	7	/
Abu Bakar et al. (2022)	QN (D)	/	/	/	/	/	/	/	7	/
Musa et el. 2021	QL	/	/	/	/			/	5	/
Yusoff et al. (2019)	QN(NR)	/	/	/	/	/	/	/	7	/
Abdullah, F, & Bahaman, S 2014	QN (D)	/	/	/	/	/		/	6	/
Che, N. et al (2022)	QN (D)	/	/	/	/	/	/	/	7	/
Mohamad, N. 2015	QN (D)	/	/	/	/	/	/	/	7	/
Ambad et al (2021)	QN (D)	/	/	/	/	/		/	6	/
Waktu, S. et al. 2020	QN (NR)	/	/	/	/	/	/	/	7	/
Firus et al, 2020	QL	/		/	/				3	
Gabriel, W. W. E & Irving T S. H (2024)	QN(NR)	/	/	/	/		/	/	6	/
Zainol et al. (2021)	QL	/	/	/		/	/	/	6	/
Kamaruzaman et al (2019)	QL	/	/	/	/			/	5	/
Mat, T. et al (2022)	QN(NR)	/	/	/	/			/	5	/
Tan, Y., W. & Abdullah, A., R. (2022)	QL	/	/	/			/		4	/
Haimid et al. (2016)	QL	/	/	/			/	/	5	/

Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Assessing the Contribution of Internship Program to Skills Acquisition: Evidence from BA Insurance Students at UiTM

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Abstract: This study examines how internships affect the skill development of undergraduate students enrolled in Universiti Teknologi MARA's (UiTM) Bachelor of Insurance program. The study examines four important aspects: professional development, professional skills, personal growth, and personal capabilities. It is based on the Social Learning Theory. A simple random sample of 58 final-year students who finished a six-month internship was given a structured questionnaire with 23 Likert-scale items as part of a quantitative research design. Tests for reliability and normality were performed as part of descriptive and inferential analyses. According to the results, internships greatly improve students' professional skills, personal development, and personal capabilities, with personal capabilities being the aspect that is most highly rated. Even though professional development received positive feedback as well, it varied the most, indicating irregularities in career alignment and mentoring. These findings highlight the importance of internships in developing skills that are relevant to the industry, emotional intelligence, flexibility, and career clarity. According to the study's findings, organized internships are essential for connecting academic understanding with practical experience in the insurance industry. Enhancing supervisor engagement, updating internship results, and promoting closer university-industry collaboration are some of the recommendations. The results provide useful information for educators, employers, and legislators who want to improve internship opportunities and increase the employability of graduates in insurance and related industries.

Keywords: *Internship, Professional Development, Undergraduate Study, Social Learning Theory, Insurance Industry*

1. Introduction and Background

An important link between professional practice and academic study, internships give students the opportunity to put their theoretical knowledge to use in practical situations. Through the development of pertinent skills, the clarification of career interests, and the expansion of professional networks, these experiences improve employability in a competitive job market (Jackson & Bridgstock, 2021). Students who finish internships report higher levels of professional competence, career confidence, and job readiness, according to research (Hora, Parrott, & Her, 2020; Tran & Soejatminah, 2022).

Internships are especially important in the insurance industry. Graduates must possess both theoretical soundness and problem-solving skills due to the industry's complexity and regulatory requirements (Vaughan, 2022). Through exposure to key divisions like underwriting, claims, and risk management, internships enable students to comprehend how these roles support organizational operations (Jackson & Wilton, 2023). Along with developing professional networks that could influence future career opportunities, they also acquire technical and soft skills like communication, risk assessment, and analytical thinking (Andrews et al., 2020; Jackson & Bridgstock, 2021).

These encounters help resume construction and career exploration even more. Practical experience is regarded by employers as a sign of readiness and dedication to the industry (Tran & Soejatminah, 2022; Hora et al., 2020). All things considered, insurance internships play a crucial role in equipping students for success by fusing hands-on training, skill development, and career clarity.

Purpose of the study

This study looks at the effects internships have on undergraduate insurance students' personal and professional growth. It looks at how these programs affect long-term career paths, career readiness, and skill

acquisition. It also evaluates the elements that go into creating a successful internship.

The research questions guiding this study are:

RQ1: To what extent do BA Insurance students perceive the internship program as contributing to their professional development?
RQ2: To what extent do BA Insurance students report acquiring professional skills through their internship experience?
RQ3: To what extent do BA Insurance students perceive that the internship program has contributed to their personal growth?
RQ4: To what extent do BA Insurance students perceive an enhancement in their capabilities as a result of the internship program?

Underpinning theory of this study
Albert Bandura's Social Learning Theory (SLT) is still a crucial framework for comprehending experiential learning in contemporary educational settings. Although the theory originated in psychology in the middle of the 20th century, its tenets—such as modelling, imitation, reinforcement, self-efficacy, and observational learning—are becoming more and more applicable to how undergraduate students learn professional skills during internship programs in the fast-paced, team-oriented workplaces of today (Jackson & Wilton, 2023). When it comes to internships, SLT offers a strong conceptual framework that clarifies how students learn by doing as well as by watching and interacting with professionals, getting feedback, and internalizing workplace customs and behaviors. SLT is especially relevant because interns are immersed in social settings where learning happens continuously and informally while they work on real-world projects (Mukhalalati & Taylor, 2022).

This study, which is guided by SLT, views internship programs as rich social learning settings where students grow via interaction with professionals in the field, modelling, feedback, and observation. Through internships, students are exposed to real-world situations where learning is socially and interactively driven rather than passive. Students show progress in the four main outcome domains of professional development, professional skills, personal growth, and personal capabilities as a result. Throughout the internship, social interactions, peer and mentor modelling, and reinforcement shaped the observable learning outcomes that are reflected in each dimension.

2. Review of Literature

The conceptual framework created by Anjum (2020), which emphasizes the value of internship programs in enhancing students' employability through experiential learning, is used in this study. The framework describes how a variety of developmental outcomes, such as skill acquisition, professional growth, and the improvement of personal competencies, are fostered by well-structured internship opportunities. Drawing on recent academic contributions, the hypotheses' formulation is covered in the following section.

Professional Development
The importance of internship programs in fostering the professional development of undergraduate students has been highlighted by recent studies. Developing employability skills is a crucial goal for higher education since the transition from college to the professional workplace can be difficult. By giving students real-world experience and chances to develop critical workplace skills, internship programs act as a calculated tool to close the gap between employers' expectations and academic preparation. How these programs improve employability, cultivate the development of industry-specific competencies, and prepare students for the workforce have drawn increasing scholarly attention.

Internships provide a controlled environment where students can hone abilities that might not be fully developed in a classroom. According to Jackson and Bridgstock (2021), participating in work-integrated learning experiences, like internships, greatly enhances students' abilities in areas like problem-solving, communication, and teamwork—skills that employers highly value. In a similar vein, Hora, Parrott, and Her (2020) emphasize that internships encourage students to apply their theoretical knowledge to real-world

professional contexts, enabling them to develop skills directly related to their chosen industry and connect their academic learning with practical experience.
H1: UiTM BA Insurance students' professional development is greatly enhanced by insurance internship programs.

Professional Skills
Higher education institutions are increasingly emphasizing internship programs as a strategic way to help students develop their professional or "employability" skills in light of the growing demand for graduates who are prepared for the workforce worldwide. These skills, which are essential for graduates to successfully enter the workforce and maintain long-term professional growth, include communication, teamwork, critical and analytical thinking, adaptability, problem-solving, and digital literacy.

Students can apply theoretical concepts and develop practical skills in real-world workplace settings through internships. According to Jackson and Bridgstock (2021), internships are one of the best ways to develop transferable professional skills as part of work-integrated learning. Compared to their peers who only participated in classroom-based learning, students who completed internships reported feeling more confident and having better teamwork, communication, and initiative skills. Similar to this, Hora, Parrott, and Her (2020) noted that internships offer practical learning experiences that help students grasp workplace norms and expectations, practice professional interactions, and adjust to organizational environments—skills that are challenging to learn through traditional lectures alone.

Social interactions are also crucial for the development of professional skills during internships. In line with social learning theory, Kim and Wang (2022) contend that these abilities are frequently acquired by watching seasoned workers, copying their actions, and having meaningful conversations. Supervisors' comments and guidance help interns improve their communication, emotional intelligence, and problem-solving skills (Tran & Soejatminah, 2022).

However, program design and organizational support can have an impact on how effective internships are. According to Andrews, Barker, and Stewart (2020), internships that don't have defined learning objectives, organized supervision, or purposeful work tend to impede the development of real skills. On the other hand, skill acquisition is more significantly impacted by programs that incorporate performance feedback and mentoring into academic curricula. The extent of skill development can also be influenced by the duration of the internship and its connection to the student's field of study. According to Jackson and Wilton (2023), longer internships provide more chances to take on challenging tasks and hone advanced skills like project management, data analysis, and negotiation. More effective knowledge transfer into practice was also shown by students assigned to internships related to their field of study.
H2: UiTM BA Insurance students' professional skills are greatly improved by insurance internship programs.

Personal Growth
Additionally, internships offer significant chances for students to grow personally by fostering the development of qualities that are essential for both career success and lifelong learning, such as independence, resilience, confidence, and adaptability. Students are frequently forced to leave their comfort zones when working in professional settings, which fosters self-awareness and personal development. According to Hora, Parrott, and Her (2020), students who are exposed to real-world responsibilities are better able to manage their time, develop their interpersonal skills, and recognize their strengths and weaknesses. In a similar vein, Gercek and Ozveren (2024) emphasize that internships foster self-efficacy and self-regulation by teaching students how to take charge and make decisions on their own.

The confidence and emotional intelligence of interns are further shaped by structured feedback and mentoring. According to Tran and Soejatminah (2022), internships frequently result in gains in communication abilities and the capacity to handle challenging work situations. When combined, these experiences strengthen the transformative power of internships by fostering the development of both professional and personal skills.
H3: UiTM BA Insurance students' personal development is greatly enhanced by insurance internship programs.

Personal Skills

Internships are essential in helping students develop their wider personal capabilities in addition to their professional skills and personal development. These include the self-management, resilience, leadership, and cognitive flexibility needed to succeed in fast-paced work settings. According to Jackson and Bridgstock (2021), students develop critical skills like initiative, flexibility, and decision-making when they take on real-world professional challenges. Autonomy and self-discipline are fostered by meeting deadlines, accepting responsibility for tasks, and resolving workplace conflicts.

Additionally, work-integrated learning fosters higher-order skills. According to Gercek and Ozveren (2024), structured internships enhance self-confidence and the capacity to perform well in fast-paced, unfamiliar environments, while Tran and Soejatminah (2022) highlight that internships assist students in developing reflective thinking, cross-cultural awareness, and emotional regulation. These results demonstrate the importance of internships in preparing students for the challenges of the working world.

H4: UiTM BA Insurance students' skills are greatly enhanced by insurance internship programs.

3. Methodology

The primary research methodology used in this study is quantitative. The study looks at how internships affect the professional and personal growth of students enrolled in the BA Insurance program using both descriptive and inferential statistical analyses. The central tendency to interpret participant responses was measured as part of descriptive analysis. Normality and reliability tests were among the scale evaluations used in inferential analysis. Cronbach's alpha was used to assess the questionnaire's reliability, and skewness and kurtosis were tested for normality using univariate and multivariate analyses.

Data Collection

Primary data for the study came from final-year BA Insurance undergraduate students at UiTM Selangor who completed six-month internships at a variety of insurance-related companies, including brokers, adjusters, agencies, and underwriters. The information was gathered from October 2024 to March 2025. employing a structured questionnaire with 23 closed-ended questions to evaluate aspects of skill development, professional and personal growth. A 5-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," was used to rate each item.

Construct validity

To ensure content validity, the proposed questionnaire items were designed based on constructs derived from previous empirical studies on the influence of internship programs in higher education. The following table summarizes each subscale, its description, and supporting literature.

Table 1: Construct Validity of the Study

Variable/Construct	Definition	Measurement Scale	Source
Professional Development	The extent to which the internship helps students grow in their future career roles and workplace readiness.	5-point Likert scale	Adapted from Anjum (2020); Nguyen et al. (2021); Jackson & Bridgstock (2021)
Professional Skills	The acquisition or improvement of job-relevant competencies during the internship.	5-point Likert scale	Adapted from Anjum (2020); Tan et al. (2022)
Personal Growth	The extent to which the internship contributes to students' self-awareness, maturity, and self-confidence.	5-point Likert scale	Adapted from Anjum (2020); Hora et al. (2020); Patrick & Worsley (2020)

Personal Capabilities	Development of internal traits such as resilience, adaptability, and emotional intelligence during the internship.	5-point Likert scale	Adapted from Anjum (2020), Tomlinson (2021), and Tan et al. (2022)

Population and sampling procedures

To guarantee that every member of the target population had an equal chance of being chosen, a straightforward random sampling technique was used in this investigation. Final-year students enrolled in Universiti Teknologi MARA's (UiTM) BA Insurance program made up the population. A basic random sample was both appropriate and practical given the population's manageable and relatively small size (i.e., 65 students spread over two semesters from October 2024 to March 2025).

Randomization was used to choose 58 students as participants; no preset selection criteria, such as academic standing or internship placement, were used. Within the parameters of the program, this approach improved the findings' generalizability and reliability while reducing selection bias. The study intends to gain a representative understanding of students' internship experiences and their perceived efficacy by employing this sampling technique. The sample's randomness enhances the study's methodological rigor and supports the results' objectivity.

4. Findings and Analysis

The study's empirical results, including scale analysis and descriptive statistics, are presented in this section. In order to measure respondents' levels of agreement across important dimensions, mean score analysis is used to answer the four research questions, each of which is phrased with "to what extent."

Central tendency measurement. The questionnaire's mean and standard deviation values for the items related to the four constructs it measured are shown in Table 1.

Table 1: Measurement of Central Tendencies of the Study

Variables	Items	Mean	Std Dev (SD)
Professional Development (PD)	PD1	4.33	0.69
	PD2	4.24	0.89
	PD3	4.19	0.79
	PD4	4.37	0.77
	PD5	2.88	1.32
	PD6	4.49	0.68
Professional Skills	PS1	4.40	0.68
	PS2	4.54	0.60
	PS3	4.38	0.72
	PS4	4.61	0.60
	PS5	4.24	0.83
	PS6	4.46	0.63
Personal Growth	PG1	4.09	0.87
	PG2	4.26	0.81
	PG3	4.31	0.68
	PG4	4.17	0.80
	PG5	4.29	0.73
	PG6	4.38	0.72
Personal Capabilities	PC1	4.53	0.63
	PC2	4.54	0.63
	PC3	4.53	0.60

PC4	4.49	0.66
PC5	4.42	0.65

On the basis of mean scores and standard deviations, the descriptive analysis of the four dimensions that were measured—Professional Development (PD), Professional Skills (PS), Personal Growth (PG), and Personal Capabilities (PC)—reveals significant variations in the responses of the participants. The construct of professional development (PD) had the lowest mean (M = 4.08) and the highest standard deviation (SD = 0.86), indicating that participants' opinions on it were more divided. Item PD5, which had a significantly lower mean (M = 2.88) than the other items, is largely to blame for this variability. In professional development assessments, where experiences and opportunities can vary greatly among individuals, this disparity may indicate areas of misunderstanding or unfulfilled expectations (Billett, 2020; McChesney & Aldridge, 2021).

Professional Skills (PS), on the other hand, had a moderate standard deviation (SD = 0.69) and the second-highest mean score (M = 4.44). According to these findings, respondents frequently acknowledged that their internships helped them acquire important workplace skills. These stronger and more consistent perceptions might have resulted from the practical nature of the insurance industry, which prioritizes flexibility and task-based learning (OECD, 2021).

With a mean score of 4.25 and a standard deviation of 0.77, Personal Growth (PG) revealed responses that were generally positive but moderately variable. This is consistent with earlier research showing that a variety of factors, such as organizational culture, feedback quality, and the learner's motivation, can impact personal development (Clarke, 2020).

Lastly, with the highest mean score (M = 4.50) and the lowest standard deviation (SD = 0.63), Personal Capabilities (PC) was the dimension that was rated the highest overall. Respondents strongly and consistently agreed that the internship improved their skills, especially in the areas of workplace resilience and adaptability, which are traits strongly associated with long-term employability (Jackson et al., 2020; Yorke, 2019). This dimension's low variability might suggest that the insurance industry places a universal emphasis on these transferable skills.

Multivariate normality test

Table 2: Skewness and Kurtosis Test of the Study

Variables	Items	Kurtosis	Skewness
Professional Development (PD)	PD1	1.00	-0.89
	PD2	0.68	-1.14
	PD3	-0.44	-0.59
	PD4	1.45	-1.24
	PD5	-0.99	0.28
	PD6	1.96	-1.35
Professional Skills	PS1	1.47	-1.06
	PS2	-0.05	-0.94
	PS3	2.32	-1.33
	PS4	0.68	-1.27
	PS5	0.88	-1.08
	PS6	-0.42	-0.72
Personal Growth	PG1	-0.71	-0.51
	PG2	-0.45	-0.73
	PG3	-0.76	-0.50
	PG4	-0.60	-0.55
	PG5	-1.03	-0.39
	PG6	0.80	-1.04
Personal Capabilities	PC1	-0.02	-0.99
	PC2	0.11	-1.06

PC3	-0.18	-0.87
PC4	-0.19	-0.94
PC5	-0.51	-0.69

Skewness and kurtosis values were analyzed for each item under the four variables: Professional Development (PD), Professional Skills (PS), Personal Growth (PG), and Personal Capabilities (PC) to evaluate the normality of data distribution across the survey items. According to Kline (2016), kurtosis values should be between 10 to be regarded as representative of a normal distribution, while acceptable thresholds for skewness fall within 3. For the majority of psychometric applications, George and Mallery (2010) suggest slightly stricter cut-offs, with skewness values within ±2 and kurtosis within ±7 indicating acceptable normality.

Kurtosis values for the PD items range from -0.99 (PD5) to 1.96 (PD6), and skewness values range from -1.35 (PD6) to 0.28 (PD5). Every value is comfortably within the range that is acceptable. Significantly, PD5 exhibits a negative kurtosis (-0.99) and a slight positive skew (0.28), indicating a comparatively flat distribution with more responses grouped below the mean. In contrast, PD6 shows a more peaked distribution and a concentration of responses on the higher end of the Likert scale, as evidenced by its high negative skew (-1.35) and comparatively high kurtosis (1.96).

Participants' propensity to strongly agree with the positive statements regarding professional skills is reflected in the moderately negative skewness of the items under the PS construct, which range from -1.33 (PS3) to -0.72 (PS6). Kurtosis values vary from 2.32 (PS3) to -0.42 (PS6). Once more demonstrating consistently high agreement among respondents, item PS3, which has the highest kurtosis and skewness within this category, indicates a distribution that is both peaked and left-skewed.

Kurtosis ranges from -1.03 (PG5) to 0.80 (PG6), and skewness values for PG items range from -1.04 (PG6) to -0.39 (PG5). These distributions show a profile that is mesokurtic to slightly platykurtic and generally symmetric. While PG6 displays a more peaked (leptokurtic) profile, which is again consistent with higher agreement responses, PG5 has the most platykurtic distribution (-1.03), indicating a flatter curve.

Skewness and kurtosis values for the PC variable range from -1.06 (PC2) to -0.69 (PC5) and from -0.51 (PC5) to 0.11 (PC2), respectively. All items have a consistently negative skewness, which indicates that participants have a strong propensity to report high levels of confidence in their abilities. Furthermore, the comparatively low kurtosis values imply a moderate spread and do not show a sharp peak in the responses.

All 23 items' skewness and kurtosis values, taken together, are within generally recognized normality thresholds (Kline, 2016; George & Mallery, 2010). A fundamental premise of many parametric statistical analyses, such as exploratory and confirmatory factor analysis, is satisfied by this, which implies that the data are roughly normally distributed (Byrne, 2016). In attitudinal surveys that use Likert scales, slight deviations from symmetry are common, especially in items like PD6 and PS3, and are not anticipated to materially impair data integrity.

Table 3: Reliability Test of the Study

Variables	Number of items	Cronbach's Alpha
Professional Development	6	0.75
Professional Skills	6	0.89
Personal Growth	6	0.87
Personal Capabilities	5	0.91

Cronbach's Alpha (α) was calculated for each of the four latent variables in this study: professional development, professional skills, personal growth, and personal capabilities. This was done to evaluate the internal consistency of the measurement scales used. A commonly used reliability coefficient, Cronbach's Alpha, assesses how well a collection of items measures a single unidimensional latent construct (Tavakol & Dennick, 2011; DeVellis, 2017).

Professional Development (α = 0.75): The internal consistency of the scale is acceptable. Even though this

suggests that the items are fairly reliable in measuring the same underlying construct, reliability could be further improved by further refinement, such as re-examining item PD5, which previously displayed a lower mean and higher variance. Both the Professional Skills (α = 0.89) and Personal Growth (α = 0.87) scales are in the good reliability range. These values imply a high degree of internal consistency, indicating that the items in these constructs measure cohesive aspects of professional competence and growth, respectively, and are highly correlated. Personal Capabilities (α = 0.91): This construct has a high degree of reliability and excellent internal consistency. The responses' close clustering indicates that participants interpreted and answered the questions about individual competence, self-efficacy, and adaptability consistently.

All four constructs have satisfactory to excellent internal consistency, according to the overall reliability coefficients. These findings give confidence in the consistency of responses across items within each construct and support the validity of the measurement tools. The results are appropriate for additional inferential analyses where trustworthy indicators are necessary, like exploratory factor analysis (EFA) or structural equation modelling (SEM) (Hair et al., 2020).

Discussion and Answers to Research Questions

The findings show that all four aspects of students' development were positively impacted by the insurance internship program.

RQ1: To what extent do BA Insurance students perceive the internship program as contributing to their professional development?

RQ2: To what extent do BA Insurance students report acquiring professional skills through their internship experience?

A high mean score (M = 4.44, SD = 0.69) indicates that students strongly agreed that the program improved their professional development and skills. During their internships, respondents emphasized gains in task management, collaboration, and communication. These results are consistent with those of Anjum (2020), who emphasized the importance of internships as experiential learning opportunities for enhancing employability skills. According to recent research, internships enhance students' capacity to apply theoretical knowledge to real-world scenarios and promote flexibility and teamwork (Nguyen et al., 2021; Smith & Lee, 2022; Lee, 2020). This is especially important in the insurance sector, where success in a fast-paced, customer-focused setting requires both technical proficiency and soft skills.

RQ3: To what extent do BA Insurance students perceive that the internship program has contributed to their personal growth?

Additionally, the program had a positive impact on personal development (M = 4.25, SD = 0.77). Although results varied based on individual motivation and mentorship quality, students reported feeling more mature, confident, and self-aware. Previous studies have demonstrated that internships improve emotional resilience, independence, and adaptability, particularly when combined with strong supervisory support (Anjum, 2020; Smith & Lee, 2022; Pianda et al., 2024).

RQ4: To what extent do BA Insurance students perceive an enhancement in their capabilities as a result of the internship program?

Personal capabilities had the highest scores (M = 4.50, SD = 0.63), indicating notable improvements in emotional intelligence, problem-solving skills, and adaptability. In contemporary workplaces, these competencies are becoming more and more important (Anjum, 2020; Smith & Lee, 2022; Chong & Yuen, 2023). The results are consistent with earlier research that highlights the value of internships in fostering cognitive flexibility and resilience.

Personal Capabilities were ranked highest overall by mean score analysis, followed by Professional Skills, Professional Development, and Personal Growth. This trend is in line with Jackson et al. (2020) and Tomlinson (2021), who emphasize the increasing significance of non-cognitive skills in employability. Despite receiving

high ratings, professional development was the most variable; some students reported having little clarity about their careers or opportunities for mentorship, which echoes the context-dependency identified by McChesney & Aldridge (2021).

Every construct exhibited strong internal consistency (Cronbach's α = 0.75–0.91) and satisfied normality criteria (Kline, 2016). The results validate Anjum's (2020) conceptual framework and lend support to all four hypotheses.

5. Policy Implications and Recommendations

The necessity for universities to incorporate internships as a fundamental part of undergraduate curricula is highlighted by the significant impact these programs have on student outcomes. Structured internship policies with explicit learning objectives and evaluation procedures could be implemented by UiTM and other educational institutions. To guarantee that placements match students' academic specializations and career objectives, increased university-industry collaboration is also crucial. Companies that offer worthwhile internship opportunities could be rewarded by government organizations like MDEC or the Ministry of Higher Education. Lastly, the disparity in professional development results emphasizes how crucial structured feedback and mentoring are. Standardizing quality and accountability can be facilitated by formalized evaluation frameworks that were jointly created by academic institutions and business partners.

Recommendations

The following suggestions are put forth in light of the study's findings. First, increase the involvement of supervisors. Create and conduct training sessions for internship supervisors to improve student support, particularly in promoting professional development, and standardize expectations. Second, the internship program's learning objectives should be revised to make sure that the development of workplace competencies and personal development are given more weight in the learning contracts and logbook templates. Thirdly, it is advised to conduct midpoint evaluations throughout the placement phase. Early detection of possible issues, such as a lack of opportunities for students to use their skills or a discrepancy between their roles and learning objectives, would be facilitated by these organized check-ins. Ultimately, rotating assignments or job-shadowing opportunities across various departments of the host organization could broaden internship exposure, giving students a better understanding of the field and enhancing their professional skills.

Conclusion

With an emphasis on professional development, skill acquisition, personal growth, and capabilities, this study looked at how insurance internship programs affected the overall development of UiTM BA Insurance students. According to the research, internships help students become more prepared for the workforce, especially by improving their soft skills and adaptability—two qualities that are crucial in the constantly changing insurance industry.

Although professional skills and personal capabilities were the most successful outcomes, the diversity of professional development experiences highlights the necessity of organized, meaningful internships that provide exposure to career-building opportunities and mentorship. Higher education institutions and business partners can better prepare graduates for fulfilling, resilient careers in the insurance industry and beyond by converting these findings into useful academic and policy frameworks.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Balancing Act: How Work-Life Balance, Workload, Role Conflict and Work Engagement Impact Job Performance in Financial Institutions

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Abstract: Achieving high levels of employee performance is a fundamental objective for organizations aiming to maintain competitiveness and operational excellence. To realize this goal, management must focus on monitoring and enhancing individual job performance. However, many organizations continue to face challenges in identifying which workplace factors most directly impact performance. This study addresses the gap by examining specific variables that influence job performance among employees in financial institutions by looking at the areas of work-life balance, workload, role conflict, and work engagement on job performance among employees in financial institutions. Quantitative research design was used in this study, which involved the process of collecting the information via online survey questionnaires from 125 respondents. The findings reported that there were three variables that had a significant relationship towards job performance, which were work-life balance, role conflict, and work engagement. Only one variable was not significant, which was workload. It is very crucial for the management, specifically the HR team in the organization, to enhance employees' job performance to ensure employees are more productive in their daily duties as well as perform their jobs.

Keywords: *Work-Life Balance, Workload, Role Conflict, Work Engagement, and Job Performance*

1. Introduction and Background

Job performance refers to achieving organizational goals and objectives. Over the years, job performance has been extensively researched, with scholars recognizing its complexity and multidimensional nature. Zhao, Niu, & Hu (2020) highlighted that understanding job performance requires considering various factors, including individual capabilities, motivation, and the external work environment. Task and contextual performance both play significant roles in achieving organizational objectives through different methods. Task performance is associated with an employee's contribution to organizational performance, which focuses on actions, whereas contextual performance is associated with extra-role behavior and is based on the psychological, social, and organizational context of the job. Individuals value performance as being able to complete a job and performing tasks at a high level can be a sense of accomplishment (Baskaran et al., 2020).

There are several factors that affect job performance, which are job stress, workload, work-life balance, role conflict, flexible working arrangements, work engagement, and others. Work-life balance is becoming more significant as a result of technological advancements that have blurred the lines between work and non-work domains, an increase in the number of dual-earner families and single-parent families, and longer working hours, which have resulted in work-home interference (Samikon & Dagogo, 2022). According to previous research, role conflict also may occur as a result of an imbalance between the roles needed by the organization and the expected role of the employee, or as a conflict between the roles in the workplace and the roles in the family environment (Sajida & Moeljadi, 2018). Previous research has found that as an employee's workload increases, so does their job performance (Omar et al., 2020). Next, employee engagement influences performance and retention, so when an employee is engaged within the organization, it may influence them to stay with the organization as well as perform in their job to achieve organizational objectives (Brinton, 2021).

In financial institutions, employee performance is used to determine whether an employee should be conformed, terminated, promoted, or transferred to another department or branch. Thus, it is critical for the bank's employer to recognize and assess its employees' performance, as any drop in performance might affect the bank and other employees' productivity. However, the issue that banks were currently facing was on the productivity, employee morale, and resourcing seems unprofessional and unfair (Sija, 2021). Moreover, employees' job performance will decline as they are assigned the duties simultaneously, which will create an

unmanageable burden. Hence, they will be unable to complete their duties on time and will do poorly in their performance appraisal. According to New Straits Times (2022), it revealed that 94% of Malaysians want more flexibility in their jobs and careers after working from home for most of the pandemic. Moreover, workers are subjected to high levels of stress at work, which can lead to physical and mental health issues (Ahmad et al., 2019). Work-life balance caused major changes in an employee's performance. Stress, burnout, and depression are also symptoms of an overworked worker and have a significant impact on an employee's job performance (Ahmad Suhaimi and Seman, 2019). Thus, this research aims to explore the relationship between work-life balance, workload, role conflict, and work engagement as independent variables and job performance as a dependent variable in financial institutions.

2. Literature Review

Job Performance (Work-Life Balance, Workload, Role Conflict, Work Engagement)

Job performance is used as a source of sustained competitive advantage to significantly improve the effectiveness of the organization (Soroya et al., 2022). An employee's knowledge, skills, behavior, and ethical values reflect their job performance, and this will allow employees to achieve and meet organizational expectations (Darvishmotevali & Ali, 2020). Employees who have strong capabilities and motivation will tend to do the job efficiently and effectively. When a person can complete a given task within the normal constraints of the reasonable use of available resources, this is referred to as job performance (Bjaalid et al., 2020). Furthermore, it has been stated in previous research that employees who perform well, their competitive capability will also improve, which helps them to meet goals and boosts their happiness and confidence (Sari et al., 2020). Organizations also must play an important role in continuously monitoring their employees' performance in order to recognize what needs to be improved. According to Ahmad Suhaimi & Seman (2019), it was demonstrated that employees who perform well allow the organization to make the most of their talents, which motivates employees to contribute their efforts and energy, resulting in a positive impact on organizational performance. Nevertheless, employees need to sacrifice their time for work due to the nature of their jobs. Employees who work long hours tend not to balance their work and family life, which leads to stress and health issues. The increasing levels of stress can rapidly lead to low employee motivation, poor productivity, and reduced job satisfaction.

According to Suryana et al. (2021), role conflict is a psychological condition that can lead to discomfort and cause significant employee motivation, which can lead to poor overall performance. For instance, the employee was assigned to a project by two managers; however, it cannot be completed at the same time. This situation may lead to low productivity, and they cannot perform effectively and efficiently on the project assigned. Employees who work excessive hours and have a heavy workload are also likely to become stressed as a result of the fatigue of a massive amount of energy used, both mentally and physically (Arif, Rivai, & Yulihasri, 2022). Employees who are unable to control their workload can negatively impact their health and well-being, which can cause stress in the body and affect their mood. Employee engagement will influence performance and retention, so when the employee is engaged within the organization, it may influence them to stay with the organization as well as perform in their job to achieve organizational objectives (Brinton, 2021). For instance, employee will be passionate and productive towards their job as well and can improve their performance in the future.

Relationship between Work-Life Balance and Job Performance

According to Nadesan (2018), revealed that work-life balance and job performance have a significant and positive relationship. It demonstrates that work-life balance plays an important role in determining employee job performance. It also stated that work-life balance can reduce employee stress, which leads to improved job performance. Wheatly (2012) indicates that, work-life balance of employees provides win-win outcomes for both the employer and employees. In addition to that, an organization that neglects issues related to employee work-life balance will end up with lower employee productivity and, in turn, will find it more difficult to improve employee job performance. HRM practices that promote work-life balance, such as telecommuting, job sharing, and flextime, lead to improved employee performance by removing work-life conflict.

H1: There is a significant relationship between work-life balance and job performance.

Relationship between Workload and Job Performance

According to Muslih and Hardani (2022), they found that workload can provide benefits for the ways to enhance individual performance in an organization. It was stated that excessively light workloads can reduce employees' level of performance. As we all know, an increase in workload affects employee work stress, which reduces employee commitment to their company. When the amount of work to be done at a given time increases, employees tend to rush to perform the tasks, which tends to increase stress levels because the employees are under increased work pressure. As a result, this study demonstrates that workload is a factor that influences job performance. Workload directly affects the job performance of an employee, and if an employee feels satisfied with their job, the workload is considered acceptable.

H2: There is a significant relationship between workload and job performance.

Relationship between Role Conflict and Job Performance

Employee roles can create an imbalance and unmatched pressure, which can lead to conflict. For instance, the need to recognize how progressive interactions can influence work-family interactions for more women in the global workforce strengthens the bias in favor of women. Work-life conflicts affecting employee performance were one of the most significant challenges faced by female employees, and this is due to excessive working hours for married employees, especially females. As a result, role conflict can have a negative impact on family welfare by adversely affecting marriage, family, and well-being. Excessive work and role ambiguity, for instance, can lead to role conflicts, which are factors that cause a lack of free time due to scheduled work, daily tasks, and overtime. This issue can also arise when employees bring their assigned duties home, which adversely affects the employee's life and family. Apart from that, role conflict occurs, which affects employees' family lives as well as their work-related performance. Role conflicts occur when employees find it difficult to determine which demands should be met while ignoring others (Rahayu & Hidayat, 2021).

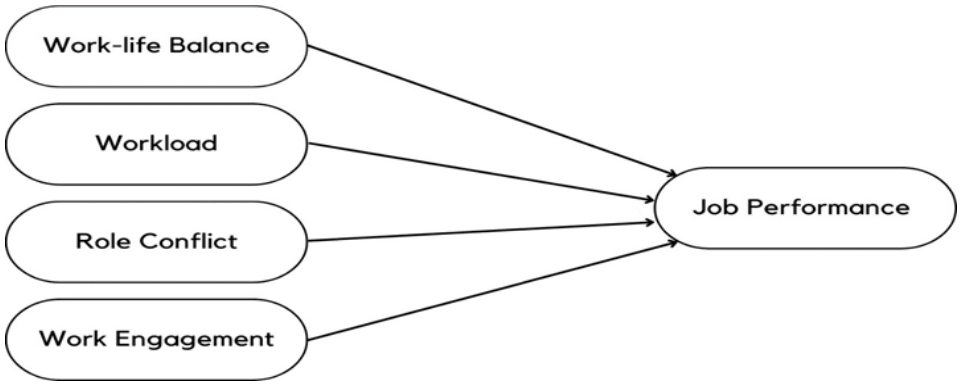
H3: There is a significant relationship between role conflict and job performance.

Relationship between Work Engagement and Job Performance

According to Yao et al. (2022), stated that work engagement improves job performance when work requirements match an individual's work resources. Previous research has also shown that as employees' emotional, cognitive, and forward-thinking behaviors improve, so will their job performance. Employee engagement is defined as the close physical, cognitive, and emotional involvement of someone in a job role (Arifin, Nirwanto & Manan, 2019). Furthermore, employee engagement is defined as an employee's appreciation of the goal, then focusing on that goal and generating energy, having effort, being able to adapt, striving, being consistent, and being optimistic in attaining organizational objectives. Employees' psychological availability refers to their perception of having sufficient physical, emotional, or psychological resources to deal with a particular situation (Lai, Tang, Lu, & Lee, 2020). Additionally, employees who are engaged will be aware, connected, incorporated, and focused on their work performance.

H4: There is a significant relationship between work engagement and job performance.

Figure 1: Conceptual frameworks of the relationship of work-life balance, workload, role conflict, work engagement toward job performance



Thus, the hypotheses addressed for this research are:
HO1: There is no significant relationship between work-life balance and job performance.
HA1: There is a significant relationship between work-life balance and job performance.

HO2: There is no significant relationship between workload and job performance.
HA2: There is a significant relationship between workload and job performance.

HO3: There is no significant relationship between role conflict and job performance.
HA3: There is a significant relationship between role conflict and job performance.

HO4: There is no significant relationship between work engagement and job performance.
HA4: There is a significant relationship between work engagement and job performance.

3. Research Methodology

A quantitative research study was conducted to collect primary data from individuals currently employed in financial institutions. To gather data, the study employs a non-probability sampling method with a total sample size is 125. Respondents will complete a structured questionnaire designed to measure each of the variables. The questionnaire used to gather data from the respondents consists of three (3) parts which were demographic profile of respondents, job performance as well as factors that affect job performance (work-life balance, workload, role conflict and work engagement) by using 5-point Likert Scale to measure the items ranging from 1 = "strongly disagree" to 5 = "strongly agree". All data were collected and analyzed using the Social Science Statistics Package (SPSS) version 29. Data analysis began with the characteristics of demographic data through descriptive analysis such as percentage, mean, frequency, and standard deviation. In this study, multiple regression analysis is used to determine the predictive values of work-life balance, workload, role conflict, work engagement, and job performance.

4. Results and Discussion

Demographic information of the participants was analyzed through frequency analysis. Among the total 125 participants, male respondents were 40 (32%) while the female respondents were 85 (68%). A total of 85 (69.7%) respondents were aged between 20 – 30 years old from the majority sample, followed by respondents who were in the age of 31 – 40 years old with 30 (24.6%) respondents, then those in the age of 41 – 50 years old with 6 (4.9%) 34 respondents and the least was those in the age of 51 years old and above with 1 (0.8%) respondent. Moreover, the findings revealed that almost all respondents had graduated with a Bachelor's Degree, with 82 (67.2%), followed by 25 (20.5%) respondents with a Diploma, and respondents who graduated with Postgraduate with 15 (12.3%). The collected data also reveals that the majority of respondents, 95 respondents or 77.9%, do not have children, 19 respondents or 15.6% have 1 - 2 children, and 8 (6.6%) respondents have 3 - 4 children. The responses indicate that most of the respondents, 67 (54.9%) have been working for less than 2 years, next was 24 (19.7%) respondents that have been working for 2 - 5 years, then 17 (13.9%) respondents that have been working for more than 10 years and 14 (11.5%) who have been working for 6 - 10 years.

Cronbach's Alpha analysis showed that the dependent variable which is job performance has a range of good consistency with 0.804 as its Cronbach's Alpha value while the independent variables, three (3) of them which are work-life balance, role conflict and work engagement have shown good results with 0.801, 0.872 and 0.864 respectively. Another independent variable, which is workload, showed acceptable results with 0.753 as the Cronbach's Alpha value.

Descriptive statistics results of mean used to measure the tendency of the average score, and standard deviation is used to measure the variability of the square root of variance. Results showed the mean and standard deviation for the dependent variable (job performance) and independent variables (work-life balance, workload and role conflict, and work engagement) in this study. The mean and standard deviation for job performance (M = 4.095, SD = .412), work-life balance (M = 3.718, SD = .452), workload (M = 3.972, SD = .397), role conflict (M = 3.041, SD = .842) and work engagement (M = 3.514, SD = .632).

Pearson correlation was calculated to examine the relationship between job performance as a dependent variable and work-life balance, workload, role conflict, and work engagement as independent variables. It was found that work-life balance has a moderate correlation with job performance ($r = .262$, $p < 0.01$), indicating a significant positive relationship between work-life balance and job performance. Moreover, workload has a weak correlation with job performance ($r = .331$, $p < 0.01$), which also indicates a significant positive relationship between workload and job performance. Besides that, role conflict has a weak correlation with job performance ($r = -.078$, $p < 0.01$), which indicates a significant negative relationship between workload and job performance and work engagement has a moderate correlation with job performance ($r = .468$, $p < 0.01$), which also indicates a significant positive relationship between work engagement and job performance.

Table 1: Pearson Correlation Analysis

Job Performance			Work-Life Balance	Workload	Role Conflict	Work Engagement
Job Performance	**Pearson Correlation**	1	.262**	.331**	-.078	.468**
	Sig. (2-tailed)		.003	.000	.389	.000
	N	125	125	125	125	125

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

Multiple Regression reveals the value of coefficient determination, R-squared (R2) was 0.337. This R2 value indicates that 33.7 percent of the variance of job performance is explained by four (4) independent variables, which are work-life balance, workload, role conflict, and work engagement. The remaining 66.3 percent of variance can be explained by other factors that are important and were not included in these 43 studies. These other factors could be added to strengthen the regression equation. Table 1 also indicates a significant regression equation was found with an F value is 15.265 at 4 degrees of freedom (df), with a P value significant at 0.00, where $p < 0.01$. As a result, the test is significant and can be used to further each of the study's objectives. Moreover, the results in Table 2 demonstrate that work-life balance, role conflict, and work engagement showed significant contributions towards job performance, as the significant values for the three 3 variables were $p < 0.05$. Meanwhile, there is only one variable, which is workload is not significant towards the job performance, as the significant value of the variable was 0.078, which $p > 0.05$. In addition, the standardized coefficient (Beta) shows the value of the independent variable that affects the dependent variable. The higher the Beta value of an independent variable, the more it will affect the dependent variable. Based on Table 1, the job performance was most affected by work engagement, as this independent variable had the highest Beta value of 0.436.

Table 2: Multiple Regression Analysis

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficient Beta	t	Sig.
(Constant)	1.950	.346		5.634	.000
Work-Life Balance	.202	.085	.221	2.388	.018**
Workload	.167	.094	.161	1.780	.078
Role Conflict	-.088	.039	-.181	-2.250	.026**
Work Engagement	.284	.050	.436	5.702	.000**
F value	15.265				
Sig.	.000				
Adjusted R^2	.315				
R^2	.337				

Based on the study, analysis, and findings that have been generated from the accumulated data of the distributed questionnaires. The hypotheses were tested, and the results show that three (3) factors, which were work-life balance, role conflict, and work engagement, have a significant relationship with the job performance of employees in financial institutions. This was supported by Nadesan (2018) showed that work-life balance positively affects the job performance of employees, and Yao et al. (2022), stated that work engagement improves job performance when work requirements match an individual's work resources. As mentioned by Saranani (2015), the role conflict has the potential to be both a positive and a negative effect. Therefore, management does not have to resolve all conflicts, but only those that risk the business organization's ability to achieve its objectives.

5. Conclusion

In conclusion, this study highlights the significant influence of work-life balance, role conflict, and work engagement on employee job performance, while workload showed no notable impact. These findings suggest that organizations, particularly in the financial sector, should prioritize supportive HR strategies that foster engagement and manage role clarity. By addressing these key factors, organizations can improve employee satisfaction, reduce burnout, and enhance overall job performance, contributing to long-term organizational success and resilience**.** These insights offer valuable implications for human resource practitioners and organizational leaders in fostering a high-performing workforce. Companies should focus on implementing HR policies that reduce role ambiguity, provide clear expectations, and encourage open communication. Enhancing employee engagement through recognition, career development opportunities, and a supportive work culture is also vital. Moreover, work-life balance initiatives such as flexible working arrangements, mental health support, and wellness programs should be prioritized to maintain employee well-being.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Nexus between Product Features, Brand Image, Service Quality and Islamic Banking Performance in Malaysia

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Abstract: Islamic banking in Malaysia has been operating in parallel to conventional banking since the establishment of the first Islamic bank in the country in 1983. Thus, Islamic banking in Malaysia has been facing stiff competition against traditional banking in the country with a mixed population of Muslims and non-Muslims. It is crucial to identify the factors that may impact the performance of Islamic banking in the country. Therefore, this research aims to explore the factors that could affect Islamic banking performance in Malaysia. This research presents a conceptual framework on the effects of product features, brand image, and service quality on Islamic banking performance, based on the review of past research. Research hypotheses are proposed based on the theorised relationship among the variables in this research. Significant effects are expected between product features, brand image, service quality, and Islamic banking performance. This research highlights the importance of Islamic banks to manage their product features, brand image, and service quality to enhance their performance in the highly competitive banking industry.

Keywords: *Islamic Banking, Product Features, Brand Image, Service Quality, Islamic Banking Performance.*

1. Introduction

The Malaysian banking landscape consists of both the Islamic banking system and the conventional banking system, which operate in parallel to one another. Islamic banking in Malaysia began in 1967 with the establishment of Lembaga Tabung Haji (Muslim Pilgrimage Fund Board) to accept savings from Muslims for hajj purposes (Bank Negara Malaysia, 2023a). Subsequently, the first Islamic bank in Malaysia, Bank Islam Malaysia Berhad, was established in 1983 to serve the needs of Muslims in the country for banking products and services that comply with Islamic law or Shariah (Bank Islam Malaysia Berhad, n.d.). Islamic banking in Malaysia has been facing very stiff competition from conventional banking despite the dominance of Muslims in the country. As of December 2024, assets of the Islamic banking system of the country were recorded at USD260 billion, representing 43% of loans and financing of the Malaysian banking industry (FitchRatings, 2025). The report by Fitch Ratings (2025) also pointed out that the growth of Islamic banking deposits has fallen short of the financing growth since 2020. The report by Fitch Ratings (2025) also indicated the lower proportion of the low-cost current account savings account (CASA) Islamic deposits compared to the conventional banking deposit, thus proving the stiff competition faced by Islamic banking from its competitor, conventional banking. Consequently, Islamic banking needs to improve its performance compared to conventional banking. Islamic banking can leverage its product features, brand image, and service quality to improve its performance. Therefore, it is crucial to study the effects of product features, brand image, and service quality on the Islamic banking market performance. This research has the following objectives:

Research objective 1: To identify the relationship between product features and Islamic banking performance.
Research objective 2: To identify the relationship between brand image and Islamic banking performance.
Research objective 3: To identify the relationship between service quality and Islamic banking performance.

2. Literature Review and Hypotheses Development

Theory of Social Exchange

Social Exchange Theory pointed out that relationships are developed through mutual exchange, whereby individuals try to strike a balance between rewards and costs. The theory proposed trust, commitment, and satisfaction as the factors influencing a bank-customer relationship. Trust is considered crucial for the Islamic banking business. Banks are expected to fully comply with Shariah requirements and avoid involving themselves with prohibited activities, including interest, gambling, and excessive uncertainty. Dedication to

ethics in line with Shariah requirements will reinforce morality among customers, and consequently enhance trust and satisfaction (Raza et al., 2023). An Islamic bank and its customers can be involved in a relationship that provides benefits to both parties. Through the provision of equitable, ethical, and transparent services, Islamic banks can fulfill the expectations of customers and consequently gain loyalty from customers. The relationship between bank and customer can be strengthened, and consequently lead to customer retention as the customer perceives value from such a relationship.

Theory of Social Identity

Social psychologists Henri Tajfel and John Turner (Tajfel & Turner, 1979) created Social Identity Theory in the late 1970s. According to the Social Identity Theory, the group to which an individual belongs has a profound influence on their feelings. According to this theory, people divide themselves and others into social groups, such as religious, professional, or cultural groups, and these classifications produce shared identities. In the context of Islamic banking, this can be used to understand how customers might develop a sense of collective identity through their relationship with a Shariah-compliant bank. Customers may see their involvement with Islamic banks as an extension of their personal and social identity, especially if they respect religious principles and ethical financial practices (Tajfel & Turner, 1979). Social identity focuses on three important psychological processes that help people create and maintain their social identities, such as social categorization, social identification, and social comparison. Social categorization involves putting people together to understand and define social settings. Islamic banking customers support ethical and religious practices, in contrast to conventional banking customers. Social identification enhances such a relationship by linking the customer's identity with the Islamic banks. Such a link enhances customer loyalty and brand attachment as customers' personal and social trust are strengthened upon using Shariah-compliant services (Tajfel & Turner, 1979).

Theory of Service Quality

"The difference between what is expected from each service dimension and what the consumer perceives he receives from them" is a general definition of service quality (Shonk & Chelladurai, 2008). Analyzing consumer perception and satisfaction requires an understanding of this gap. The SERVQUAL model, developed by Parasuraman et al. (1988), is one of the fundamental frameworks in this discipline. It identifies five dimensions of service quality: tangibility, assurance, responsiveness, empathy, and reliability. The term "tangible goods" describes the actual building, furniture, and appearance of the staff. Reliability highlights a bank's ability to consistently deliver on its promises. Responsiveness shows that you are eager to help customers and offer timely service. Reassurance is associated with expertise, courtesy, and trustworthiness of employees, while empathy emphasizes personal care. These characteristics are extended by Brady and Cronin's (2001) hierarchical model of perceived service quality, which combines three main constructs, including outcome quality, service environment quality, and interaction quality. The importance of customer service provider relationships is underscored by the quality of interactions, where perceptions can be influenced by the service delivery process as much as the final product. While outcome quality focuses on service advantages, service environment quality highlights how the physical environment affects the customer experience (Chen et al., 2012). Amirzadeh and Shoorvarzy (2013) found that in the context of Islamic banking, customers are often more concerned with practical aspects such as reducing waiting time and ensuring reliable, polite employees rather than complying with Islamic law. Although these services are based on adherence to Islamic principles, customers are more likely to focus on the practical and human elements of service provision. To successfully meet customer expectations, Islamic banks must strike a balance between operational effectiveness and their ethical obligations. Service quality theory offers a systematic method for understanding and improving customer experience. This framework helps Islamic banking organizations to improve customer satisfaction and create lasting loyalty by filling service dimension gaps, streamlining interactions, and making practical improvements a priority.

Islamic Banking Performance

Organizational performance is critical as it reflects the ability of an organization to achieve strategic goals, maintain operational efficiency, as well as ensure sustainability and competitiveness in the industry. Islamic banking market performance is defined as fulfilling the expectations of customers and matching market demands in an Islamic way, which is by following the shariah guidelines (Dusuki & Abdullah, 2007). The performance of Islamic banking is shown by the consistent growth and significant contribution to the overall profitability of the Islamic banks (Bank Negara Malaysia, 2023b; Islamic Financial Services Board, 2023).

Islamic banks provide various products, dominated by financing facilities as their income-generating products. The biggest contributor of profits to the Islamic banks is the home financing portfolio as it accounts for more than half of the financing profits of the Islamic banks (Amin et al., 2017). This market performance is supported by the attraction of Shariah-compliant products, which attract both Muslim and non-Muslim consumers due to their ethical and safe nature (Amin et al., 2017). Islamic banking performance can be assessed from the perspective of economic, environmental, and social (Alsmadi et al., 2023), which means that the performance can be measured in monetary terms or non-monetary terms (perceptions). Islamic banking performance guarantees the sustainability of the Islamic banks. Strong financial performance is very important to guarantee the sustainability and growth of Islamic banks, especially in the face of competition from conventional banks and digital finance players. Islamic banks must show financial resilience and effectiveness to remain relevant (Ali et al., 2021). Unlike conventional banks, which only strive to make profits, the performance of Islamic banks also covers the achievement of Islamic values such as social justice, community wellbeing, and transparency. Therefore, Islamic banking performance includes financial and non-financial dimensions (Mohd Nor et al., 2020). Good performance plays an important role in increasing customer and investor confidence in the integrity and efficiency of Islamic banking institutions. This includes the ability of banks to comply with Shariah principles while achieving competitive returns (Abdullah et al., 2022). Performance is also used to assess the success of Shariah governance implementation on the operations and reputation of Islamic banks (Rahman & Majid, 2021). In a recent study by Alkindi and Utami (2025), it was shown that the profitability of Islamic banks could be achieved by complying with Shariah and by being responsible towards the environment. They also pointed out that Islamic banks' policies and strategies must emphasize green practices as an important aspect in strengthening financial performance, in line with the Sustainable Development Goals.

Product Features

Product features refer to the tactics used by content marketing to attract customers to buy the product, and it is also a key to reducing environmental consequences while simultaneously presenting a competitive advantage to potential customers a competitive advantage. Therefore, the product can be tangible or intangible since the main purpose is to attract customers and satisfy their wants and needs. Product features in the technology sector are characterized by unique characteristics and/or unidentified technologies that are challenging to explain to a large audience (Chaffey, 2024; Corazza, 2018; Al-Malkawi et al., 2023; John et al., 1999). Product features significantly influence performance in the banking market by shaping customer experiences, meeting varied financial needs, and differentiating banks from competitors. Besides, the degree to which a product's visual components are regarded as aesthetically pleasing is known as product features (Shahid et al., 2022). Shahid et al. (2022) also highlighted that by offering Shariah-compliant products, Islamic banks may increase their customer base and build Muslim community confidence. Development of Islamic banking products is essential to the overall development and stability of the Islamic finance sector. Product features and performance are regarded as the most significant components in developing a bank's competitive advantage. Furthermore, banks are continuously analyzing the features and performance of their current products to determine whether other products with broader features and performance can help them gain a competitive edge and improve their market position in high-technology markets that are always changing (Al-Kwifi & McNaughton, 2013). Certain product features become appealing only when they contribute to excellent performance in a way that differentiates them from other products in the market. In a recent study by Miah et al. (2024), the use of electronic banking applications in serving customers, convenient locations of the bank branches, favorable terms and conditions imposed on the products and services given by the bank, attractive product packages and offerings by the bank, and awareness of the customers towards the Islamic banking products were found to be the factors considered by the customers in choosing an Islamic bank. Based on the above arguments, the following hypothesis is proposed:

H_1: There is a significant relationship between product features and Islamic banking performance.

Brand Image

Brand image refers to a variety of human characteristics related to the brand. However, it is also referred to as a word, sign, symbol, or design, or an assortment of such things, that differentiates the products or services of one seller or group of sellers from the products of competitors. From a different point of view, brand image is also referred to as customers' overall opinion and sentiment about a business, which can affect their purchasing decisions (Aaker, 1997; Zhang, 2015). Company brands or products in the market could become a company's personality trait. This can be called brand image. These features are impacted by marketing, corporate social

responsibility, and other methods that have been used by the company (Araujo et al., 2023; Rico et al., 2023). Islamic banks not only provide products and services, but they also have ethical aspects that emerge from the Islamic laws, which differ from those of conventional banks. Therefore, the customers in the Islamic Bank ecosystem identify with financial institutions that comply with the Islamic views (Albaity & Rahman, 2021). The transparency of Islamic Banks that follow the Shariah guidelines and the ethics plays a big role in engaging and connecting with their customers (Abbas et al., 2020). (Rohmad et al., 2022) stated that brand image has a positive relationship with the Islamic Bank, as they follow the Shariah-compliant rules and help their customers gain and boost their trust in them. With the increase of globalization, the banking sector has improved all kinds of services that they had due to the need to continuously grow. 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 arguments, the following hypothesis is proposed:

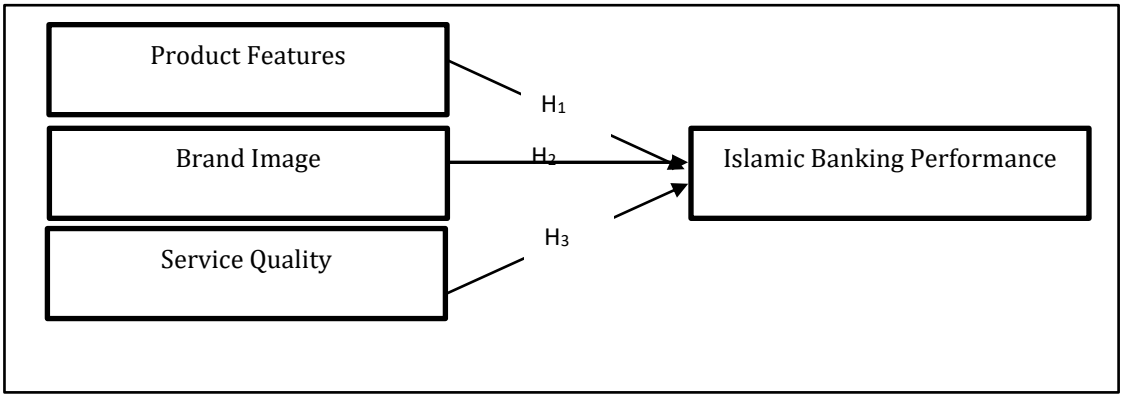
H_2: There is a significant relationship between brand image and Islamic banking performance.

Service Quality

The capability of a service provider to effectively satisfy customers to improve market performance is referred to as service quality. "Quality" is also a key factor in economic success in the service industry. Service quality also refers to providing better or superior service in comparison to what the customer expects (Ramya et al., 2019). Two components of the customer's perception of service quality include the process-related dimensions and the technical or final dimension (Ramya et al., 2019). A good and stable market performance of Islamic banking is influenced by the service quality. This can be shown by the customers who are loyal and satisfied with the products and services that the bank offers (Afifah & Kurniawati, 2021; Ahmed et al., 2022). When the customers are satisfied and happy, they will likely recommend it to others and make it more popular among people, and develop more customers (Lee et al., 2020). This will indirectly increase the market performance of the Islamic banking industry, and people will start to believe and try to involve themselves with Islamic banking instead of conventional banking. Things are getting more challenging as technologies around the world are continuously advancing. This will cause Islamic Banking and other sectors to have no option but to follow and adapt to this digital age. However, most of the banks have similar features that make them look similar with no differentiation, such as their online banking and mobile apps. Therefore, banks find out that the customers prefer 'high-touch' interaction since it is more trusted (Grant Thornton, 2024). Banks need to give more focus on 'high-touch' interaction instead of 'high-tech' interaction to maintain their market performance (Angur et al., 1999). Zeitun and Anam (2024) highlighted that service quality is important for Islamic banks as it is the main driver in enhancing customer satisfaction, and consequently performance of the Islamic bank. Based on the above arguments, the following hypothesis is proposed:

H_3: There is a significant relationship between service quality and Islamic banking performance.

Figure 1: Research Framework



3. Research Design

The instrument to be used to gather data in the research is a questionnaire involving items or questions adopted or adapted from previous studies. Responses will be gathered online through Google Forms, involving closed-ended questions structured on a Likert scale, which require the respondents to evaluate each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). Convenience sampling is chosen to collect data from the population of Islamic banking customers in Malaysia, as it is impossible to obtain the list of Islamic banking customers due to the secrecy of customer information. Convenience sampling is the simplest kind of non-probability sampling, which seeks to get information from respondents who are "convenient" for the researcher to contact. Researchers may choose individuals at random who are open to being approached and taking part in the study using this convenience sample technique, rather than selecting them based on a predetermined set of characteristics, also called a demographic. Descriptive and inferential statistical analyses will be carried out on the data collected using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics like means and standard deviation will be used to summarise and describe the characteristics of the variables and provide an overview of the data that has been collected. Inferential statistics will be produced using regression analysis on the data collected from the sample to describe and make inferences about the population. The regression analysis is required to test the hypotheses on the effects of product features, brand image, and service quality on the Islamic banking market performance.

4. Theoretical and Managerial Implications

Findings from this research contribute to the literature on Islamic banking management by proposing the relationship between product features, brand image, service quality, and Islamic banking performance through the integration with the Theory of Social Exchange, Theory of Social Identity, and Theory of Service Quality. The relationship between product features, brand image, service quality, and Islamic banking performance is established. Findings from this research highlight the importance of Islamic banks to carefully manage their product features, brand image, and service quality, to enable them to enhance their performance in the highly competitive market. 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 product features, brand image, and service quality on Islamic banking performance. 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 enhancing their performance. The results will also assist future researchers in designing their studies on Islamic banking performance.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

The Nexus between Operational Failure and Mobile Banking Usage in Malaysia: A Conceptual Framework

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Abstract: Mobile banking has become a common method used by banks in delivering their products and services to customers. However, operational issues occur in the use of mobile banking, including function failure, system failure, information failure, and service failure. Therefore, this research aims to explore the factors that could affect mobile banking usage in Malaysia. Hence, this research presents a conceptual framework on the effects of operational failure (function failure, system failure, information failure, and service failure) on mobile banking usage. Research hypotheses are proposed based on the theorised relationship among the variables in this research. Significant relationships are expected between function failure, system failure, information failure, service failure, and mobile banking usage. It is hoped that this research will provide insights to the banks in effectively managing their mobile banking platform in serving the customers.

Keywords: *Mobile Banking, Function Failure, System Failure, Information Failure, Service Failure.*

1. Introduction

Globally, the advancement of technology has influenced the banking industry to be digitalised, unlike before when everything revolved around bank branches. In the context of the Malaysian banking industry, the Central Bank of Malaysia (BNM) has launched the Financial Inclusion Framework (2023-2026) to address numerous challenges faced by the industry (Fintech News Malaysia, 2023). In particular, BNM laid down seven policy objectives, including policy objective 2, which promotes a secure and inclusive digital financial services in the country (Bank Negara Malaysia, 2023). This shows the support from the regulator towards the use of mobile banking the banks in serving their customers. Mobile banking provides convenience to customers in using banking products and services. The online banking and mobile apps can be accessed 24/7. It makes things faster, easier, and keeps customers happy (Tam & Oliveira, 2016; Kamboj et al., 2022). It has been suggested that the success of mobile banking comes from its potential to reduce transaction costs while improving the user experience of instant and secure financial services (Baabdullah et al., 2019; Kamboj et al., 2022). This, however, is not to suggest there is no disadvantage, as operational failures to feed the information into the platform and manipulate it in real time often dampen the performance of the mobile banking platform and consequently disenchant its users. For example, functional failures take place when users bump into hurdles like broken apps or disrupted transactions. Relying too much on automation has its risks (Bitner, 1990; Kamboj et al., 2022). When things go wrong, customers may get upset because it seems as if the bank neglects them or takes too long to respond.

A report by the World Bank Group (2021) highlighted that the low-income, elderly, and rural communities preferred to use cash and traditional banking services due to their concern about fraud and the security of digital financial services. Security issues involving financial fraud remain one of the concerns of mobile banking customers, where the safety of these customers is threatened by malware attacks (Povera & Borhan, 2024). Besides, the prolonged disruptions in numerous banking services interface with customers and counterparties of a year by two leading Malaysian banks led to the imposition of a huge fine by the Malaysian banking regulator, BNM (Birruntha, 2024). This indicates the importance of maintaining a reliable mobile banking service. That is why it is so important to innovate while keeping services reliable, so customers can keep trusting these digital banking solutions. Therefore, it is crucial to study the effects of the different types of operational failure on mobile banking usage. This research has the following objectives:
Research objective 1: To identify the relationship between function failure and mobile banking usage.
Research objective 2: To identify the relationship between system failure and mobile banking usage.
Research objective 3: To identify the relationship between information failure and mobile banking usage.
Research objective 4: To identify the relationship between service failure and mobile banking usage.

2. Literature Review and Hypotheses Development

Tan's Failure Model

Tan et al. (2016) highlighted three main issues in e-services: functional, informational, and system-related problems. Functional issues refer to challenges customers face throughout their journey, from finding what they need to after-sales service. Informational issues arise when the information provided is inaccurate, insufficient, or irrelevant. System-related problems involve things like a website being hard to navigate, security risks, or very slow loading speeds. All these factors contribute to a less-than-ideal digital banking experience. Similarly, Xu et al. (2013) and Kamboj et al. (2022) emphasized the importance of maintaining high-quality systems and accurate information, as these are crucial for customer satisfaction and continued engagement.

DeLone and McLean Model

DeLone and McLean (2003) introduced the Information System (IS) success model, which provides a comprehensive framework for evaluating information systems based on criteria such as information quality, system quality, and user satisfaction. This approach has evolved to incorporate service quality as a vital element, emphasizing the importance of user support and reliability in digital service performance (Tam & Oliveira, 2016; Kamboj et al., 2022). The flexibility of the DeLone and McLean model has made it highly applicable across various industries, enabling a deeper understanding of user satisfaction and system performance in diverse digital environments.

An Integrated Model of Tan's and DeLone and McLean

Tan's model discusses three key aspects of failure: functional failure (issues in identifying needs and selecting alternatives), information failure (insufficient information provided), and system failure (technical problems such as difficulty navigating) (Tan et al., 2016; Kamboj et al., 2022). On the other hand, the DeLone and McLean model addresses service failure by focusing on issues in service delivery and customer involvement, as well as emphasizing the importance of service quality in user satisfaction. Combining these two models provides a deeper understanding of how failures in mobile banking affect user satisfaction and engagement. This comprehensive approach considers both the technological concerns raised by Tan's model and the service-related issues highlighted in DeLone and McLean's model, offering valuable insights into how such failures influence customer behavior within the mobile banking context.

Mobile Banking Usage

Mobile banking is a powerful tool to help people without access to traditional banks because they can do transactions like transferring money or checking their account balance just by using a mobile phone. According to a report by the World Bank Group (2010), mobile banking is essential to provide financial services to underserved populations, especially in developing countries. Mobile banking makes life easier because there is no need for customers to visit a physical bank, as banking transactions can be done right from home or anywhere. This is a way to give people far from urban areas or without banks a chance to participate in the financial system. Mobile banking is genuinely a great new approach to help people who struggle to reach banks. Mobile banking is convenient because people only need a mobile phone to manage their finances (World Bank Group, 2010). In countries with fewer physical banks, it offers a time- and cost-efficient solution. People can do many things using apps, like transferring money, paying bills, or checking their balance, without needing to visit the bank. This approach is a big help for remote areas or places with no bank presence because transactions can be done anytime and anywhere. However, despite its advantages, mobile banking does come with its challenges. Sometimes systems may fail, internet connections might be unavailable, or there could be cyberattacks. These issues can make people lose trust in the apps. In areas with slow internet, it is even harder to use mobile banking consistently. Therefore, investments in digital infrastructure, cybersecurity measures, and educating users are crucial. Once these concerns are addressed, mobile banking cannot only reach more underserved populations but also become a secure and reliable platform (World Bank Group, 2010). According to the research by Fidelis et al. (2025), continuous mobile banking usage depends on system quality, information quality, and user satisfaction. Users with positive experiences from effective information and systems tend to continue using the mobile banking application despite facing various external challenges (Fidelis et al., 2025). Rouse et al. (2025) found that trust that the users' had in the banks provides a positive effect towards mobile banking usage, despite the users' economic increase impact on the usage is fairly

moderate. Demographic factors such as age, income, and education level were also found to significantly influence mobile banking usage (Rouse et al., 2025). Apau et al. (2025) indicate that mobile banking usage does not depend solely on the features of the application, but also depends on the perceived level of security and trust of the users towards the bank and the technology. It was found that perception of security and trust towards the banks were the main drivers of users' intention, while technology also plays an important role in the context of users with specific demographics (Apau et al., 2025).

Function Failure

Functional failure is one of the elements causing a customer's inability to execute the required transaction activity. The inability to assist clients in weighing their service options is referred to as failure. This is known as "process failure." If this is occurring simultaneously, it results in how consumers act, brought on by unsuccessful transactions (Mustafa et al., 2020). This failure is indirectly linked with customer satisfaction while using mobile banking, as stated by Sosa et al. (2021). Meaning that, mobile banking must avoid any failure, because if it happens, the transactional needs of its users cannot be satisfied adequately. The relationship between mobile banking and function failure is negatively related. This is because a function failure in mobile banking will make customers annoyed because they cannot do online transactions (Mustafa et al., 2020). Previous research has shown that if customer needs are not met, the functional aspect of any service loses all value (Tan et al., 2016). Functional failures in mobile banking can make customers unhappy and stop using it. These issues, like slow systems or glitches, make it hard for people to do their transactions, especially during busy times. When the service does not meet customer needs, they feel frustrated and may lose trust in the bank. If these problems happen often, customers might switch to other banks that provide better and more reliable services. This not only affects the bank's reputation but also leads to a loss of customers. Functional failures prevent essential tasks, like pay and fund transfers, and are immediately dissatisfying. In case users face functional issues (e. g. app crashes, unresponsive features), the main purpose of performing a critical transaction becomes impossible. Not only is that frustrating, but it also creates a belief of unreliability. They have repeatedly shown that functional failures are the biggest driver for overall user dissatisfaction, especially those that occur during high-stakes transactions like bill payments and salary transfers (Kamboj et al., 2022). Based on the above arguments, the following hypothesis is proposed:

H_1: There is a significant relationship between function failure and mobile banking usage by bank customers.

System Failure

In mobile banking, faults happen because of system failures. Internal factors directly contribute to system failures. Not only that, but system failures also have an impact in terms of use, procedure, expenses, and user pleasure (Mustafa et al., 2020). One of the factors is inaccessibility, which happens to be the inability of users to log into their mobile banking and thus prevents customers from attempting any transactions (Sosa et al., 2021). Similarly, delays contribute to system malfunctions that irritate customers when they use mobile banking daily (Mustafa et al., 2020). Furthermore, insecurity also causes system failure problems because the increase in security issues contributes to user concerns. This is reinforced in the article by Mustafa et al. (2020), which states that failure to provide security to users is also part of a system failure. Therefore, we can see that system security correlates with system security. This insecurity problem exists when scammers misuse user data. System failure in mobile banking is another dimension of cyber risk (Okpa, 2022). This is because the system triggered various risks by embedding distributed denial of services (DDoS), causing all banking systems to shut down completely. Therefore, a suggestion (Almajali et al., 2022) is that mobile banking developers should improve system strength to avoid system failure. System failure can be prevented by using software that is applied to ensure a specific goal or specific issue is resolved (Rahman et al., 2024). It is to ensure that the system can avoid malfunction, as system components intersect with one another, and when one component breaks down, it may be liable for triggering a few issues in the system (Rahman et al., 2024). Customers have also raised concerns about system failure, one of the most severe risks to mobile banking programs (Mugo, 2021). If something goes amiss with mobile banking, the bank will suffer significant losses, including millions of dollars in losses, and the bank client will also be affected (Serrah & Maidin, 2022). The quality of the system, which allows users to access the content of the mobile banking app, has an impact on how efficiently it operates (Delone & McLean, 2003; Wixom & Todd, 2005).

According to previous research, examples of system failures in mobile banking include handphone operability, security issues, poor internet connection, authentication risks and issues, viruses, hackers' fear, etc.

(Gomathinayagam et al., 2019). From this, we can see that the problem might come from the bank system or the customer device, or a fault. Therefore, the bank needs to update its system and improve its quality to cope with the problem between customers and the mobile banking system, so that customers do not face difficulty despite the problem coming from themselves. Bank customers' usage patterns are significantly affected by system failures (Mustafa et al., 2020). System failures in mobile banking negatively affect how customers use it because they make the service unreliable. The system is very important to ensure customers can access the app and complete their transactions without problems. However, issues like poor internet, security risks, errors during login, and device problems can cause the system to fail. These problems may come from the bank's side or the customer's device, but both create frustration and make it harder for users to trust mobile banking. If these failures happen often, customers might stop using the app or switch to another bank with a better system. To fix this, banks need to update and improve their systems regularly to make sure the app works smoothly and meets customers' needs. This shows that system failures can significantly reduce how much people use mobile banking. Therefore, the following hypothesis is proposed:

H_2: There is a significant relationship between system failure and mobile banking usage by bank customers.

Information Failure

The relationship between information failure and mobile banking is negatively related in that each failure dimension affects user perceptions, and indirectly leads to user trust and loyalty in a different manner. It is important to understand these relationships to identify the root causes of dissatisfaction and engineer tractable interventions. The negative relationship between information failure and mobile banking adoption is well-documented in recent research. Information failure occurs when customers do not receive sufficient, accurate, or timely information about mobile banking features, security protocols, or operational guidelines. This lack of information often leads to confusion, decreased trust, and heightened perceptions of risk, all of which discourage users from adopting or continuing to use mobile banking services. For instance, a study by Kamboj et al. (2022) highlighted that information failure significantly impacts user satisfaction and engagement with mobile banking. Insufficient or poorly communicated information about technical errors, service functionalities, or updates can erode customer confidence, leading to reduced usage. Researchers have emphasized that addressing these information gaps is crucial for enhancing user trust and satisfaction. Similarly, Laukkanen and Kiviniemi (2010) found that inadequate guidance and communication from banks exacerbate barriers such as perceived risks, usability issues, and value concerns in mobile banking. These barriers ultimately lead to resistance to adopting the technology. The study also showed that effective communication can mitigate these challenges by improving customer understanding and trust. In summary, information failure negatively affects the adoption and continued use of mobile banking by reducing user trust, satisfaction, and perceived value. Addressing these information-related issues is vital for banks to improve customer experience and adoption rates. Losses of trust are also due to informational failures, e. g. if account details are incorrect or delayed. For example, the user will lose faith in the platform's dependability if they receive contradicting information from it, such as their account balance. Accordingly, research stresses that informational precision and timeliness are critical determinants of satisfaction in the digital banking setting (Nedeljković, 2022). The relationship between information failure and mobile banking is predominantly negative, as it undermines customer trust, satisfaction, and adoption. Based on the above arguments, the following hypothesis is proposed:

H_3: There is a significant relationship between information failure and mobile banking usage by bank customers.

Service Failure

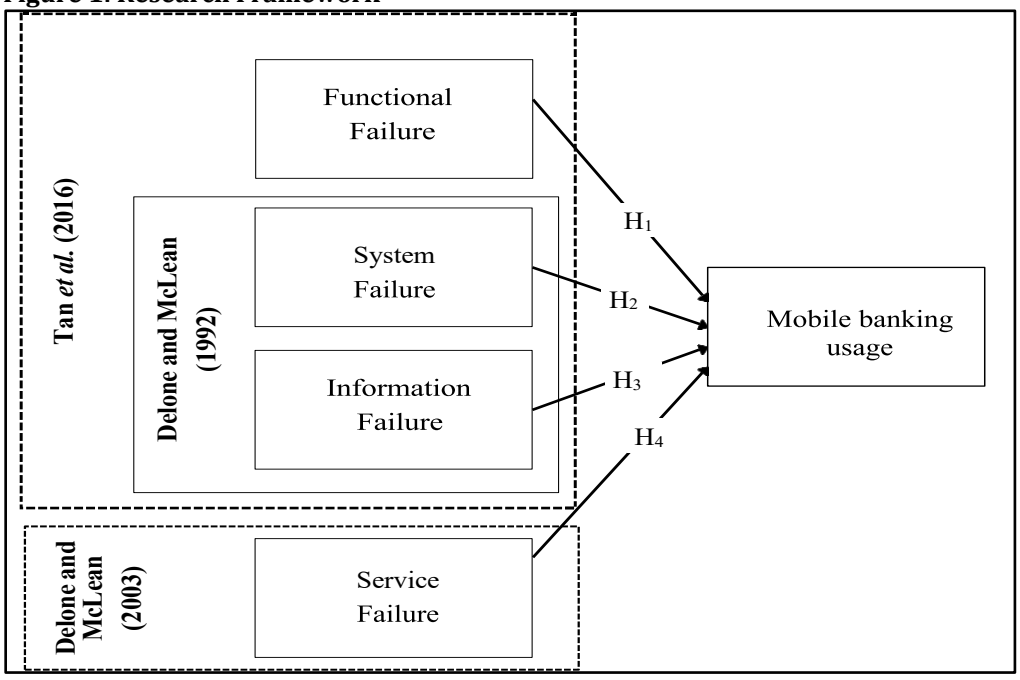
Mobile banking performance has shown a significantly positive impact on customers' behavior (Chong, 2013). According to Merhi et al. (2021), customers' perceptions of the benefits of using mobile banking, particularly the ability to complete financial transactions more quickly, are represented by performance expectancy, which represents the convenience of adoption with technology that also includes full-time availability of mobile banking without restrictions. Despite these advantages, customers' financial stability might be significantly affected by service failure. Many consumers find themselves in risky positions when internet platforms are unavailable, particularly when there are few options for physical banking. Service failure usually occurs when an organization fails to meet consumer desires (Azemi et al., 2019; Hazée et al., 2017). According to Mattila and Ro (2008), service failure prevails when the service is not delivered to the customer as it was originally planned. Migacz et al. (2018) defined service failure as when customers are not satisfied because their

perception of the service they have received falls short of what they expect. According to Mustafa et al. (2020), there is a decrease in the service offered to customers at the time of the online transaction through mobile apps, and the final transaction of the user is dependent on the response time of the mobile bank apps. Past studies have pointed out that failure of mobile banking services will result in the customers thinking that such a service has wasted their time, and eventually affect the customer's behavior (Dwivedi et al., 2021; Shaikh & et al., 2015; Singh et al., 2017).

The frequency of mobile banking service disruptions has been increasing in recent years and has led many consumers to move back to the use of cash in their transactions. This is true in times when such systems go through outages or planned upgrades, resulting in customers becoming helpless and distressed with their financial management (Zhou et al., 2021). Such technical issues not only create problems with responsiveness in mobile banking applications but can also be a great source of frustration among users who depend on these platforms for their daily financial activities. Further, when apps fail to provide efficient and reliable service, this diminishes the credibility and trustworthiness that consumers are presumed where customers will consider other banking options. Hence, system reliability should be at the top of the list of concerns in enhancing the user experience in their mobile banking services. Service failure and mobile banking are negatively related. Service failure in mobile banking often refers to instances where the service does not meet the user's expectations due to issues such as technical glitches, failed transactions, or poor user experience. These failures can lead to negative consequences, including dissatisfaction, loss of trust, and reduced usage of mobile banking services. The past decade has seen a growing consideration of service failure and recovery issues by researchers (Azemi et al., 2019; Su et al., 2019). One stream of researchers considered two major online service failure types, which are technical problems with websites (specifically, 'technological' failures), and failures to receive products purchased online (Forbes et al., 2005). The relationship between service failure and mobile banking is negative, as service failures directly impact customer trust, satisfaction, and retention. Research indicates that service failures erode customer trust and increase dissatisfaction, often leading to reduced usage or abandonment of mobile banking platforms. According to Kamboj et al. (2022), frequent service interruptions significantly discourage continued engagement, particularly when users perceive the platform as unreliable and risky. Based on the above arguments, the following hypothesis is proposed:

H_4: There is a significant relationship between service failure and mobile banking usage by bank customers.

Figure 1: Research Framework



3. Research Design

This research is quantitative. The study population is the current mobile banking users, to be sampled through the convenience sampling method. This population is chosen as it enables examination of the effect of operational failure on mobile banking usage. G*Power software is used to determine the minimum required sample size. Based on the inclusion of four independent variables, at least 85 respondents will be sufficient to meet the statistical standards. A non-probability sampling method, specifically convenience sampling, is chosen, which involves the collection of data from a research population that is easily accessible to the researcher (Rahi, 2017). Probability sampling cannot be used as it is impossible to obtain the list of mobile banking users from the banks due to the secrecy of banking customer information. Data will be collected in a non-intrusive way, and respondents will complete electronic surveys on their own. In addition, ethical considerations will be followed carefully to ensure that participants' trust and confidentiality are maintained. Survey responses will be assigned unique non-identifiable codes to ensure anonymity. Survey instruments ensure that the data taken is accurate and meets the study objectives. The survey uses the summated rating method in the Likert scale format to collect data from respondents. The application of the Likert Scale is straightforward to measure and understand the views of each respondent (Subedi, 2016). This Likert Scale is practical for measuring respondents' perception to indicate how strongly they disagree or strongly agree with a topic question (McLeod, 2023). Every question has the option to choose a rating starting from number 1, indicating strongly disagree, until number 5, indicating strongly agree. The survey items are adopted or adapted from previous studies. Statistical tests will be performed involving reliability, descriptive, correlation, and multiple regression analysis using the Statistical Package for the Social Sciences (SPSS) software.

4. Conclusion

Further studies are required to examine the effects of operational failure (function failure, system failure, information failure, and service failure) on mobile banking usage. 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 banks in designing their mobile banking application. The results will also assist future researchers in designing their studies on operational failures and mobile banking usage.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Effects of Customer-Based Brand Equity (CBBE) on Guest Experience in Beach and Island Resort

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Abstract: This study investigates the effect of customer-based brand equity (CBBE) on guests' experience in the beach and island resort settings. A survey method was adopted by using a self-administered questionnaire. Purposive sampling was employed, and data were collected from 200 guests who had stayed at beach and island resorts in seven destinations. A Structural Equation Model (Partial Least Squares-SEM or PLS-SEM) approach was applied to analyze the data. The findings in this study reveal that the hypothesized relationship between brand association and guests' experience and perceived quality was supported. However, the findings failed to support the hypothesized relationship between brand awareness and guests' experience. This study offers several theoretical contributions, followed by managerial implications and outlines potential directions for future research.

Keywords: *Customer-Based Brand Equity, Guests' Experience, Resort.*

1. Introduction and Background

In an increasingly competitive and experience-driven hospitality landscape, resorts must leverage every strategic advantage to differentiate themselves and build lasting customer loyalty. One of the most influential yet underexplored assets in this regard is Customer-Based Brand Equity (CBBE). Aaker (1991) defined brand equity as a name and symbol that gives value to a firm's product or service. It is also viewed as a brand asset and a liability to a firm. Brand equity is a major element that affects a brand, which gives several advantages to a firm. For instance, it can reach a price premium, high demand from customers, generate brand extension easily and make communications on the brands more easily accepted among the customers. According to him, CBBE is shaped by the perceptions of brand awareness, associations, perceived quality, and loyalty. Recent studies have reaffirmed the critical role of CBBE in shaping customer attitudes and behaviors, highlighting its potential to enhance customer experiences in service-intensive sectors like hospitality (Rather, 2020; Cervova & Varvova, 2021). Thus, this indicates that brand equity has become crucial to the hospitality industry, where competition has become very strong (Nuseir, 2021).

Pine and Gilmore (1998) described customer experience as a personal construct that exists entirely in the minds of individuals who have been engaged emotionally, physically, intellectually, and spiritually. Given that experiences in resorts are largely intangible and co-created, the perceived strength and trustworthiness of a brand can substantially influence a guest's pre-stay expectations, on-site satisfaction, and post-visit loyalty (Hanaysha, 2022). For instance, The Ritz-Carlton is extensively recognized as a benchmark in the luxury hospitality industry, largely due to its strong CBBE. One of the most compelling elements of Ritz-Carlton's brand equity is its exceptional service delivery, personalized guest interactions, and an unwavering commitment to excellence, creating strong emotional and cognitive brand associations in the minds of consumers (Kandampully, Zhang & Bilgihan, 2018).

Although previous research studies have explored the individual impacts of CBBE components on customer behavior, few studies have directly examined how an integrated framework of CBBE contributes to the overall customer experience in the resort context. With rising consumer expectations and the resurgence of travel post-COVID-19, understanding this relationship has never been timelier (Sunder & Dixit, 2023). This study seeks to address this gap by exploring the influence of CBBE on customer experience within the resort industry, offering both theoretical insights and managerial implications for enhancing their brand and guests' experience.

2. Literature Review

Customer-Based Brand Equity (CBBE)

A brand can be described as the way customers perceive its reputation (Wantini & Yudiana, 2021). Thus, when a specific brand has a good reputation, this indicates that the brand has the potential to get a high brand equity (Haudi, Handayani, Musnani, Suyoto & Prasetion, 2022). Aaker (1991) defined brand equity as a name and symbol that gives value to a firm's product or service. It is viewed as a brand asset and liability. He further asserted that brand equity will generate several values for both customers and organizations. High brand equity will provide a competitive advantage for a company. In addition to that, it can also increase customer loyalty and retain the company's present customers. Therefore, a company must develop a high brand equity to compete with its competitors. Brand equity was introduced by Aaker (1991) and Keller (1993). Even though their brand equity concept are different, both their theories are based on the consumer's perspective. Aaker (1991) conceptualized brand equity based on customers' memory (cognitive psychology) to provide further understanding of how customers respond to a brand. This model emphasizes that customer response occurs when a customer believes that a brand is well-known with a positive, strong and exceptional brand association. Aaker (1991) divided brand equity into two main categories: customer perception and customer behavior. He mentioned that these categories should be combined to form the foundation of customer-based brand equity. Accordingly, he identified four key dimensions for measuring it.

The dimensions related to customer perception are brand awareness, brand association, and perceived quality, while brand loyalty represents the dimension of customer behavior. Aaker (1991) identifies brand awareness as the first dimension of customer-based brand equity. It refers to a customer's ability to recognize and recall a brand in the marketplace. This dimension plays a crucial role in shaping consumer perceptions and can significantly influence brand preference and loyalty. The second dimension is brand association, which is described as any thought, image, or connection that a customer links to a brand in their memory. The third dimension, perceived quality, is defined as the customer's evaluation of the overall excellence or superiority of a product or service in comparison to competing brands. It encompasses the perceived value and benefits that drive purchasing decisions. Lastly, brand loyalty represents the fourth dimension and defines it as the strength of a customer's commitment or emotional attachment to a brand.

On the other hand, Keller (1993) defined brand equity as customers' knowledge about a specific brand after they have responded to the marketing activities. He argued that customer-based brand equity only occurs when a customer is familiar with a brand. He described that customers would react to brand marketing communications and get familiar with the brand, thus holding a favorable brand association in their memory. According to him, brand knowledge plays a crucial role in customer-based brand equity because customers will react more favorably to the brands' marketing communications that they know rather than an unknown brand. To explain more about brand knowledge, Keller (1993) suggested that brand knowledge can be described from two main dimensions: brand awareness and brand image. Brand awareness is the ability of a customer to identify a specific brand under different situations. He emphasized that a customer is only aware of the existing brand in the market after they can recognize and recall the brand. Thus, he further classified brand awareness into two sub-dimensions: brand recognition and brand recall. Brand recognition is viewed as the ability of a customer to remember a brand based on prior experience, seeing or hearing about the brand. On the other hand, brand recall is conceptualized as the ability of a customer to retrieve a brand based on a given cue (e.g., product category). Brand image is defined as a customer's perception of a brand, which is imitated by brand association held in the customer's memory. Brand association is viewed as the information about a brand that contains a brand meaning to a customer, for instance, favorability, strength and uniqueness (Keller, 1993). According to this concept, a customer holds several brand association characteristics in their memory, which lead to a positive association towards a brand.

Even though both scholars view brand equity differently, both concepts are considered two important, vital views in brand equity literature that provide a valuable approach to customer-based brand equity knowledge. There are similarities in the two models in which Aaker (1991) described brand association and perceived quality as two single dimensions, but Keller (1993) described these two dimensions as one and referred to it as brand image. Thus, it can be concluded that these two models complement each other rather than competing. Most research studies in hospitality are based on Aaker's and Keller's model. However, Aaker's model is the

most applied within this industry (Martínez & Nishiyama, 2019).

Given this, brand equity received huge attention from many researchers, specifically in the hospitality industry. For instance, Piriyakul, Kunathikornkit and Piriyakul (2024) evaluate brand equity in the hotel industry by integrating customer journey analysis with text mining. Zhang, Filimonau and Tlemissov (2024) examined brand equity from employees' perspectives and how it influences customer experience in multinational chain hotels. Nuseir (2021) examined how brand equity and customer experiences influence brand loyalty and explored the relationship between brand equity and the quality of customer experience in leading hotels across the United Arab Emirates. Khanh and ThiHoai (2020) investigated the influence of brand equity on brand loyalty in the hotel context. This study also examined whether customer satisfaction moderates the relationship between brand equity and brand loyalty.

Customer Experience

Since the mid-1980s, research on customer experience has expanded considerably (Skard, Nysveen, & Pedersen, 2011). Scholars in marketing have discovered and refined the concept of customer experience through various theoretical lenses. A foundational contribution came from Holbrook and Hirschman (1982), who emphasized the significant role of emotion in consumer behavior. They argued that consumers are not purely rational decision-makers but also engage in hedonic consumption driven by emotional experiences. Over time, the concept of customer experience has attracted increasing academic interest and is now regarded as an important theoretical addition to the literature. As a result, the idea has also been developed into a practical managerial concept, gaining prominence in marketing and management studies. Notable developments in this area include experiential or experience marketing (Pine & Gilmore, 1998; Schmitt, 1999; Tynan & McKechnie, 2009), customer experience management (Verhoef, Lemon, Parasuraman, Roggeveen, Tsiros & Schlesinger, 2009), and experience design (Pullman & Gross, 2004; Skard, Nysveen, & Pedersen, 2011).

This concept emphasizes that, beyond seeking functional benefits, customers also desire memorable experiences from businesses. These experiences are regarded as products themselves, for which customers are willing to pay. Pine and Gilmore (1998) proposed that experiences can be defined by two key dimensions, which are the level of customer participation and the nature of their interaction with the environment. The level of customer participation distinguishes between passive and active participants. Passive participants are those who simply observe the experience without direct involvement, while active participants are fully engaged and take part in shaping the experience. In contrast, the environmental relationship level focuses on the depth of the customer's connection with the experience itself. Pine and Gilmore (1998) advocated the Experience Economy concept, which refers to the customer experience dimensions as entertainment, educational, escapism, and aesthetic experiences. They described entertainment experience as an individual's feelings of fun, pleasure, and relaxation. This development occurs when customers can engage in any form of activity. For instance, the entertainment experience offered by a resort to its guests included enjoying live music performances from the resort's resident artists of the month at their café or lobby lounge. Education-based experiences occur when customers enrich their knowledge and expertise, which could influence them to explore and participate in new endeavors. Within the context of a resort, an educational experience could include inviting guests to take part in cooking lessons with local chefs and sampling local and exotic food. Aesthetic experience is when the customers engage with the physical environment, such as the resort's ambience and decoration.

Lastly, escapism experience explains the individuals' desire to escape their everyday lives at home and office and the stress that may follow from the unchanging routines. For example, guests may enjoy listening to the relaxing resonances of nature from the comfort of their resort rooms. However, for this study, only aesthetic and escapism experiences are considered and exclude entertainment and educational experiences. This is because this study argues that most guests visit beaches and island resorts to relax, rejuvenate and enjoy the environment only. Escapism is a prominent theme in the hospitality industry, especially in beach and island resort settings (Maru & Dey, 2024). These resorts provide an escape from everyday life where guests can enjoy themselves and relax on the beach and in nature. In addition to that, aesthetics such as interior design, architecture and ambience are also important to beach and island resorts. These elements will influence initial impressions of the guests and establish an emotional connection with the resort. For instance, these resorts integrate traditional architecture such as wood carving, stone and bamboo. It has an open-air design, such as a

beachfront cottage, that allows guests to enjoy the ocean view.

Most of the previous studies in the hospitality and tourism industry are based on Pine and Gilmore's (1998) Experience Economy Concept. For instance, a study by Paisri, Ruanguttamanun, and Sujchaphong (2022) examined the effect of customer experience on electronic word of mouth (eWOM) and revisit intention towards Thailand tourist destinations and whether commitment mediates the relationship between customer experience, eWOM and revisit intention. A similar study by Ali and Gaber (2022) explores customer experience in Taladtongchom, one of the popular local cultures in Thailand. Another study by Lee, Jeong and Qu (2020) adopted the Experience Economy Concept to explore theme park visitors' experience on satisfaction and revisit intentions. In the context of culinary, Hoang (2023) explores the Experience Economy Concept dimensions to develop scales in measuring culinary experience in Vietnam. In the context of hotels and resorts, Manhas (2019) explored the dimensions of customer experience and how it varied among different chains of hotel brands in North India. A recent study by Ojha (2025) adopted the Experience Economy Concept to examine the effect of guests' experience on brand loyalty towards boutique hotels in Kathmandu Valley.

The Relationship Between Brand Equity and Customer Experience

The quality of customer experience has been shown to have a strong connection to brand equity, which plays a crucial role in driving repurchase behavior and entails a promise for quality experience (Harris & De Chernatony, 2001). In addition to that, a recent study by Sato, Yoshida, Doyle and Choi (2023) emphasizes the significance of brand identification in shaping consumer experiences. The research highlights that consumers often rely on brand cues to facilitate quicker decision-making, especially when faced with time constraints. This reliance on familiar brands helps streamline choices, enhancing the overall consumption experience. Another study by Nusier (2021) found that there is a substantial influence of brand equity and customer experience on the hotel industry in the United Arab Emirates.

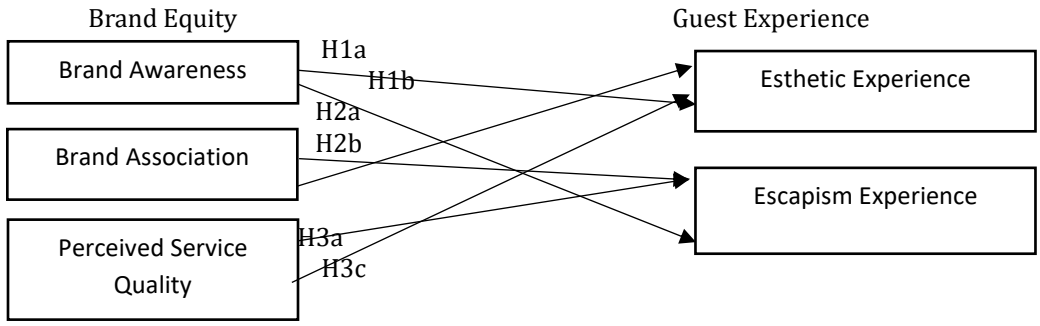
According to Aaker (1991), brand awareness is a key component of customer-based brand equity, as it can shape customer perceptions and promote brand preference and loyalty. In relation to the resort context, customers who are aware of the resort's brand could develop familiarity among consumers and lead to some anticipation of the experience. In addition to that, a firm's brand association also contributes to a greater customer experience and is considered an important customer experience development (Phong, Nga, Hanh, & van Minh, 2020). Recent research underscores the significance of perceived service quality attributes such as product quality, service quality, product freshness, and time-saving as key indicators in shaping customer experience (Xie & Sun, 2021). Accordingly, this study hypothesized that:

H1a: Brand awareness significantly influences aesthetic experience.
H1b: Brand awareness significantly influences escapism experience.
H2a: Brand association significantly influences aesthetic experience.
H2b: Brand association significantly influences the escapism experience.
H3a: Perceived quality significantly influences aesthetic experience.
H3b: Perceived quality significantly influences escapism experience.

The Conceptual Framework

The proposed conceptual framework exploring the relationship between brand equity and customer experience is exhibited in Figure 1. It is predicted that brand equity significantly influences customer experience. Brand equity is suggested to contribute value to the customers. It will help the customers to interpret and process information, increase confidence in purchase decisions and influence the quality of customer experience. This is because the development of brand equity, driven by marketing activities such as advertising, can influence the quality of the guest's direct experience.

Figure 1: Conceptual Framework



3. Research Methodology

Sampling and Data Collection

The targeted respondents of this study comprised local guests who had stayed for at least one night at beach and island resorts located in destinations such as Penang Island, Langkawi Island, Port Dickson, Tioman Island, Perhentian Island, Desaru Beach, and Pangkor Island. These destinations were chosen because they are considered among the top tourist destinations in Malaysia (Tourism Malaysia, 2023). For data collection, a non-probability purposive sampling method was employed. A total of 200 questionnaires were distributed to respondents over three months at the selected destinations. This sample size aligns with the general guideline for Structural Equation Modelling (SEM) proposed by Hair, Black, Babin, and Anderson (2010), which recommends a minimum sample size of 100 or more.

The Instrument

The questionnaire was developed to collect data from the respondents. The first part of the questionnaire captured general demographic information, which included gender, age, level of education, marital status and occupation. The section of the questionnaire included research constructs used to measure the two main variables of the study, namely customer-based brand equity (CBBE) and customer experience.

As for CBBE, the measurement items were adapted from Kim, Jin, Sun & Kim (2008). Brand awareness, brand association, and perceived quality were each measured using four items. To measure the construct of customer experience, the instruments were also adapted from Ali, Hussain and Ragavan (2014). Customer experience was measured through two dimensions, namely aesthetic experience (four items) and escapism experience (five items).

Data Analysis Tool

For this study, data analysis in the initial phase was carried out using IBM SPSS version 23.0. The software facilitated data screening procedures, including the detection of missing values, identification of outliers, and assessment of normality. Additionally, descriptive statistics such as frequencies, means, and standard deviations were computed.

In the second phase, Structural Equation Modelling (SEM) was employed to evaluate both the measurement and structural models. SEM is particularly valuable for researchers in the behavioral and social sciences, as it allows for the assessment of latent constructs that cannot be directly observed. Its widespread adoption in recent years is attributed to its numerous advantages (Hair, Hult, Ringle, & Sarstedt, 2017). Furthermore, the literature identifies SEM as one of the most robust methods for multivariate data analysis (Hershberger, 2003).

4. Results

Respondents Profile

Out of 200 questionnaires distributed to the respondents, only 135 data can be used to be carried out for data analysis. As shown in Table 1, most of the respondents were female (N=90; 67%) as compared to male respondents (N=33; 45%). With regards to marital status, most of the respondents were married (N=87; 64%),

followed by single (N=46; 34%), and the remaining respondents were categorized as others (divorced and widowed) (N=2, 2%). Most of the respondents have also completed their postgraduate studies (N=69; 51%), followed by 33 respondents having undergraduate level qualifications, while 33 (24%) respondents had high school/ diploma level or lower qualifications. The respondents' occupational status was also derived from the results. Most of the respondents are unanswered on their occupational status (N=55, 41%), followed by government servants (N=31, 23%) and the private sector (N=23, 17%). The remaining respondents were students (N=15, 11%), unemployed (N=4, 3%), self-employed (N=3, 2%) and retired (N=4, 3%).

Table 1: Respondents' Profile

Profile	Descriptive Profile	Percent	Frequency (n=135)
Gender	Female	67	90
	Male	33	45
Age	18 - 25 years old	14	19
	26 – 35 years old	29	39
	36 – 45 years old	33	44
	46 – 55 years old	18	24
	56 – 65 years old	6	9
	66 and above	0	0
Level of Education	High school/ diploma level or lower	24	33
	Undergraduate level	24	33
	Postgraduate level	51	69
Marital Status	Single	34	46
	Married	64	87
	Divorce	1	1
	Widow	1	1
Occupational Status	Government Servants	23	31
	Private Sector	17	23
	Retiree	3	4
	Self-employment	2	3
	Unemployed	3	4
	Student	11	15
	Unanswered	41	55

Measurement Model

All hypotheses in this study were tested using the partial least squares-structured equation (PLS-SEM) modelling technique (Ringle, Da Silva & Bido, 2015). Based on Anderson and Gerbing's (1988) guidance, this study primarily investigated the measurement model for reliability and validity testing before subsequently assessing the structural model in testing the proposed hypotheses. The first step in the PLS-SEM method is to examine the convergent validity. This study assessed convergent validity using composite reliability (CR), factor loadings, and average variance extracted (AVE)

As shown in Table 2, the findings reveal that composite reliability surpassed the suggested value of 0.70 (Hair et al., 2017). In addition to that, the findings also show that all indicator loadings were above .70. Regarding the average variance extracted (AVE), the results showed that all construct values exceeded the recommended minimum threshold of 0.50 (Hair et al. 2017). Based on the identified data, the constructs explained more than half of the variance of their indicators.

Table 2: Summary of Validity and Reliability for the Constructs

Construct	Dimension	Item	Loadings	CR	AVE
Customer-Based Brand Equity (CBBE)	Brand Awareness	BAW1	0.757	0.881	0.649
		BAW2	0.770		
		BAW3	0.841		
		BAW4	0.849		
	Brand Association	BA1	0.793	0.863	0.612
		BA2	0.728		
		BA3	0.802		
		BA4	0.804		
	Perceived Service Quality	PQ1	0.761	0.89	0.676
Customer Experience	Escapism Experience	ESC1	0.777	0.934	0.741
		ESC2	0.804		
		ESC3	0.930		
		ESC4	0.900		
		ESC5	0.884		
	Esthetic Experience	EST1	0.903	0.905	0.706
		EST2	0.885		
		EST3	0.824		
		EST4	0.739		

Discriminant validity was further tested in the measurement model. In this study, the Fornell-Larcker Criterion (Fornell & Larcker, 1981) was implemented to evaluate discriminant validity. Using this approach, the indicators should load more strongly on their constructs than on other constructs within the model, and the average variance extracted (AVE) shared between each construct and its measures should be greater than the one shared between the construct and other constructs (Fornell & Larcker, 1981). As presented in Table 3, the value for all key constructs revealed sufficient discriminant validity. Hence, the result indicates that uniqueness does exist between the constructs.

Table 3: Summary of Fornell-Larcker Criterion

	BAW	BA	PQ	ESC	EST
BAW	**0.806**				
BA	0.643	**0.782**			
PQ	0.434	0.598	**0.822**		
ESC	0.402	0.579	0.462	**0.861**	
EST	0.404	0.553	0.553	0.800	**0.840**

Structural Model

Data analysis was then undertaken to test the relationship between independent and dependent variables. This study found that H2a, H2b, H3a and H3b were statistically significant, except H1a and H1b. The standardized estimates for these hypotheses were all significant at t >1.65. Thus, it can be concluded that hypotheses H2a, H2b, H3a and H3b were supported except H1a and H1b. Table 5 illustrates the overall hypothesis testing of the said relationships.

Table 4: Summary of Hypothesis Testing

Hypothesis	Relationship	t-value	Significance (t>1.65)?	Decision
H1a	Brand Awareness > Esthetic Experience	0.795	No	Not Supported
H1b	Brand Awareness > Escapism Experience	0.536	No	Not Supported
H2a	Brand Association > Esthetic Experience	4.866	Yes	Supported
H2b	Brand Association > Escapism Experience	8.193	Yes	Supported
H3a	Perceived Service Quality > Esthetic Experience	1.861	Yes	Supported
H3b	Brand Association > Escapism Experience	4.962	Yes	Supported

Discussion

The growth of the resort industry depends on its capability to develop and achieve a great brand and unforgettable experience for its guests. Thus, the purpose of this study is to examine the influence of brand equity on guests' experience in the beach and island resort context. This study has tested six hypotheses of how dimensions of brand equity (brand awareness, brand association and perceived quality) affect resort guests' experience (aesthetic experience and escapism experience). The study's findings regarding the role of brand equity towards guests' experience provide meaningful theoretical implications.

First, the findings reveal that brand association was found to have a significant impact on guest experience. This indicates that a resort that has a positive image by portraying characteristics such as user-friendly technology, superb guest service, excellent guest room design and function and thoughtful guest amenities will assist guests in predicting the quality of their experience. In this sense, this result is consistent with a previous study by Phong et. al (2020), who exhibit that strong brand associations enhance customers' willingness to pay and contribute to a positive customer experience. This underscores the importance of brand associations as a predictor of favorable customer experiences. Similarly, Safeer and Le (2023) examined the role of brand experience dimensions in predicting consumer loyalty. The study revealed that brand associations, along with brand trust, mediate the relationship between brand experience and brand loyalty. This suggests that brand associations are critical in shaping customer experiences and fostering loyalty.

Second, the finding suggests that perceived quality was found to have an influence on guests' experience. In the context of a resort, this indicates that overall service performance by resort operators could predict guest experience during their stay. In other words, resort operators provide greater service quality, such as concern for the needs of the guests, the staff is always available when needed, the staff responds to the guests' requests promptly and the resort operators provide attractive facilities, and equipment will influence guests' experience. This finding is consistent with a previous study by Ribeiro and Prayag (2019). They found that service quality continues to be a key factor in generating positive emotions and plays a significant role in shaping customers' evaluations of their service experience. Similarly, Mamakou, Zaharias, and Milesi (2023) identify that there is a favorable association between service quality and customer experience.

Finally, the findings from this study failed to support the hypothesized relationship between brand awareness and guests' experience. Brand awareness was found to have no impact on the guest experience. In other words, being aware of a resort's brand did not assist guests in anticipating the quality of their experience. Brand awareness can be defined as the ability of a customer to recall and recognize a brand available in the market (Aaker, 1991). In this context, brand awareness refers to the ability of a guest to recognize a resort's brand from various forms of advertisements initiated by resort operators. Thus, at this stage, guests only form a familiarity towards the resort's brand and may not associate it with the quality of experience. Besides that, awareness of a resort's brand may assist guests in making comparisons between resort brands. This is consistent with a study by Ahmed and Taha (2023). He posited that brand awareness plays a vital role in helping customers compare different products during the decision-making process. Therefore, this could be a major plausible reason behind the findings of this study.

5. Managerial Implications and Recommendations

This study offers critical insights for the resort industry, demonstrating how strategic management of brand equity can directly enhance the guest experience, contributing to the resort industry by helping operators understand how brand equity can predict guest experience during their stay. First resort operators should focus on creating brand associations and perceived service quality, which directly affect guest experience. These findings indicate that hotels and resorts that have strong brand association and good service quality will develop some anticipation of the stay experience in the guests' minds. Resort operators should develop a good image and reputation for their hotels and resorts. They should understand how to preserve and safeguard it, particularly in today's digital age. This involves staying updated with review platforms like Booking.com, Airbnb, and Expedia. Resort operators need to regularly monitor these sites, watch for negative feedback, respond promptly and assist guests, while also encouraging satisfied guests to share positive reviews.

Second, besides brand association, resort operators should also pay attention to providing greater service quality, specifically service quality by the employees. Resort operators should give autonomy to the employees to make decisions and resolve guests' issues promptly. Besides that, resort operators also should create a positive work environment that fosters a caring, friendly and professional environment where the employees feel valued and supported. Enhancing employees' skills is also critical to developing greater service quality. Resort operators should send their employees constantly to the training that focuses on customer service, communication, product knowledge, and problem-solving. During the training, resort operators should also integrate guests' feedback to improve service and enhance guests' experience.

Limitations and Future Research

First, this study only addressed the relationship between brand equity and guests' experience. The results of the study are based on the questionnaire of guests' opinions. Only two variables of guests' experience, which are aesthetic and escapism experience, were used in this study. Future studies should measure all dimensions of experience highlighted in the Experience Economy Concept, thus might provide substantial managerial implications.

Second, this study only addressed local guests who stay at selected beaches and island resorts. Therefore, the findings may not represent the views of foreign guests. Future research should also include foreign guests and should compare Malaysian and foreign guests to fully uncover the relationship between brand equity and guests' experience to further understand the cultural background and expectations. Finally, this study was conducted in the context of a beach and island resort. Thus, the findings may lack generalization and may not be generalized to other types of resorts. Hence, future research should test the proposed conceptual framework in other resort types or tourism industries related to experience creation.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

An Organization DNA Model: UiTM in Analysis

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Abstract: This study focuses on Universiti Teknologi MARA (UiTM), highlighting its academic success and strong employee character. It aims to identify employees' trust in the institution and analyze the data using qualitative content analysis. Three data sources were used: an interview with the former Vice-Chancellor, an exploratory survey with 187 respondents from various categories, and secondary data from the Vice-Chancellor's speeches and writings. Methods included content analysis, exploratory data analysis, and word frequency analysis. The study draws a comparison between UiTM's organizational structure and DNA, where the backbone represents "Nation (Bangsa), Knowledge (Ilmu), and Success (Berjaya)," and the nitrogenous bases symbolize "Thinking (Pemikiran), Emotions (Emosi), Spirit (Semangat), Aspirations (Aspirasi), and Behavior (Tingkah laku)." These elements form the PESAT model, which encompasses the core components of UiTM's identity. The research contributes by offering a framework for managing large institutions like UiTM, ensuring a sustainable identity, and guiding future aspirations. This model provides valuable insights into the institution's community and its continued development.

Keywords: *Organizational DNA; Variation; DNA structure, content analysis, organizational identity*

1. Introduction

Deoxyribonucleic Acid (DNA) is the primary chemical component of chromosomes and the substance responsible for producing genes (Saenger, 1984). Inspired by the biological concept of DNA as a hereditary molecule that carries essential instructions for life and continuity, this study applies the DNA metaphor to develop a model representing the collective identity, values, and institutional legacy of UiTM's community.. Encouraged by this definition, a study was conducted to establish a DNA Model representing the heritage of UiTM's community, including both staff and students, as a family within the institution. High-quality staff and civil servants are vital assets to the success of any organization and nation (Megat Ayop Megat Arifin & Abd. Halim Ahmad, 2016). Universiti Teknologi MARA is renowned for its contributions to higher education and has produced numerous notable figures on both national and international levels. From the perspective of biological epistemology, DNA is a nucleic acid containing genetic instructions essential for the formation and development of all living things (National Human Genome Research Institute, 2014)

The concept of DNA can also be applied to the DNA of an organization to ensure its survival as a living entity, akin to the definition of DNA. Many organizations face challenges not due to the absence of rules but because of a lack of a compliance culture. Without compliance, the organizational culture may not align with the objectives to be achieved (Kurnia Hadi, 2021). Currently, UiTM lacks a model that represents its organizational DNA, which could serve as a reference for human capital development and as a guideline to strengthen the organizational structure in alignment with its vision and mission. As a large entity, UiTM's organizational structure is integral to its functional effectiveness. Often, organizations face a disconnect between strategy and implementation, leading to confusion, failure to meet goals due to a lack of commitment, duplication of efforts, ambiguity in decision-making, and internal conflicts (Lozano, Gomez, and Rositas, 2012). This misalignment results in disorder and ineffective strategies, which ultimately affect the achievement of objectives and outcomes.

In this scenario, civil servants at UiTM, as a public sector organization, need a cohesive organizational DNA that

transcends service schemes and ranks. They must cultivate a sense of unity and responsibility towards the trust placed in them. This sense of togetherness and accountability is crucial for ensuring that the reputation of the public service remains elevated and is continuously upheld (Mohd Khairul, 2020).
Two objectives will be achieved through the implementation of this study, namely:

- To identify the heritage DNA of UiTM denizens who have a soul for UiTM.
- To analyze the gathered data by using a qualitative method.

This research is significant due to the strong connection between practicing good values at UiTM and forming the institution's DNA, which can contribute to empowering the university to excel. The results are expected to serve as a reference and guide for UiTM denizens, enhancing their morale and commitment to the organization.

2. Literature Review

For this research, several key terms are crucial for guiding the study, as they are interrelated. Among them are:

Deoxyribonucleic acid (DNA)

DNA is a fundamental component of life, containing biological instructions that define an individual's traits and personality (Harrow et al., 2019). This genetic information is transmitted from one generation to the next through reproductive processes (Lamm, 2012). A DNA molecule is structured as a double helix composed of two strands of nucleotides connected. Each nucleotide includes a nitrogenous base, a sugar (deoxyribose), and a phosphate group. The four nitrogenous bases—adenine (A), thymine (T), guanine (G), and cytosine (C)—form the genetic code for all DNA strands, regardless of their origin. Adenine pairs with thymine, while guanine pairs with cytosine. These base pairs connect at the core of the DNA helix. The backbone of each strand consists of deoxyribose and phosphate groups, with the phosphate group of one nucleotide binding to the carbon number three of the ribose in the next nucleotide. The helical structure of DNA is stabilized by hydrogen bonds between the base pairs (Rizzaq Aynur Nugroho, 2019).

Organizational DNA

Organizational DNA helps establish and maintain an organization’s identity (Groysberg et al., 2018), which encompasses its culture, values, and purpose. A strong, relevant, and rational organizational DNA influences the employees of the organization in their actions and strategic endeavors. The DNA of the organization is defined as the core value conveyed by the founder or shareholder to the organization and all employees to be socialized and internalized to ultimately form the corporate culture as expected by the founder or shareholder of the organization (Fahmi, 2012). DNA and corporate culture help differentiate the behavior in an organization and the behavior of employees through collective characteristics and values. Organizational DNA also means the underlying factors that define the organization's "personality" and help explain its performance. This is made possible as organizational DNA fosters a sense of solidarity and coalition among its employees (Korda & Rachmawati, 2022). Pehlivanoğlu & Köse (2020) and Groysberg et al. (2018) found that strategic initiatives that not only align well but also represent the organizational DNA would influence employees’ participation, motivation, and commitment. Research by PricewaterhouseCoopers (PwC) highlights that organizations often fail in implementation due to their focus on structural reorganization while overlooking key drivers of effectiveness, such as decision-making rights and information flow (PwC, 2014). Similarly, just as the human body maintains organ function despite periodic cellular changes, an organization's structure can remain functional even as its elements evolve. This "DNA network" is what differentiates living organisms and organizations.

In the context of Malaysian universities, leveraging organizational DNA engages their community, including academic staff, administration, and students. A well-defined DNA attracts academics, encourages students to further their studies, and fosters collaboration with external partners (Chan, Wong & Wok, 2017). UiTM, as a higher education institution, retains its core function despite changes in organizational structure and staffing. Therefore, the DNA of the organization represents its self-identity, guiding strategic decision-making, shaping the learning environment, cultivating innovation, and fostering collaboration both within the university and with external stakeholders (Korma et al., 2022). This self-identity sustains the structure and system of UiTM.

Variation

The term "variation" refers to the differences or diversity that make something distinguishable from another. In biology, these abnormalities arise from variations in the DNA network of individuals or populations, influenced by genetics, environment, and the interaction between the two (Vihinen, 2018). From an organizational perspective, such variation depends on the scope, purpose, and leadership that have shaped the organization over time. This is reflected in the organizational DNA, which represents the heritage and identity distinguishing one organization from another. UiTM, as part of the educational institution class, contributes to the diversity among such institutions through its distinctive identity. An organization can typically be identified through visible characteristics like its name or logo, and the heritage identity of an organization plays a crucial role in its uniqueness and overall appearance.

Strategic management and organizational culture

Over the past five years, scholars have increasingly underscored the symbiotic relationship between strategic management and organizational culture, showing how culture shapes strategic efficacy and innovation. For instance, Panda (2022) reveals that collaborative, advice-seeking, and error-management cultural traits significantly strengthen the formulation and conceptualization of strategic plans in nonprofit organizations Alwan (2023) further demonstrates that an organization's strategic cultural structure closely aligns with superior performance outcomes migrationletters.com In the business-to-business digital transformation domain, Orero-Blat et al. (2022) develop a compelling case that a “digital culture”—characterized by openness, agility, and data-centric decision-making—is a critical antecedent for both strategic digital transformation and big data analytics capabilities. Similarly, Wiese et al. (2024) find that developmental cultures notably boost the deployment of Industry 4.0 technologies, reinforcing the idea that culture underpins strategic technology implementation. Collectively, this recent literature highlights that strategic management both shapes and is shaped by organizational culture, establishing culture not merely as context but as a dynamic driver of strategic success.

3. Research Methodology

The methodology for the formation of the UiTM DNA framework model involves six phases, which are: Phase 1: Problem and Research Objective Identification, Phase 2: Data Collection, Phase 3: Data Analysis, Phase 4: Model Formation, and Phase 5: Model Formation Validation. However, this paper will only cover up to Phase 3, as some processes in the later phases are yet to be completed. The subsequent sections will describe the methodology of each completed phase in detail, providing insight into the progress of the study.

Phase 1: Problem and Research Objective Identification

A brainstorming session was conducted to establish a reference point for determining whether an organizational DNA model exists within UiTM. This process was crucial in avoiding duplication and redundancy, which could complicate the formulation of organizational strategy (Roetzel, 2019). Additionally, a literature review of previous research on organizational strategy and institutional DNA was carried out. The goal was to identify key characteristics or elements necessary for an organizational DNA framework. This review allowed for comparison with existing work process models, guidelines, and policies to see if any fit the concept of organizational DNA.

The investigation revealed that UiTM lacks cohesive organizational DNA. The existence of random decision-makers and policy executors, along with input from long-serving UiTM denizens, reinforced the problem definition. This validation confirmed that UiTM has yet to develop a clear organizational DNA model that can serve as a guiding reference for its denizens, ensuring the institution's values are upheld and emulated.

Phase 2: Data Collection

Clearly outlining ideas and inspiration helps facilitate a positive and productive work culture, which can be embraced by subordinates. A positive work culture embodies a strategic philosophy that endures even with changes in leadership or personnel. With this concept in mind, primary data was gathered through open-ended interviews with former UiTM Vice-Chancellors. The rationale behind this approach was their ability to:

- Provide leadership insight and aspirations for the institution.
- Reflect on their achievements based on the strategic plans implemented during their tenure.

- Share their perspectives on how the institution may have evolved or remained consistent since their departure, including governance, traits, and values.

In addition, documented publications were sought to embody the ideas and thoughts of UiTM's leadership, which are typically conveyed to the university's denizens. Speeches delivered by His Excellency Tun Dato' Seri Utama Dr. Haji Arshad Ayub and memoirs published by previous Vice Chancellors were identified as valuable resources for understanding UiTM's leadership philosophy and strategic direction.

Phase 3: Data Analysis
This study employed a qualitative data analysis methodology, which involves working with data, organizing it, breaking it down into manageable units, synthesizing it, and looking for patterns to identify important insights. According to Bogdan & Biklen (1982), qualitative data analysis is a systematic process for managing and displaying research findings clearly and understandably. Two key methods were used in this study: content analysis and word frequency analysis.

Content analysis was utilized to examine interview transcripts and secondary document sources. Data was organized into relevant categories and themes through an inferencing process (Creswell, 2007). Although several approaches to qualitative content analysis exist (Hsieh & Shannon, 2005), this study employed the deductive content analysis method. Deductive content analysis (Kyngäs & Kaakinen, 2019) uses data codification based on prior knowledge or assumptions. In this case, the themes for analysis were predetermined from brainstorming sessions and information gathered in Phase 1. Keywords and phrases were extracted from the interview transcripts and secondary documents, then codified based on the identified values, which reflect ways of thinking, attitudes, and aspirations.

Word frequency analysis was used as a complementary method to provide a frequency distribution of words. This involved processing both online and local content to identify how often certain words appeared. Cloud graphics were generated to visually analyze the most frequently used words (Dicle, Mehmet F., and Dicle, Betul, 2018). Word frequency analysis offers a simple and visually attractive method for interpreting textual data and is often used to provide an overview by highlighting the most frequent terms in each text.

4. Results

The following section discusses the results for each of the phases by the research methodology described earlier.

Phase 1: Problem and Research Objective Identification
The first task in this phase was to identify the research problem and objective. Through a comprehensive literature review and random interviews with top management, it was confirmed that UiTM does not yet have a formal model representing the DNA of its denizens. This model could serve as a reference for the university's core values, strategic direction, and organizational identity. Such a model would help consolidate the values and practices upheld by UiTM over the years and provide a foundation for institutional growth and coherence.

Phase 2: Data Collection
For this phase, data were collected primarily through interviews with two former UiTM Vice Chancellors: YB Senator Prof. Emeritus Tan Sri Dato' Seri Dr. Ibrahim Abu Shah and Prof. Emeritus Dato' Dr. Hassan bin Said. These interviews provided valuable leadership insights and reflections on the institutional strategies implemented during their tenures. Additionally, secondary data was obtained from documented speeches by His Excellency Tun Dato' Seri Utama Dr. Haji Arshad Ayub, preserved in the UiTM Archive Collection. Memoirs written by previous UiTM Vice Chancellors were also reviewed, offering an in-depth understanding of their thought processes, emotions, aspirations, and behaviors towards the success of the institution. These memoirs provided a rich narrative of UiTM's historical and organizational journey. The selected memoirs are:

- *Mencorak Destini by Professor Emeritus Tan Sri Dato' Sri Ir. Dr. Sahol Hamid bin Abu Bakar*
- *Falsafah Mim: Membina Minda Melayu by Professor Emeritus Tan Sri Dr Ibrahim Abu Shah*
- *Ibrahim Shah: Menyingkap pengurusan universiti by Professor Emeritus Tan Sri Dr Ibrahim Abu Shah*
- *Syahadan: Menyingkap 5 nilai-nilai murni untuk sukses by Professor Emeritus Datuk Ir. Dr. Mohd Azraai*

Kassim

Phase 3: Data Analysis

In this phase, the research team began identifying components from the data collected in Phase 2. Components were further developed through brainstorming sessions and analysis of UiTM archival materials. The concept of organizational DNA, which centers around thinking, attitude, and aspiration, served as a guiding hypothesis. During the coding process, subcategories began to emerge, expanding upon the initial hypothesis.

Coding revealed that the attitude construct encompasses various themes related to emotions, spirit, and behavior. This led to the formulation of the acronym PESAT, which represents the following components:

- Pemikiran (Thinking)
- Emosi (Emotions)
- Semangat (Spirit)
- Aspirasi (Aspirations)
- Tingkah laku (Behavior)

The PESAT model encapsulates the internal and external values practiced by the university. It is hypothesized that these constructs reflect the unique identity of UiTM, setting it apart from other universities.

To further validate the PESAT hypothesis, the research employed a concept mapping method using affinity diagramming. This method organizes language data (e.g., quotes, ideas, and opinions) into groups based on their relationship and structure (Hartson & Pyla, 2012; Lucero, 2015).

To build a relationship diagram, the following steps were undertaken:

PESAT Definition Draft

An initial definition of the PESAT components was drafted to enable researchers to map the collected language data objectively. This definition is considered provisional, open to refinement as the content analysis progresses. At this stage, the PESAT concept is still a hypothesis requiring further validation. The initial draft of PESAT's definition is presented in Table 1.

Table 1: PESAT Definition Draft

Components	Definition Draft
P = *Pemikiran* (Thinking)	Language data shows the form of thinking that must exist in UiTM denizens. It concerns denizens' traits in framing ideas, solving problems, and approaches undertaken in bettering oneself and other stakeholders.
E = Emosi (Emotion)	Language data that show feelings guided by conscience that have not yet been nurtured, but are, on average, present in UiTM residents. It also looks into feelings that are steered by religious beliefs and philosophies.
S = Semangat (Spirits)	Language data shows the feeling or pneuma in the form of positive will and determination. It should reflect self-pneuma and the reflection of spirit to surrounding stakeholders, to set oneself apart.
A = Aspirasi (Aspiration)	Language data reflects the ambition and expectations of UiTM leaders towards UiTM denizens. It also looks into the ideas that UiTM denizens would have of themselves within the community and nation.
T = Tingkah laku (Behavior)	Language data shows the internal and external attitude of UiTM denizens. It shows how one should conduct oneself and the surrounding community.

Referring to Schein's model (2010) divides organizational culture is divided into three levels, which are:

- Artifacts (visible structures/processes)
- Espoused Values (strategies, goals, philosophies),
- Basic Underlying Assumptions (unconscious beliefs, perceptions, thoughts).

In which the PESAT model - Pemikiran (Thinking), Emosi (Emotion), Semangat (Spirit), Aspirasi (Aspiration), Tingkah Laku (Behavior) are mapped closely to Schein's second and third levels. This can be shown where Pemikiran and Aspirasi reflect espoused values that guide UiTM members in how they conceptualize leadership

and personal development, whereas Emosi and Semangat likely align with basic underlying assumptions, such as how feelings and spiritual motivation are integrated into UiTM's identity. The PESAT model aligns with Schein's (2010) levels of organizational culture, particularly in expressing the university's espoused values and underlying assumptions that shape behavior and identity.

Other than Schein's model, Hofstede's Cultural Dimensions (2020), which consists of six dimensions, was also referred to in the PESAT modelling. The six dimensions of Hofstede's Cultural Model are as follows:

- Power Distance
- Individualism vs. Collectivism
- Uncertainty Avoidance
- Masculinity vs. Femininity
- Long-Term Orientation
- Indulgence vs. Restraint

The emphasis on Emosi guided by conscience and religious beliefs (Emotion) and Semangat (spirit of positive will and determination) reflects high Collectivism and high Power Distance, both of which are commonly found in Malaysian organizational culture. The aspiration to "better oneself and other stakeholders" (Pemikiran) and "ideas that UiTM denizens would have of oneself within the community and nation" (Aspirasi) align with **Long-**Term Orientation and Masculinity (achievement-driven). The cultural attributes defined in PESAT, such as hierarchical leadership, collective identity, and religiously influenced emotional regulation, are consistent with Hofstede's dimensions, particularly high-power distance, collectivism, and long-term orientation (Hofstede Insights, 2020).

Note Writing

In the note-writing stage, quotations, ideas, opinions, and various language sentences from the interview transcripts and texts were recorded on post-it notes, each representing an affinity note. This process, guided by the draft definition of PESAT (as detailed in Table 1), produced approximately 250 related notes. To ensure an unbiased collection of data, no color schemes were used to categorize the notes, which helped avoid undue influence over the language data. The primary focus at this stage was to accurately transfer the language data from the transcripts into Relationship Notes, without imposing any preliminary categorization or analysis.

Note Grouping

For the note grouping phase, a dedicated room at the Institute of Malay Thought and Leadership (IMPAK), UiTM, was utilized. This room was selected for its spaciousness, ease of movement, and wall space suitable for hanging groups of notes based on the PESAT components. Reserved for one week to avoid disturbances, the room facilitated an effective organization of the data, in line with the recommendations by Holtzblatt, Wendell, and Wood (2004), which emphasize the importance of a conducive environment for constructing relationship diagrams.

In this phase, Mahjong paper, each representing one PESAT component—Thinking (Pemikiran), Emotion (Emosi), Spirit (Semangat), Aspiration (Aspirasi), and Behavior (Tingkahlaku)—was labeled accordingly. A total of five Mahjong papers were used. The Relationship Notes from the previous step were attached to the respective Mahjong papers based on the PESAT component they represented. This method ensured that notes were categorized according to the draft definitions, minimizing bias and maintaining consistency in the classification process.

Group Data Reflection

In the Group Data Reflection phase, four research members were assigned to update and refine the Relationship Notes that had been attached to the Mahjong papers. Each researcher focused on a specific PESAT component, such as Thinking (Pemikiran) or Emotion (Emosi), due to the complexity and overlapping nature of the data. This division of labor allowed for a detailed and focused analysis of each component.

After the initial attachment of Relationship Notes, the team identified Derived Clusters by grouping language data that carried synonyms or similar contextual meanings. This process highlighted the definitional nuances

within each PESAT component, enriching the understanding of the underlying spirit or value it represents. Related Affinity Notes were grouped and circled with a marker pen to delineate the Derived Clusters, providing a clearer view of the data's thematic structure.

Documentation

In the Documentation phase, the research team captured photographs of the Relationship Diagram Construction session results. This step ensured that the results could be referenced and revisited in future brainstorming sessions, as the materials used were not permanent and could deteriorate over time. Overall, the process of constructing the Relationship Diagram through inductive reasoning confirmed the existence of PESAT components, validating the research hypothesis. Additionally, it was discovered that the context of the language data involved aspects of "function, social construct, post-modernism, and psychodynamics," which are key criteria for understanding an organization's identity (Mujib, 2017).

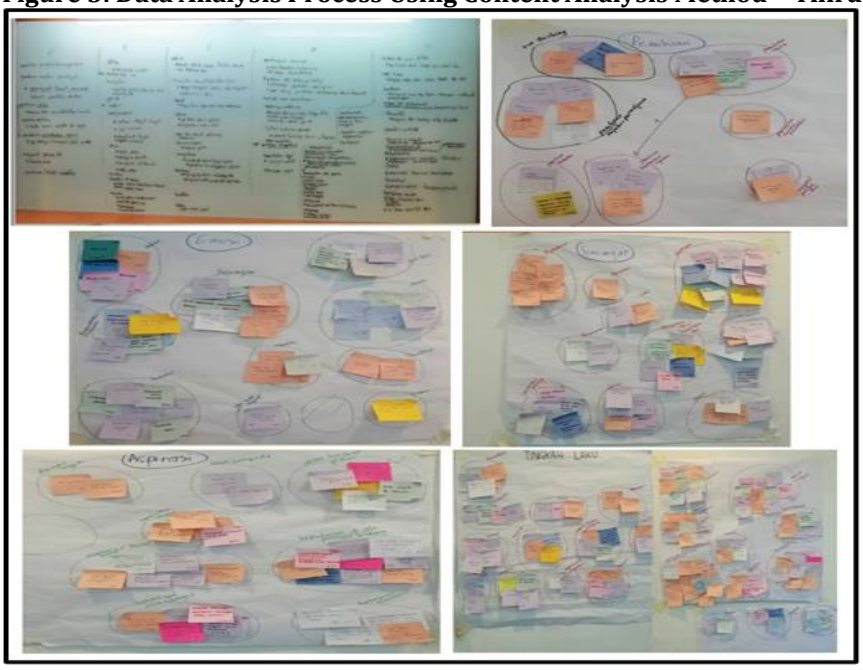
Figure 1: Data Analysis Process Using Content Analysis Method – First Stage



Figure 2: Data Analysis Process Using Content Analysis Method – Second Stage



Figure 3: Data Analysis Process Using Content Analysis Method – Third Stage



To analyze the discourse and content of interview transcripts, scripts, and relevant scientific literature, the study utilized the language corpus method with a Word Cloud Generator application. This method visualizes the frequency of words within a text, highlighting key terms. The results of this analysis revealed three lexicons with the highest frequency values: "Bangsa," "Ilmu," and "Berjaya." These terms were identified as central to UiTM's DNA structure. Despite the high frequency of the term "Malay," it was excluded from the final list due to UiTM's diverse composition, which includes various Bumiputera ethnicities.

Figure 4: Data Analysis Process to Form the Backbone of UiTM DNA Structure through the Word Frequency Corpus method using the Word Cloud Generator application

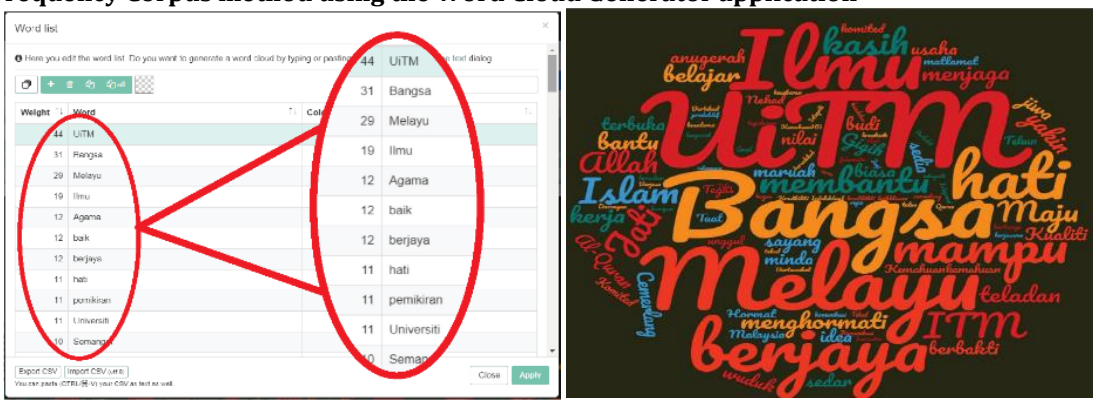


Figure 5: Formation of the "PESAT" DNA Model for Universiti Teknologi MARA based on the analysis that has been done by referring to the original structure of the DNA from the biological perspective.

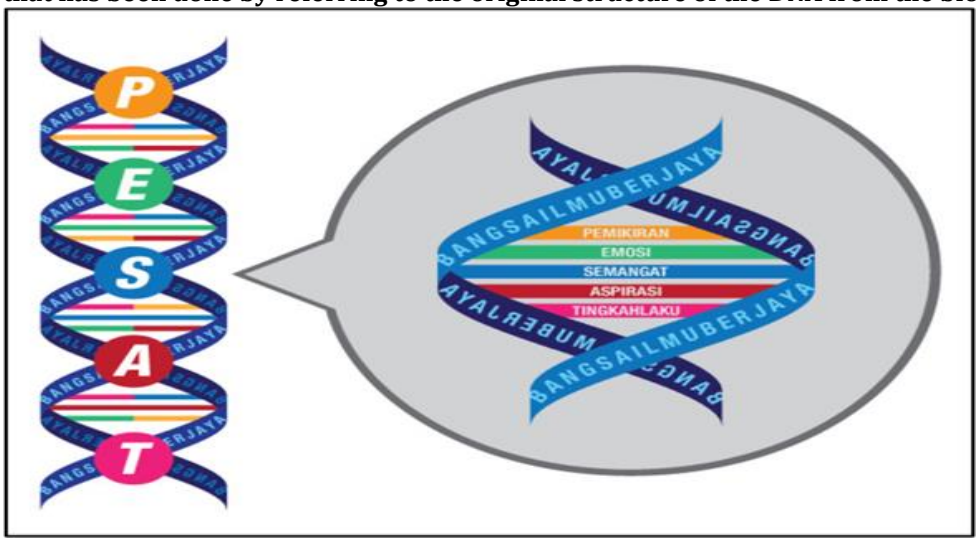
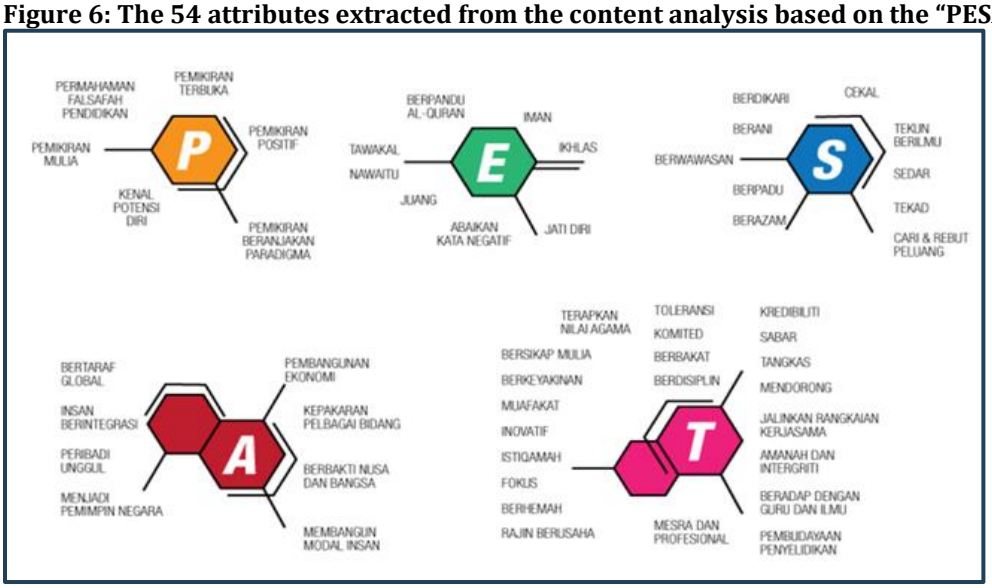


Figure 6: The 54 attributes extracted from the content analysis based on the "PESAT" DNA model



5. Conclusion

In conclusion, this study significantly contributes to the identity profiling and sustainability of UiTM denizens by developing a model that encapsulates the essential elements of UiTM's organizational DNA. The research underscores the importance of preserving and manifesting the core values of the organization, ensuring they remain relevant for future generations. The study highlights that organizational DNA, defined by elements such as thinking, emotion, spirit, aspirations, and behavior, is crucial for fostering strong values, exceptional behavior, and academic excellence. The identification and establishment of this DNA by organizational management can enhance a sense of belonging among denizens and provide a clear pathway for contributing to the organization's success. Ultimately, the results of this study offer a valuable reference for top management, particularly in the formation of human capital and the implementation of strategic planning.

Acknowledgment: The highest appreciation is extended to the former Vice Chancellor of UiTM for their invaluable ideas, insights, and contributions to the implementation of this study. Gratitude is also expressed to the Research Management Institute (RMI), UiTM, for their support through the MyRA LESTARI grant (File No.: 600-RMC/MYRA 5/3/LESTARI (131/2020)). Additionally, thanks are due to the dedicated team of researchers from the Institute of Malay Thought and Leadership (IMPAK), the Academy of Language Studies, the Faculty of Computer & Mathematical Sciences, and the Faculty of Applied Science of Universiti Teknologi MARA, who worked tirelessly to ensure the successful completion of this study.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Policyholders' Knowledge in Claiming Life Insurance: A Conceptual Paper

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Abstract: Life insurance is one of the most important insurance products that is available in the market, where its vital function is to provide financial security and protection to the beneficiaries upon the demise of the policyholder. The effectiveness of insurance operations lies in the efficiency with which claims are served to policyholders. Despite its importance, many individuals still lack knowledge of how to claim their life insurance policy. This lack of knowledge poses a threat to both beneficiaries and the nation, particularly given the low ownership of life insurance among individuals in Malaysia. This research investigates the impact of education, claims processes, and intermediary services on claims knowledge within the life insurance sector, utilizing the Resource-Based View as a theoretical framework. The study examines the role of educational initiatives, the claim process and effective intermediary services to enhance policyholders' knowledge of their rights and responsibilities. Hence, it will lead to more informed decisions and fewer disputes between the policyholders and insurance operators. In the long run, the life insurance companies may boost their competitive advantages and remain sustainable in a dynamic insurance market. Future research should focus more on longitudinal studies to expand the discussions on the factors affecting the policyholders' claim knowledge

Keywords: *Life insurance, Knowledge, Claims, Intermediaries*

1. Introduction and Background

The primary goal of life insurance is to provide people with financial stability. By providing beneficiaries with a financial safety net, life insurance policies are intended to lessen the financial strain caused by the untimely loss of a breadwinner. The importance of life insurance can be captured in several key benefits, including risk transfer, long-term savings, and peace of mind, which contribute to its relevance in personal financial planning (Edward et al., 2024; Nga, 2023). One important advantage of life insurance is its ability to protect against monetary loss in the event of an untimely death. By transferring the risk of loss from their dependents to the insurer, this feature enables individuals to protect the financial stability of their families. According to a study, life insurance is not just a protective financial instrument; it also encourages savings and investments, leading to long-term financial discipline among policyholders (Kiwanuka & Sibindi, 2023). Furthermore, in contexts where consumers exhibit lower financial literacy, life insurance policies can enhance understanding of financial management, positively impacting policy retention (Christopher, 2024).

An essential component of life insurance operations is policyholders' understanding of claims processes and entitlements. Studies have shown that policyholders' knowledge regarding the procedures, documents, and requirements for submitting and receiving claims has an impact on customer satisfaction, trust, and the overall perceived value of life insurance products (Lawaju et al., 2024; Yusuf & Ajemunigbohun, 2015). The findings align with the primary objective of insurance operations, which is to ensure transparency in transactions and to provide comprehensive protection for policyholders (Edward et al., 2024).

This conceptual paper explores the determinants of claims knowledge among life insurance policyholders, with an emphasis on the impact of education, the transparency of the claims procedure, and the quality of services offered by intermediaries. As life insurance faces the changing dynamics of claims settlement in life insurance, a rise in policy numbers results in an increased volume of claims, highlighting the need for efficient and transparent claim settlement processes (Kaur & Singh, 2023). On the other hand, Ajemunigbohun, Oluwaleye, et al. (2022) argued that perceptions of the claims handling process are central in defining the relationship between insurers and policyholders, stating that inefficient processes can damage overall customer

experiences.

In the context of Malaysia, the understanding of claims knowledge within the life insurance sector presents significant challenges and opportunities. Life insurance serves as a crucial component of the financial ecosystem, significantly contributing to economic growth and family financial security. (Edward et al., 2024). A lack of public knowledge and comprehension of life insurance claims procedures is a significant issue for the industry, which can lead to unfavourable consequences, including underinsurance and claims disputes. This knowledge gap is evident in Malaysia and other regions, emphasising the necessity for insurance operators to enhance communication and education efforts. Further, Lim et al. (2020) have shown that issues and dissatisfaction with claims arise from Malaysians' ignorance of policies and claims. When choosing their life insurance plans, an inadequate understanding can potentially have negative consequences. It has been supported by Rajbansh (2024), who indicated that financial literacy helps to a higher understanding of insurance products and their benefits.

The increasing demand for life insurance points to a developing industry, yet empirical data show that the claims process can be complicated. For instance, the dispute rates for medical claims have been observed to increase due to policyholders' non-disclosure and misrepresentation of medical history. (Isa & Ismail, 2022). A greater grasp of claims knowledge may lessen the number and intensity of disputes in the claims process. Furthermore, studies indicate that young adults, specifically Generation Y, exhibit a notable lack of awareness regarding the importance of life insurance, even as they represent a significant segment of the market (Chung, 2020; Low et al., 2021). As Malaysia is known as a multiracial country, the distinct demographics' perception is shaped by societal norms and influences, which can affect life insurance purchasing decisions (Arifin et al., 2022; Musa et al., 2022).

Moreover, the regulatory framework within Malaysia aims to increase the penetration rate of life insurance, targeting a goal of 75% by the end of 2020 (Lim et al., 2020). However, in 2024, Bank Negara of Malaysia reported that the life insurance penetration level reached 3.3% (Business Times, 2024). Despite this, the accomplishment of this goal is contingent on increasing knowledge distribution regarding the benefits of life insurance and the mechanics of claims processing. Consumer perceptions of insurance firms also play an important part in this dynamic. It has been reported that a consumer's understanding of insurance claims significantly influences their purchasing decisions (Low et al., 2021; Salleh et al., 2018). Hence, enhancing public knowledge regarding claims can ultimately foster a further trusting relationship between insurers and consumers (Zainal et al., 2024). Research on policyholders' claim knowledge is scarce in developing nations such as Malaysia, despite ongoing attempts to increase policyholder education in recent years.

To address the gap, this research employs a resource-based view to examine how this framework will influence a policyholder's knowledge of claims. The shift in underlying idea is credible, and it is used throughout the study to assess techniques for increasing claims knowledge among policyholders. The paper will commence with a comprehensive literature review, illustrating the significance of the previous studies from a life insurance perspective. The conceptual framework outlines the interrelation between education, the claims process, and the services provided by intermediaries about claims knowledge, highlighting its significance in expanding the theoretical and practical contributions.

2. Literature Review

The literature review section discusses the underlying theory for this paper is the Resource-Based View Theory (RBV). Then, the synthesis of the literature follows with variables proposed for the study, which are education, claim process and intermediaries. All of the variables are critically examined to develop hypotheses at the end of each variable's discussion.

Resource-Based View Theory (RBV): Jay Barney, in the early 1990s, initially articulated this theory, wherein it posits that the firm's long-term competitive edge comes from its rare, valuable, hard-to-copy and non-substitutable (Barney et al., 2001). This theory focuses on the internal capabilities of firms. It also stresses the importance of managing and leveraging these resources to enhance performance and strategic outcomes (Newbert, 2008).

From the extent of literature, research on RBV has expanded to various contexts, including insurance. RBV provides a framework to understand the role of a firm's knowledge, and including claim perspectives may contribute to increased effectiveness and customers' trust. Kweh et al. (2021) stated that customer satisfaction and loyalty may be built upon better customer service and claims processing, which is rooted in knowledgeable workers. Moreover, to sustain in this insurance market, a unique organisational resource linked with the claimant's knowledge ensures better financial indicators and a resilient competitive edge. The Resource-Based View (RBV) theory suggests that a long-term sustainability of a firm can be attained with the assistance of the firm's exclusive resources, which are rare, hard to imitate, and difficult for others to substitute. Hence, this theory is applicable within the scope of the life insurance market in Malaysia, where it relates to the concept of how claims management knowledge may contribute as an essential resource to improve the firm's effectiveness and retain its customers' loyalty.

Claims knowledge is regarded as a valuable intangible resource that influences customer purchasing behaviours in life insurance. Research indicates a strong relationship between consumers' awareness of life insurance benefits and life insurance purchase intention(Masud et al., 2021). To gain a competitive edge, life insurance companies should strive to build a knowledgeable workforce and a transparent claims culture. For instance, Organizations that invest in educating their employees about claims handling and customer service can build a reputation for reliability and trustworthiness (Piaralal et al., 2014). Hence, it aligns with RBV theory, which postulates that intangible resources, such as knowledgeable staff, can reinforce greater service delivery and customer satisfaction.

Moreover, the insurance industry is characterised by high levels of competition, leading firms to seek a competitive advantage. Claims knowledge not only strengthens customer relationships but also helps mitigate disputes arising from claims processing. Past study highlights that claim knowledge is vital, as misunderstandings on policy-related details may lead to increased claims disputes(Piaralal et al., 2014). In return, the companies that expand on their claim knowledge initiatives can manage their risks, resulting in enhanced customer loyalty and retention (Zainudin et al., 2018).

Integration of RBV with the life insurance market emphasises the importance of human assets as one of its strategic assets. Piaralal et al. (2016) noted the critical role of developing an insurance company's employees' knowledge, where it may cultivate a culture of service excellence, leading to superior results. By empowering customer service employees through training and rewards it may enhance their ability to provide support during the claims process. Therefore, it is essential in the insurance industry to be involved with enhanced knowledge to address the consistent frustration concerning the level of service provided and the transparency of claims processes.

In addition, the link between claims knowledge and organisational performance has implications for strategic decisions. RBV directs that firms must continually invest in developing their incomparable resources to maintain a competitive edge. Life insurance companies in Malaysia should enhance their knowledge management by prioritising claims education that is imparted through their training programs and consumer education efforts(Mihardjo et al., 2020). Firms that excel in this dimension are ahead of their competitors in terms of reduced claim disputes and transaction costs, as well as improved market positioning.

Education: Education plays an essential role for the policyholders as it provides insurance-related information, such as insurance policies' coverage, claim submission, and their legal rights. The knowledge gained from the education on insurance is crucial as it affects the process of a successful claim. It has been found that people with more advanced educational qualifications tend to understand more sophisticated insurance products and their use (Mardinawaty et al., 2022). Hence, the increase in the policyholder's understanding improves their skills, especially in claim processes, communication and dispute matters. As reflected in the Resource-Based View (RBV) theory, which stresses the maximization of intangible assets is needed to achieve the competitive advantage (Lockett et al., 2009). Further, there is a need for insurance companies to boost their education, especially on claims and product knowledge, which aligns with the goals of increasing their customer satisfaction. The benefits of it are that it directly reduces the claim process issues and significantly improves their claim management. A well-informed customer base enhances the culture of trust and transparency, which is critical in the insurance industry, particularly in maximizing the efficiency of the claims process (Liu et al.,

2021).

There are past research studies to explain that education has a significant relationship in affecting the purchase of insurance products, signifying the role of education in enhancing the individual's understanding of insurance coverage (Kimani et al., 2014). Similarly, a study by Mamun et al. (2021) and Balqis-Ali et al. (2021) reported that educational attainment significantly influences health insurance purchase intentions among working adults in Malaysia. This reflects that educational attainment fosters a greater comprehension of insurance benefits, which is critical for effective claims management.

Studies also show a link between financial literacy and education, hence leads to enhanced knowledge on various financial products, including insurance (Santini et al., 2019). Al-Bahrani et al. (2018) found that individuals may display increased insurance literacy from their education level. Thus, it proved that the ability to understand policy specifications and the claims process correlates with the educational background of the policyholder. Other than that, this remark is that with the educational attainment of the policyholders, they can comprehend important elements in an insurance policy. Hence, the study proposed the following hypothesis;
H1: There is a positive relationship between the education of the policyholder and the knowledge of claims in life insurance policies.

Claim Process: In the life insurance business, the claims process is one of the most important considerations between insurance companies and the policyholders in the event of unforeseen circumstances. Understanding a claim involves knowing the steps that need to be taken for a claim to be successful. The RBV posits that companies can get ahead of their competitors by using their distinct skills to maximize their value. In this case, educating policyholders about claims becomes a strategic advantage that supports claims promptly and effectively by managing the claims process well (Hankede & Mwelwa, 2024; Ntwali et al., 2020)

The complexity of insurance products and processes can lead to misinterpretations and confusion, often resulting in claims being delayed (Kadyan et al., 2022). A study by Ajemunigbohun, Olowokudejo, et al. (2022) found that unfair treatment can be minimized by altering attitudes and with a clear claim process. However, Kadyan et al. (2022) stated that policy concerns can be resolved by having clear guidelines and communication. Eventually, a clear claim process brings benefits as it may mitigate misunderstandings and boost customer satisfaction(Lawaju et al., 2024).

As fintech and Insurtech have emerged in recent years, the insurance industry in Malaysia has shifted to a customer-centric centric. Zainal et al. (2024) and Mamun et al. (2021) in recent studies have concluded that information clarity and efficient claim process are key components in engaging the trust and loyalty among the policyholders(Masud et al., 2021). Hence, it is hypothesized that the following;
H2: There is a positive relationship between the claim process and the policyholders' knowledge of life insurance.

Intermediaries: The Insurance industry demands various parties to rely on in transacting the process between policyholders and insurance companies. Hence, it depends on intermediaries like agents and brokers to play a key role in expediting more efficient communication and the claim process. However, this cannot be done without the policyholder's knowledge in claiming their policies, which signifies the crucial interdependence between the intermediaries and the policyholders. The idea can be expanded through the lens of the Resource-Based View(RBV) theory, which focuses on the link between unique resources and capabilities within the organization. Intermediaries' expertise in their specialized area and skills acts as a treasured resources that strengthen the insurance firms' abilities to cope with claims knowledge among the policyholders(Salleh et al., 2018; Zainal et al., 2024).

Recent studies have discussed the relationship between the experience of intermediaries during the claim process. Praja (2023) found that strong claim procedures from the intermediaries have influenced the effective claim management of the insurance companies. It justifies the concept that strong education on insurance possessed by the policyholder is from knowledgeable intermediaries. Eriksen and Vet (2020) added that intermediaries' support is vital, especially in handling the uncertain things that involve emotional and psychological factors during the claim process. During the hostile events that happen to the policyholder, such

as a disaster, knowledgeable intermediaries may give support to start compiling the evidence for the claim process. Thus, it shows that the multi-faceted role of intermediaries is not focusing on operational aspects only, but also taking care of the policyholders' emotional well-being.(Eriksen & Vet, 2020).

As in the Malaysian context, the policyholders' experience with intermediaries has a significant influence on their knowledge and understanding of the claim process. Current studies show that intermediaries like agents and brokers are playing a key role in closing the knowledge gap between the policyholders and insurance companies. Zainal et al. (2024) indicate that the public's perception of insurance companies is significantly influenced by knowledge, suggesting that intermediaries equipped with comprehensive knowledge can enhance policyholder confidence, ultimately impacting their success in navigating claims processes. Moreover, findings by Yusof and Abd Razak (2018) stress the importance of trust in intermediaries for a positive claims experience, stating that policyholders' trust is essential for an effective claims process. It aligns with the notion that knowledgeable intermediaries can help instill confidence in policyholders (Yusof & Abd Razak, 2018; Zainal et al., 2024).

It can be deduced from the past literature that the experiences with intermediaries are crucial for determining policyholder claim knowledge in the insurance landscape. The well-informed intermediaries can enhance policyholder awareness about claims processes, thereby nurturing trust and leading to a more efficient claims experience. The resonant relationship between insurance companies and policyholders is paramount in enlightening the claim practices in Malaysia. Hence, our next hypothesis is being developed by justifications from the past research as below;
H3: There is a positive relationship between intermediaries' experiences and the policyholders' knowledge of claims in life insurance policies.

3. Research Methodology

This paper adopts a conceptual approach to investigate the impact of education, claims processes, and intermediary services on claims knowledge within the life insurance sector. As a conceptual paper, the methodology focuses on a comprehensive review of existing literature on insurance claims, policyholder education, claims process, and the role of intermediaries. This review will use academic journals and pertinent materials to synthesise existing information and identify gaps. A conceptual framework will be created based on the literature review to demonstrate the relationships between key variables. This conceptual framework will serve as a roadmap for the analysis and interpretation of the findings. Finally, this paper will employ logical reasoning and critical analysis to explore the relationships proposed in the conceptual framework. It entails investigating how transparent claims processes, effective education, and skilled intermediaries are thought to improve policyholders' claims knowledge.

4. Managerial Implications and Recommendations

The managerial contributions of this conceptual paper lie in its potential to guide life insurance companies in several key areas. Firstly, it tackles the critical importance of open, easy-to-understand, and accessible claims processes in addressing policyholder satisfaction and trust directly. This article seeks to nudge managers towards prioritising process improvement initiatives, to simplify and make claims processes easier to understand for policyholders. Such a focus aligns with the insurance industry's rising need to meet client requirements and expectations. Insurance companies can identify the internal elements that cause claim payment delays and devise better methods to address these difficulties (Hankede & Mwelwa, 2024).

Secondly, the paper recommends investing in comprehensive education initiatives that help policyholders understand their insurance coverage and rights. Recognising the importance of an educated customer base in reducing disputes and creating long-term relationships, managers may use the insights presented in this study to create tailored insurance training campaigns for their workers and policyholders. In addition to improving customer happiness, this strategy boosts insurers' operational effectiveness since policyholders will understand their rights and duties better and workers will be more equipped to handle consumer complaints and offer fast answers.

Finally, the paper underscores the strategic importance of intermediary services in facilitating effective communication and support for policyholders. By acknowledging the role of agents and brokers in guiding customers through the insurance landscape, managers can optimize their intermediary networks to deliver personalized and value-added services. It is relevant, considering the shift towards tailor-made solutions and consulting services in the insurance sector. (Masud et al., 2021). Finally, this paper is a great resource for managers looking to improve claims expertise, strengthen client connections, and achieve long-term success in the life insurance market.

5. Conclusion

In conclusion, this conceptual paper provides numerous critical findings with substantial consequences for life insurance businesses and the industry. First, it discusses the application of the Resource-Based View Theory (RBV) in the insurance industry. It also broadens existing knowledge by discussing relevant education, claim processes, and experiences with intermediaries that will increase the value of insurance companies, in line with the concept of RBV, which enables the optimization of intangible resources to remain competitive in the insurance industry.

Secondly, this paper offers a specific guideline for insurers aiming to enhance policyholder happiness and foster trust. It is achievable by emphasising the need for straightforward, user-friendly, and accessible claims processing processes. Furthermore, the research suggests that an overly complex claim handling process may lose credibility, resulting in consumer discontent and corporate losses. Thus, insurers must focus on establishing and sustaining uncomplicated claims systems that are user-friendly and graspable. Hence, this paper highlights the great input of education in providing policyholders with information to make informed decisions and understand the intricacy of insurance. By investing in comprehensive education programs, insurers can increase their customers' information and reduce the risk of miscommunication and conflicts. Besides that, customers are less likely to be dissatisfied when they feel knowledgeable and secure about their insurance coverage, which eventually improves consumer loyalty and trust and fosters a better connection between policyholders and insurers. This concurs with the Resource-Based View, which identifies skills and information as stimuli for competitive advantage.

This theoretical discussion also recognizes the strategic role of intermediary services in bringing insurers and policyholders together. Intermediaries play a very crucial role in offering customised advice and service, most especially during the claims process. Thus, insurance companies must squeeze as much as they can out of their intermediaries and equip them with the tools they need to provide great customer service. By embracing such observations and prioritizing claims information management, life insurance firms can more effectively utilize competitive advantage, foster enduring customer relationships, and ensure long-term success in an increasingly dynamic market.

Future studies should empirically examine the linkages posited in this paper and investigate the long-term effects of these interventions on policyholder conduct and claims outcomes. Moreover, emphasis must be placed on the developing domain of Islamic insurance (takaful), concentrating on the management of claims services following Shariah principles.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Understanding Job Satisfaction in Malaysia's Banking Sector: The Role of Work Environment, Training and Compensation

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Abstract: This study examines the key factors that influence employee job satisfaction within the Malaysian commercial banking sector, focusing on the roles of the work environment, professional development opportunities, and compensation packages. Responding to critical gaps in the literature, such as the sector's high workload, limited autonomy, lack of recognition, and increasing staff turnover, this research aims to evaluate how these factors contribute to job satisfaction among banking employees. A quantitative survey targeting employees from various hierarchical levels in commercial banks was conducted, utilizing a structured questionnaire and a five-point Likert scale to explore the roles of work environment, professional development, and compensation in job satisfaction. Data were collected from 149 respondents using a simple random sampling method. The study employed multiple linear regression analysis using SPSS version 28 to determine the job satisfaction that the independent variables would predict based on the identified associations. The results reveal that the three factors which are work environment, training and development, and salary and benefits have a positive and significant impact on job satisfaction. The results emphasize the importance of organizational support systems to enhance employees' wellness and improve retention in the banking industry. The study provides practical implications for human resource policies to reduce dissatisfaction and encourage a more motivated and engaged workforce.

Keywords: *Job Satisfaction, Work Environment, Training, Compensation, Malaysia's Banking Sector*

1. Introduction and Background

In the contemporary landscape of commercial banking, job satisfaction has become a main component in shaping organizational success and employee retention. As banks strive to remain competitive amidst digital transformation and increasing customer expectations, the importance of understanding and nurturing the determinants of employee satisfaction becomes more conspicuous. Global and regional studies have consistently shown that employee dissatisfaction leads to high turnover, reduced productivity, and compromised service quality. In Malaysia, the banking sector has been particularly vulnerable to such challenges, with increasing demands, long working hours, and rigid hierarchical structures often contributing to disengagement among staff (Adhikari, 2021). Furthermore, the commercial banking sector is widely recognized for its intense workload and high-pressure environment, which frequently undermines job satisfaction and exacerbates attrition rates (Giorgi et al., 2019). Consequently, there is growing academic and managerial interest in exploring key determinants of job satisfaction within this sector. Notably, elements such as work environment, training and development, and salary and benefits have emerged as central constructs in both empirical and theoretical discourse on job satisfaction (Daniel et al., 2023; Dousin et al., 2020; Akhter et al., 2021).

Among these, the work environment occupies a significant role in influencing how employees perceive their jobs. A conducive and supportive workplace fosters positive interpersonal relations, encourages collaboration, and minimizes stress, which collectively elevate job satisfaction (Karsim et al., 2023; Zaydan et al., 2021). In the banking context, a healthy work environment that includes effective leadership, participative culture, and adequate physical resources is essential in promoting employee engagement and morale (Deomedes & Adam, 2021; Kirana et al., 2023). Multiple studies confirm that improvements in the organizational environment, such as enhancing communication channels, encouraging peer cooperation, and implementing work-life balance strategies, lead to higher levels of job satisfaction and organizational commitment (Ramachandaran et al., 2023;

Gupta et al., 2024). In Malaysia, such dynamics are increasingly relevant as banks face growing scrutiny over employee welfare and internal culture. Research has also pointed out the psychological ramifications of toxic environments, noting that stress and workplace bullying significantly reduce satisfaction and contribute to turnover (Wulandari et al., 2024; Tsai & Chang, 2022). Therefore, fostering a positive and inclusive work culture is indispensable to retaining talent and cultivating a committed workforce in the commercial banking sector.

Equally critical is the role of training and development in shaping job satisfaction. Ongoing professional development not only enhances employees' competencies but also increases their sense of value and belonging within the organization (Chandra et al., 2021; Al-Amin et al., 2023). In the Malaysian banking sector, where innovation and service quality are vital, equipping staff with up-to-date skills and knowledge through continuous learning initiatives is paramount. A culture of learning also enhances internal mobility, reduces skill stagnation, and mitigates the adverse effects of job monotony. In the highly regulated and competitive banking industry, such measures are not optional but necessary for sustaining a capable and satisfied workforce. Accordingly, training and development are no longer viewed solely as operational necessities but as strategic tools for retention and morale enhancement (Zhang & Dousin, 2024).

In tandem with the work environment and training, compensation and benefits constitute a foundational element influencing job satisfaction. Adequate and fair remuneration affirms employees' contributions and reinforces organizational trust, which are essential for job fulfillment (Ananda, 2023; Wajdi & Nafisa, 2023). Within the Malaysian banking context, competitive salary structures, performance-based incentives, and comprehensive benefits packages are increasingly seen as determinants of job contentment and loyalty (Nuraini et al., 2022; Kadir et al., 2022). Researchers have shown that both monetary and non-monetary rewards, including health insurance, recognition, and promotion opportunities, are significant predictors of job satisfaction and intention to stay (Zin et al., 2022; Al-Amin et al., 2023). Moreover, the role of salary and benefits extends beyond individual satisfaction to impact broader organizational metrics such as absenteeism, productivity, and customer satisfaction. In a labor market marked by high mobility and escalating expectations, particularly among younger banking professionals, inadequate salaries and benefits are often cited as a key driver for frequent job changes (Al-Suraihi et al., 2021). Thus, salary and benefits strategies must be continuously aligned with market benchmarks and employee expectations to foster satisfaction and reduce turnover.

Despite extensive research on job satisfaction in various sectors, the commercial banking industry in Malaysia remains underexplored in terms of how the triad of work environment, training and development, and salaries affects employee satisfaction. Existing studies predominantly treat these factors in isolation, lacking a holistic understanding of their combined effects and contextual variations. This gap is particularly concerning given the industry's current challenges, including technological disruption, regulatory reforms, and heightened competition, all of which place additional stress on employees. Therefore, an integrated examination of these three determinants within Malaysia's commercial banking landscape is necessary to inform targeted human resource strategies and policy reforms. By addressing this gap, the present study contributes to a more nuanced understanding of the drivers of job satisfaction in a critical sector of the national economy. Based on these concerns, this study aims to close the gap in previous studies by focusing on the impact of the work environment, training and development, and salary and benefits on employees' job satisfaction in the banking industry.

2. Literature Review

Job satisfaction has long been recognized as a fundamental construct in organizational behavior, serving as a critical predictor of employee performance, retention, and psychological well-being. In the commercial banking sector, where the pace of change is rapid and performance pressures are high, understanding the determinants of job satisfaction is particularly crucial. Scholars have identified various factors that influence job satisfaction, including leadership styles, job design, work-life balance, organizational culture, and compensation structures. However, three core variables consistently emerge across empirical literature as especially impactful: the work environment, training and development, and salary and benefits (Daniel et al., 2023; Al-Amin et al., 2023; Karsim et al., 2023). These factors are not only interrelated but also context-sensitive, requiring investigation

within specific industrial and national settings such as Malaysia's banking sector. The following sections review current findings related to each of these determinants.

Work Environment and Job Satisfaction

A supportive and well-structured work environment is widely regarded as a key determinant of job satisfaction, particularly in sectors that are hierarchical and target-driven, such as banking. Empirical studies reveal that the quality of the physical and psycho-social work environment influences employees' affective responses to their jobs (Karsim et al., 2023). Research by Deomedes and Adam (2021) affirms that features such as leadership quality, open communication, team cohesion, and ergonomic workspace design are positively correlated with job satisfaction in banking institutions. Additionally, Zaydan et al. (2021), Al Ayubi et al. (2021), and Kirana et al. (2023) highlight that employees who perceive their environment as inclusive and respectful are more likely to report higher levels of satisfaction, productivity, and lower turnover intentions.

Further reinforcing these findings, Ramachandaran et al. (2023) argue that initiatives promoting work-life balance and flexible scheduling significantly enhance employee satisfaction and engagement. Gupta et al. (2024) observed that the Malaysian banking sector benefits from policies that create psychologically safe environments, especially in managing stress and interpersonal dynamics. Conversely, toxic workplace practices such as bullying and exclusion have been shown to erode satisfaction and increase attrition (Wulandari et al., 2024; Tsai & Chang, 2022). Taken together, the literature emphasizes that both the tangible and intangible aspects of the work environment must be carefully managed to optimize satisfaction in banking settings.

Training and Development and Job Satisfaction

Training and development are crucial mechanisms through which organizations support employee growth, increase role competency, and signal commitment to workforce well-being. In the context of Malaysia's banking sector, several studies have confirmed the significant influence of training and development on job satisfaction (Chandra et al., 2021; Chowdhury & Uddin, 2022). Thapa (2024) notes that when employees are equipped with relevant skills and knowledge, their confidence and engagement improve, resulting in heightened job satisfaction. Lack of proper training may cause some employees to quit, which could cost the business money and resources (Abd Aziz et al., 2024). Therefore, structured training programs not only reduce performance anxiety but also align individual goals with organizational outcomes. Empirical findings suggest that access to structured training programs fosters employees' self-efficacy, career growth, and engagement, all of which positively correlate with job satisfaction (Thapa, 2024; Chowdhury & Uddin, 2022). Moreover, studies have highlighted that training serves as a mediator between organizational support and satisfaction, revealing that developmental opportunities amplify employees' motivation and commitment (Fadilah et al., 2023; Şeşen & Ertan, 2021).

In support of this, Al-Amin et al. (2023) emphasize that banks offering regular upskilling opportunities cultivate stronger organizational commitment among employees. Fadilah et al. (2023) found that effective training moderated by positive management support can improve employee morale and reduce turnover rates. Similarly, Şeşen and Ertan (2021) identified a mediating effect of reduced job stress in the relationship between perceived training adequacy and job satisfaction. Zhang and Dousin (2024) also argue that Training and Development interventions promote internal career progression, reducing dissatisfaction linked to stagnation or role ambiguity. These findings collectively highlight the strategic value of Training and development as more than a productivity tool; it is a central pillar of job satisfaction in modern banking institutions.

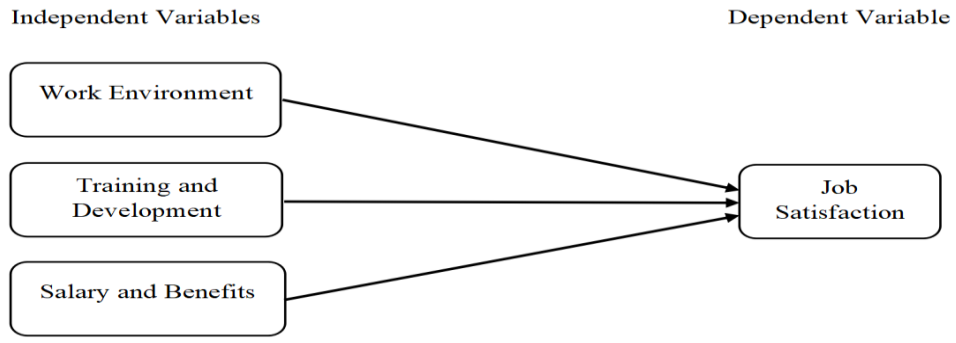
Salary and Benefits and Job Satisfaction

Among extrinsic motivators, salary and benefits stand out as consistently strong predictors of job satisfaction across industries. In the banking sector, where performance metrics and job demands are high, equitable compensation plays a pivotal role in affirming employees' value and fostering satisfaction (Ananda, 2023; Nuraini et al., 2022). In Malaysia, studies indicate that remuneration packages significantly influence employee morale and retention, particularly when aligned with market expectations and individual performance (Kadir et al., 2022).

Zin et al. (2022) found that both monetary rewards (such as base pay, bonuses) and non-monetary incentives (such as recognition, health benefits, and career development opportunities) contribute meaningfully to job satisfaction. Al-Amin et al. (2023) observed that recognition through fair salary policies enhances commitment and psychological ownership among employees. Wajdi and Nafisa (2023) further demonstrated that job satisfaction mediates the relationship between compensation and turnover intention, revealing its role as both a cause and consequence of effective remuneration strategies. Moreover, Al-Suraihi et al. (2021) emphasize that dissatisfaction with compensation is a significant factor driving job-hopping behavior in Malaysian banks, especially among younger employees. These findings underscore that salary and benefits are not just financial considerations but are deeply tied to perceptions of fairness, value, and career viability.

The literature affirms that work environment, training and development, and salary and benefits are critical determinants of job satisfaction within the commercial banking sector. While each factor independently influences employee attitudes and behaviors, the interplay among them suggests that an integrated approach is necessary for sustainable workforce satisfaction. In the Malaysian context, where banking institutions face both global pressures and localized challenges, understanding these factors is particularly urgent. Despite extensive empirical support for their importance, existing research often treats these variables in isolation. Thus, a comprehensive investigation of their combined effects is necessary to inform evidence and enhance employee outcomes in Malaysia's banking industry.

Research framework



The hypothesis for this study is as follows:
H1: The work environment has a direct and significant impact on job satisfaction.
H2: Training and development have a direct and significant impact on job satisfaction.
H3: Salary and benefits have a direct and significant impact on job satisfaction.

3. Research Methodology

Research Design
This study employed a quantitative research design using a survey methodology to investigate the relationships between work environment, training and development, salary and benefits, and job satisfaction among employees in the Malaysian commercial banking sector.

Population and Sampling Strategy
The population comprised employees working in commercial banks located in Tawau, Sabah, Malaysia. These included front-line staff, clerical personnel, supervisors, and middle management. A probability sampling technique was employed, specifically simple random sampling, to ensure that each member of the population had an equal chance of selection, thereby minimizing selection bias and enhancing the generalizability of findings. The sampling frame was derived from a publicly available directory of bank employees, obtained with permission from participating institutions. A total of 149 employees working in commercial banks in Tawau, Sabah, Malaysia, were involved in this study.

Instrument

This research used a self-administered questionnaire as its main instrument. Brace (2018) asserts that questionnaires are a traditional research methodology, particularly effective for collecting data on attitudes and behaviors. This study categorizes the questionnaire content into distinct sections. Each segment is categorized as follows:

Table 1: List of Instruments

Section	Number of Items (Questions)
Part A: Demographic Profile	5
Part B: Dependent Variable (Job Satisfaction)	5
Part C: Independent Variable (Working Environment)	5
Part D: Independent Variable (Training and Development)	5
Part E: Independent Variable (Salary and Benefits)	5

The questionnaire consisted of 25 questions. In Sections B to E, each item was measured using a five-point Likert scale (1 =Strongly Disagree and 5 = Strongly Agree). Job satisfaction was measured using items adapted from Tsounis and Sarafis (2018). The work environment was examined using items adapted from Bojadjiev et al. (2015) and Shad (2008). Training and development were assessed using items adapted from Spector (1985) and Shad (2018). Items adapted from Heneman & Schwab (1985) and Spector (1985) were used to analyze salary and benefits.

Data Collection Procedures

Data were collected using a structured questionnaire. The finalized questionnaire was administered via Google Forms and distributed through official HR channels of participating banks. The anonymity and confidentiality of respondents were assured.

Data Analysis Techniques

The information gathered was coded and analyzed with IBM SPSS Statistics Version 28. Before proceeding with the primary analysis, it was crucial to assess the reliability of the measurement scales used in the study. Reliability analysis is essential to ensure that the instruments measuring key constructs such as work environment, training and development, salary and benefits, and job satisfaction consistently produce stable and consistent results across different samples and settings. This was assessed using Cronbach's Alpha, which is a measure of internal consistency. Multiple Linear Regression Analysis was employed to assess the effects of the work environment, training and development, and salary and benefits on the dependent variable, job satisfaction. This method was chosen because it allows for the examination of multiple predictors simultaneously, enabling an understanding of how each independent variable influences job satisfaction while controlling for the effects of other variables.

4. Results and Discussion

Reliability Analysis

The results from the reliability analysis have revealed that all four scales used in this study demonstrate satisfactory internal consistency. Specifically, job satisfaction and salary, and benefits show excellent reliability (Cronbach's Alpha > 0.9), while work environment and training and development have good reliability (Cronbach's Alpha > 0.8). These high reliability values provide strong support for the use of these scales in measuring the constructs of interest.

Table 2: Reliability Analysis

Variable	No. of Items	Cronbach's Alpha	Results
Job satisfaction	5	0.947	Excellent
Work environment	5	0.880	Good
Training and development	5	0.879	Good
Salary and benefits	5	0.901	Excellent

Regression Analysis

The results of this study indicate that factors such as work environment, training and development, salary and benefits are crucial in determining employee job satisfaction in the Malaysian banking sector. Table 3 shows a positive relationship between the three independent variables and job satisfaction. This aligns with the understanding that job satisfaction significantly influences the operational excellence of the banking sector, ultimately impacting customer satisfaction (Hossan & Hasan, 2021). Therefore, H1, H2 and H3 are accepted.

The model explained a substantial portion of the variance in job satisfaction ($R^2 = 0.831$). Job satisfaction has the largest impact on the independent variable ($\beta = 0.387$, $p < 0.001$), followed by salary and benefits ($\beta = 0.303$, $p < 0.001$), and training and development ($\beta = 0.288$, $p < 0.001$). These results indicated that the main factors contributing to employee satisfaction in the Malaysian banking industry are a positive work environment, competitive compensation, and opportunities for professional advancement. This result aligns with previous research indicating that a conducive work environment enhances employee well-being and productivity (Ng et al., 2024). Thus, strong relationships with colleagues, supportive management and collaborative opportunities play an important role in fostering a positive work environment, which in turn is likely to lead to higher job satisfaction.

The findings also show that salary and benefits contribute significantly to job satisfaction ($\beta = 0.303$), suggesting that fair compensation is a key motivator for employees in the banking sector. While money may not be the only factor driving job satisfaction, it is undoubtedly an important one, as it provides employees with financial security and recognition for their contributions. Research also indicates that remuneration, along with job security and promotion opportunities, positively correlates with job satisfaction (Bhardwaj et al., 2021).

The results additionally show that training and development also play a significant role ($\beta = 0.288$), which indicates that investing in employee growth and skill enhancement is crucial. Employees who receive adequate training and development opportunities are more likely to feel valued and competent, leading to increased job satisfaction. This finding is particularly relevant in the rapidly evolving banking sector, where employees need to continuously update their skills to adapt to new technologies and regulations.

5. Conclusion and Recommendations

Table 3: Hypothesis Result

Independent Variable	Dependent Variable	R^2	F Value	Standardized Coefficient Beta	t	Sig.
Work Environment	Job Satisfaction	0.831	237.576	0.387	5.621	0.00
Training and Development				0.288	4.971	0.00
Salary and Benefits				0.303	4.641	0.00

The key determinants of job satisfaction among employees in the Malaysian banking sector have been comprehensively discussed in this study. The findings highlight the important role of a work environment supported by robust training programs and competitive compensation packages in fostering a satisfied and engaged workforce (Bhardwaj et al., 2021). Therefore, addressing concerns related to work culture, particularly pay and working hours, remains important to enhance overall job satisfaction (Bhardwaj et al., 2021). Furthermore, the implementation of effective employee-centric strategies, such as leaders providing fair treatment to employees, recognition, and opportunities for professional advancement, also contributes significantly to fostering a positive and motivating work environment (Dhamija et al., 2019; Hossan & Hasan, 2021).

These findings have significant implications for bank managers and policymakers in Malaysia. By prioritizing the creation of a positive work environment, investing in employee training and development, and offering competitive compensation packages, banks can enhance employee job satisfaction, leading to improved

performance and customer service. As previous studies suggest, satisfied employees are more productive, less likely to leave the organization, and more engaged (Ng et al., 2024). Ultimately, this can lead to improved organizational performance and a stronger competitive advantage for Malaysian banks.

Nevertheless, it is crucial to recognize the limitations of this study. The sample may not be fully representative of all banks in Malaysia, and the reliance on quantitative data may not capture the nuances of employee experiences. Future studies may examine the influence of supervisor support and organizational culture on job satisfaction or analyze the effect of work-life balance programs within the Malaysian banking sector. The research could be improved by incorporating emerging trends, especially on digital change in the banking industry. The Malaysian banking sector's growing adoption of digital HR practices may substantially impact employee satisfaction and engagement. Future studies should examine these tendencies, since digital tactics in human resources, including digital learning platforms, remote work alternatives, and AI-driven performance management systems, are increasingly crucial in influencing employee experiences. Moreover, qualitative investigations could yield profound insights into the experiences and opinions of bank staff.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Digital Entrepreneurship Intention among Bumiputera University Students and the Role of Entrepreneurial Education

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Abstract: The influence of digital technologies has transformed many aspects of life globally, including the way we do business. The shift from traditional business paradigms has created vast opportunities for value creation. With the increasing challenges, competition, and uncertainty in the job market, digital entrepreneurship has provided an alternative career path for young adults to create employment opportunities and become self-reliant. Digital entrepreneurship has emerged as a crucial driver of economic innovation, requiring a strong entrepreneurial mindset among university students. This study examines the factors that influence digital entrepreneurship intention. Utilizing a structured quantitative approach, key determinants from the Theory of Planned Behavior (personal attitude, subjective norms and perceived behavioral control) are analyzed alongside entrepreneurial education to assess the impact on Bumiputera students' readiness and motivation to engage in digital ventures through a survey questionnaire. 173 valid responses from students of University Technology MARA were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results showed that subjective norms and perceived behavioral control were positively significant in influencing digital entrepreneurship intention. However, attitude and entrepreneurial education have no significant effect on digital entrepreneurship intention within this demographic. Findings of the study provide an understanding of factors that shaped Bumiputera students' intention to explore new ventures of entrepreneurial aspirations in the digital domain. These counterintuitive results suggest that the current approach to entrepreneurial education may not be sufficient to ignite the specific intent among Bumiputera students to engage in digital ventures. These results offer valuable insights for educators and policymakers seeking to enhance entrepreneurship programs.

Keywords: *Digital entrepreneurship, entrepreneurship intention, entrepreneurial education, university students, young entrepreneurs, Bumiputera*

1. Introduction and Background

The influence of digital technologies has led to a significant transformation in the global economy. The shift has given rise to digital entrepreneurship, which reshapes traditional business models and opens up extensive opportunities for value creation. With the current job market challenges, increasing competition and uncertainty in the job market, digital entrepreneurship provides an alternative career path. This allows young adults to be self-reliant and create employment opportunities. As such, fostering entrepreneurial spirit, particularly among university students, has become a strategic imperative for socio-economic development worldwide. The establishment of the Entrepreneurship Action Plan-Higher Education Institutions (EAP-HEIs) 2021-2025 (Ministry of Higher Education, 2020) showed the commitment of the Malaysian government to promote and encourage higher involvement of university students in entrepreneurship. This study, therefore, aims to explore the influencing factors of digital entrepreneurship intention among Bumiputera university students and examines the pivotal role that entrepreneurship education plays in fostering this critical mindset.

Digital entrepreneurship is basically characterized by the establishment of a business activity with the utilization of online digital platforms and data networks for value creation. It is mostly defined as the creation of new ventures or the transformation of existing businesses that drive economic or social value by using novel digital technologies (Zhao & Collier, 2016; Sahut et al., 2021). This definition highlights the innovative use of digital technologies in creating value through the transition in business models. Other perspectives highlight digital entrepreneurship as a technological advancement in business performance (Hull et al., 2007) or the

pursuit of opportunities via digital media and information and communication technologies (Davidson and Vaast, 2010). In contrast to traditional entrepreneurs, which often constrained by location and limited resources, digital entrepreneurs can tap into global markets and leverage affordable digital marketing tools. The low barriers of entry, flexibility, low cost, and wider market reach afforded by digital technologies create a fertile ground for online business ventures, allowing individuals with business ideas and ready to offer products or services to launch quickly and with relative ease. These features alleviate a complicated traditional business start-up that normally requires more planning, resources and capital, especially among young entrepreneurs.

However, while digital entrepreneurship presents countless opportunities for young entrepreneurs, it also comes with challenges, particularly those rooted in personal traits. Successful digital entrepreneurs typically possess a unique blend of skills and characteristics. These include strong digital skills (Abubakre et al., 2022), such as the ability to set up websites, manage online sales, or handle social media, creativity for ideation and problem solving with limited resources (Fleck & Asmuth, 2020; Promthong & Chia-Han, 2021), adaptability to navigate changing technology and markets (Audretsch et al., 2024), leadership to make informed decisions (Anunthawichak & Kitcharoen, 2023; Renko et al., 2015) and networking abilities to build relationships with customers, suppliers, and promotional outlets (Mitrega et al., 2017; Äyväri & Jyrämä, 2007). A deep understanding of the underlying factors is important for the success of a digital business. As Bumiputera students represent a significant portion of Malaysia's youth population, fostering digital entrepreneurship can enhance their economic independence and help to boost the country's economic empowerment. According to Ting Ngoo et al. (2023), entrepreneurship is often seen as risky compared to traditional employment, which leads to lower entrepreneurial intention among Bumiputera students.

By utilizing the Theory of Planned Behavior (TPB), this research aims to investigate the key factors influencing intention to engage in digital entrepreneurship while identifying the vital role and effectiveness of entrepreneurial education in fostering such aspirations among Bumiputera university student populations. The TPB is widely utilized in entrepreneurial intention research because it offers a framework for explaining how intentions are formed through a rational cognitive process. The theory suggests that stronger positive attitudes, supportive subjective norms, and higher perceived behavioral control collectively lead to stronger entrepreneurial intentions (Mohd Noor & Malek, 2021; Utami, 2017; Batz Liñeiro et al., 2024; Mohamed Said & Mohamed, 2025). As Malaysian universities have been actively integrating entrepreneurship education into their programs to foster innovation and business skills among students (Ahmad & Buchanan, 2015), this study will explore the core relationship between education and intention; and examine the role of entrepreneurial education in shaping digital entrepreneurship intention, considering the unique characteristics and challenges of the evolving digital entrepreneurial ecosystem.

The predictive power of intention is widely acknowledged in behavioral and entrepreneurship studies. Intention is consistently regarded as the most reliable predictor of planned behavior, particularly for complex actions such as starting a new business, which necessitate deliberate decisions and may involve unpredictable time lags. Research suggests that by studying an individual's intentions to start a business, it is possible to forecast whether that individual will indeed establish a company. This predictive capacity elevates the study of entrepreneurial intention beyond a purely academic exercise to a field of strategic importance for practical application. If intention is a strong precursor to actual entrepreneurial behavior, then influencing intention becomes a logical and effective means of stimulating entrepreneurial activity. This means that governments and educational institutions, which often aim to boost entrepreneurship for economic growth and stability, should strategically focus their interventions on factors that demonstrably shape entrepreneurial intention. By integrating the impact of education on intention in this study, the findings hopefully can give direction on policy formulation and curriculum design, thereby contributing to real-world impact.

2. Literature Review

Entrepreneurship Intention

Entrepreneurial intention is a fundamental construct in entrepreneurship research, which refers to an individual's conviction and belief in initiating a new business venture (Hsu et al, 2019; Thompson, 2009). It signifies an individual's commitment to achieving a business goal and plays a crucial role in the identification,

evaluation, and inspection of strategic business opportunities (Barba-Sánchez & Atienza-Sahuquillo, 2018). Entrepreneurial intention is not merely wishful thinking but it represents an active cognitive process that represents an individual's beliefs, perceptions, and other external influences that can motivate and lead individuals to real action. It is conceptualized as a mindset that ultimately propels an individual toward creating a new business concept and embarking on an entrepreneurial career (Chhabra, Raghunathan, & Rao, 2020).

Theory of Planned Behavior

Theory of Planned Behavior (TPB), which was developed by Ajzen (1991), suggests that an individual's intention to perform a behavior is the most immediate determinant of that behavior. This intention is influenced by three independent factors – Attitude, Subjective Norms and Perceived Behavioral Control. Attitude towards the behavior refers to an individual's positive or negative evaluation of performing the entrepreneurial act. It is shaped by their beliefs about the potential outcomes of engaging in entrepreneurship and their evaluation of these outcomes, such as desirability or cost. Subjective Norms represent the perceived social pressure an individual feels from significant referents, such as family, friends, or role models, to engage or not engage in entrepreneurial behavior. The degree to which an individual is willing to conform to these judgments influences their normative beliefs and, consequently, their intention. Perceived Behavioral Control relates to an individual's assessment of their capacity to perform the necessary actions and effectively manage future circumstances. It reflects their perception of available opportunities, resources, and anticipated challenges, indicating the level of control they believe they have over the execution of the entrepreneurial activity.

Digital Entrepreneurship Intention

There has been growing interest among scholars to explore the factors influencing digital entrepreneurship intention among university students. The Theory of Planned Behavior has emerged as a dominant theoretical model applied in studies. Sartika and Santosa (2023) found that the TPB constructs significantly affect digital entrepreneurship intention, explaining 52% of the variance. May and Hui (2024) found that attitudes towards information technology and subjective norms significantly influence the intention. While TPB constructs (attitude, subjective norms, and perceived behavioral control) are generally accepted, researchers have explored additional factors to enhance their explanatory power. Past research has identified a range of contributing elements, including cognitive, individual, environmental, and demographic factors. This study tries to see the explanatory power of TPB by adding entrepreneurship education as an additional factor to determine Bumiputera students' intention to engage in digital entrepreneurship.

Entrepreneurial Education

Entrepreneurial education (EE) is defined as the teaching of skills and the cultivation of talents essential for students to initiate businesses, identify opportunities, manage risks, and innovate throughout their careers (Torrance et al., 2013). The widespread adoption of EE in higher education represents a significant shift from an optional offering to an essential component of future economic resilience. This expansion was driven by significant economic changes, which encouraged young people to seek independent careers and rely on their "personal brands" rather than traditional corporate employment. For university students, this means EE is crucial for navigating a future where traditional employment paths may offer less security, and entrepreneurial skills (such as identifying opportunities, managing risk, and innovating) are universally valuable, whether they choose to launch a venture or contribute innovatively within an existing organization. Many entrepreneurial education programs in universities have been shown to successfully contribute to students' engagement in entrepreneurship, particularly through experiential learning and competence-building initiatives (Lv et al., 2021). As such the entrepreneurship education has gained significant attention as one of the key drivers of economic growth and development (Maiyo et al., 2016; Raposo & do Paço, 2011).

The goals of entrepreneurship education range from imparting basic knowledge to developing practical skills, with curriculum design emphasizing innovative approaches like industrial visits and management games (Bhatt & Bhatt, 2016). Effective teaching methods include action learning and experiential learning, focusing on skills development rather than just knowledge transfer (Maiyo et al., 2016; Bhatt & Bhatt, 2016). While the impact of entrepreneurship education on venture creation is not immediate, studies suggest that it positively influences students' intentions to start businesses and has an impact on their personal development (Raposo & do Paço, 2011; Bhatt & Bhatt, 2016). The growing need and importance of entrepreneurship education

present challenges for governments in terms of funding and selecting appropriate educational programs (Raposo & do Paço, 2011).

Empirical evidence indicates that entrepreneurial education enhances entrepreneurial intentions among participants. Studies across different countries showed that students who received and were exposed to entrepreneurship education typically exhibit deeper entrepreneurial intentions as compared to their counterparts without such exposure (Bagheri, 2018; Ching & Kitahara, 2017; Ramchander, 2021). A longitudinal study in Brazil found that entrepreneurship education significantly impacts students' intentions to undertake entrepreneurial activities (Ching & Kitahara, 2017). Similarly, a study in South Africa revealed a statistically significant increase in students' entrepreneurial intentions after completing an entrepreneurship module, primarily due to increased desirability for entrepreneurship (Ramchander, 2021). Rauch and Hulsink (2014) further demonstrated that entrepreneurship education not only enhances intentions but also mediates the effect on subsequent behavior associated with new venture creation. These findings suggest that entrepreneurship education is effective in fostering entrepreneurial mindsets and should be integrated across disciplines to contribute to economic development and professional self-realization (Ching & Kitahara, 2017).

This positive correlation extends specifically to digital entrepreneurship intentions, with EE identified as a critical predictor in shaping these aspirations. Critically, studies confirm that both general entrepreneurship education and specialized digital entrepreneurship education significantly contribute to the development of DEI. Digital entrepreneurship education was found to moderate the relationship between perceived behavioral control and digital entrepreneurship intention, though it does not moderate the relationships between attitude, subjective norms, personal innovativeness, and intention (Nguyen & Nguyen, 2024). In the context of Malaysian university students, Ting Ngoo et al. (2023) found that entrepreneurial education is the second most crucial factor affecting digital entrepreneurship intention.

Table 1: Key Definitions in Digital Entrepreneurship Research

Concept	Definition(s)
Digital Entrepreneurship	"The creation of new ventures or transformation of existing businesses that drive economic or social value by using novel digital technologies" (Zhao & Collier, 2016; Sahut et al., 2021). "Technological advancement with new ways of establishing and performing business" (Hull et al., 2007). "Pursuit of opportunities based on the use of digital media and other information and communication technologies" (Davidson and Vaast, 2010). "Combination of digital infrastructure and entrepreneurial agents within the context of both ecosystems" (Sussan & Acs, 2017).
Entrepreneurship Intention	"An individual's belief in starting a new business venture". (Hsu et al, 2019; Thompson, 2009) "Individuals' conviction of achieving the business goal. It helps identify, evaluate, and inspect strategic business opportunities" (Barba-Sánchez & Atienza-Sahuquillo, 2018). "A conscious understanding of one's capacity to launch a new business and a belief in one's potential to do so in the future" (Thompson, 2009). "A mindset that ultimately leads a person to create a new business concept and pursue an entrepreneurial career" (Chhabra, Raghunathan, & Rao, 2020).

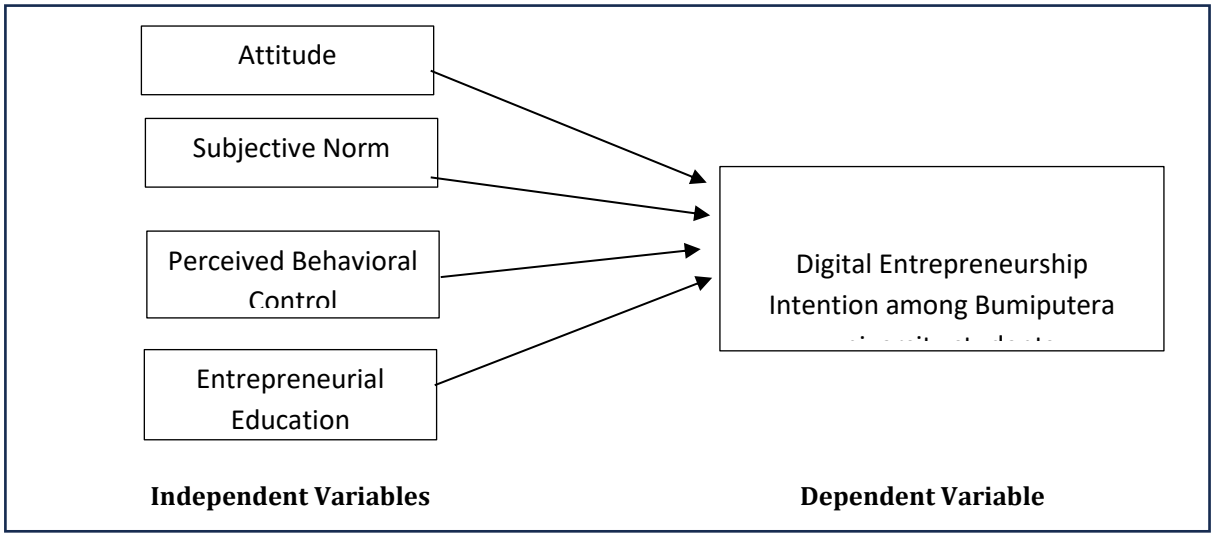
Entrepreneurial Education	- "The teaching of skills and cultivation of talents that students need to start businesses, identify opportunities, manage risk, and innovate in the course of their careers" (Torrance et al., 2013). "Improving the individual's knowledge, skill set, and abilities" (Bhatt & Bhatt, 2016).

Hypotheses of the study are developed as follows:

H1: Attitude has a positive effect on digital entrepreneurship intention among Bumiputera university students.
H2: Subjective norm has a positive effect on digital entrepreneurship intention among Bumiputera university students.
H3: Perceived behavioral control has a positive effect on digital entrepreneurship intention among Bumiputera university students.
H4: Entrepreneurial education has a positive effect on digital entrepreneurship intention among Bumiputera university students.

Figure 1 below represents the research model of this study. The three constructs of Planned Behavior Theory, together with the additional construct, entrepreneurship education, serve as the independent variables in this study. Whereas the intention of Bumiputera university students to engage in digital entrepreneurship is the dependent variable.

Figure 1: Research Model



3. Methodology

This is a quantitative study with a self-administered survey to collect data by applying a non-probability purposive convenience sampling method on undergraduate students from three schools of studies – the Faculty of Business and Management, the Faculty of Accountancy and the Faculty of Hotel and Tourism Management at UiTM Puncak Alam. The minimum sample size required of 95 for 4 explanatory variables was computed using G*Power version 3.1.9.7 (Faul et al., 2007). This study managed to collect 173 valid data which is more than the minimum sample size required.

The measurement items of the constructs in this study were adopted from past studies. The measurement items of constructs of attitude (3 items), subjective norms (6 items), perceived behavioural control (2 items) and digital entrepreneurship intention (6 items) were adopted from (Tavares Damasceno et al., 2023). Six measurement items of entrepreneurship education were adopted from Jiatong et al. (2021). All items were measured with a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data was analysed by applying structural equation modelling–partial least squares (PLS-SEM) technique using SmartPLS version 4.1.1.2 (Ringle et al., 2024). The analysis of PLS–SEM comprises a measurement model (validity and reliability) and a structural model (hypothesis testing on the relationship between variables).

4. Data Analysis

The measurement model was assessed to measure convergent validity and discriminant validity of the outer model. The assessment results of convergent validity are shown in Table 2. The convergent validity measurement of outer loading for all items is greater than 0.5, average variance extracted (AVE) exceeds 0.5 and composite reliability is more than 0.7, indicating the validity and reliability of the measurement items and constructs.

Table 2: Measurement model

Construct	Item	Loadings	CR	AVE
Attitude (ATT)	ATT1	0.839	.9	.75
	ATT2	0.91		
	ATT3	0.848		
Subjective Norms (SN)	SN1	0.732	.867	.521
	SN2	0.725		
	SN3	0.741		
	SN4	0.716		
	SN5	0.729		
	SN6	0.688		
Perceived Behavioral Control (PBC)	PBC1	0.896	.853	.744
	PBC2	0.828		
Entrepreneurship Education (EE)	EE1	0.778	.926	.675
	EE2	0.82		
	EE3	0.845		
	EE4	0.846		
	EE5	0.808		
	EE6	0.83		
Digital Entrepreneurship Intention (INT)	INT1	0.81	.922	.748
	INT2	0.864		
	INT3	0.889		
	INT4	0.894		

Table 3: HTMT

	1	2	3	4	5
1. Attitude					
2. Subject Norms	0.645				
3. Perceived Behavioral Control	0.744	0.549			
4. Entrepreneurial Education	0.668	0.636	0.628		
5. Entrepreneurial Intention	0.470	0.484	0.558	0.441	

The discriminant validity was examined using the Heterotrait-Monotrait Ratio of Correlations (HTMT) criterion (Henseler et al., 2015). As shown in Table 3, the values of HTMT were less than the 0.85 threshold

(Kline, 2011), supporting sufficient discriminant validity.

Structural Model

The structural model was assessed to test the hypotheses in the study through a bootstrapping procedure with a resample of 10,000 (Hair et al., 2022) for path coefficients, t-values, p-values and confidence intervals. The results of the structural model are shown in Table 4.

Table 4: Hypothesis Testing

Relationship	Std beta	Std error	t-value	p-value	BCI LL	BCI UL	f^2	R^2
H1: Attitude -> Digital Entrepreneurship Intention	0.088	0.091	0.962	0.168	-0.071	0.23	0.006	0.297
H2: Subject Norms -> Digital Entrepreneurship Intention	0.262	0.08	3.281	0.001	0.102	0.372	0.060	
H3: Perceived Behavioral Control -> Digital Entrepreneurship Intention	0.225	0.086	2.609	0.005	0.082	0.366	0.047	
H4: Entrepreneurship Education -> Digital Entrepreneurship Intention	0.102	0.099	1.027	0.152	-0.054	0.274	0.008	

The path coefficient results show that two hypotheses were found to be significant. Subjective norms had a positive and significant effect on digital entrepreneurship intention (H_2: $\beta = 0.262$, $p < 0.01$), with the f^2 value of 0.060 indicating a small effect of subjective norms on digital entrepreneurship intention among students. Perceived behavioral control was found significantly positive effect on digital entrepreneurship intention among students (H_3: $\beta = 0.225$, $p < 0.01$). The f^2 value of 0.047 indicated a small to medium effect of perceived behavioral control on digital entrepreneurship intention. Thus, only H_2 and H_3 were supported. The results indicate that attitude (H2: $\beta = 0.088$, $p > 0.05$) and entrepreneurship education (H4: $\beta = 0.102$, $p > 0.05$) have an insignificant effect on digital entrepreneurship intention among students.

The R^2 value of 0.297 showed that 29.7% of the variation in digital entrepreneurship intention is explained by four predictors in the model, as shown in Table 5.

Table 5: R^2

Dependent variable	R^2
Digital Entrepreneurship Intention	0.297

Table 6: PLS Predict

	PLS-SEM Q^2predict	RMSE	LM RMSE	PLS-SEM - LM RMSE
INT1	.136	.192	.232	-0.040
INT2	.122	.115	.140	-0.025
INT3	.191	.090	.103	-0.013
INT4	.263	.074	.147	-0.073

The predictive relevance was tested using PLSpredict (Shmueli et al., 2019) and the results are shown in Table 6. All items of PLS-SEM RMSE values were less than LM RMSE values, indicating the predictive power of the model is significant. This attitude toward collaborative consumption, subjective norms and perceived behavioural control had a strong predictive relevance for digital entrepreneurship intention.

Discussion

This study examines the factors influencing digital entrepreneurship intention among Bumiputera university students using the TPB model. This study contributes to the literature with a better understanding of Bumiputera students' digital entrepreneurship intention. The analysis results indicated that subjective norm had a statistically significant positive influence on digital entrepreneurship intention, which aligns with the findings of past studies (Al-Mamary & Alraja, 2022; Alferaih, 2022).

Peers and family members are influential in students' intention to start a business. Thus, if the individual has enough support around them, such as working conditions and an environment conducive to work, then their intention and desire to initiate that work will rise. Perceived social pressure to perform or not to perform the entrepreneurial behavior may be triggered by family, friends, teachers, and other possible role models. Close interaction with friends and family members is important in supporting their decision-making to engage in a business. The family has a significant influence on the perception that entrepreneurship is as esteemed as other professions. Moreover, learning environments that facilitate student interaction with entrepreneurial role models and business professionals play a critical role in fostering their willingness to engage in entrepreneurial activities (Maydiantoro et al., 2021).

The findings revealed that perceived behavioural control has a significant influence on digital entrepreneurship intention among students, which is in line with Al-Mamary and Alraja's (2022) and Alferaih's (2022) findings. The availability of opportunities, skills, competencies, and resources may affect an individual's decision-making capacity. The entrepreneurship intention increases with an individual's level of conviction in the presence of conditions that could facilitate the behaviour (Al-Mamary & Alraja, 2022).

Contrary to expectations, attitude did not exhibit a statistically significant effect on digital entrepreneurship intention among Bumiputera students. This indicates that the extent of students' evaluation of the creation of a new business is negative and not strong enough to start a new business, suggesting that other factors may play a more prominent role. Sobaih and Elshaer (2022) in their study examining digital natives in Saudi Arabia found that while personal traits significantly influenced attitude, the direct effect of attitude on digital entrepreneurial intention was not significant. Instead, according to the study, attitude served as a mediator, not a direct predictor.

Interestingly, the insignificant effect of entrepreneurial education on digital entrepreneurship intention among Bumiputera students was also found in the study, diverging from the assumptions of prior research. However, the finding is consistent with Auliadara et al. (2024), who found that entrepreneurship education had no significant effect on students' interest in entrepreneurship. While Lopes et al. (2025) found that digital entrepreneurial education only became influential when mediated by students' innovative digital attitudes. They stressed that on its own, entrepreneurial education did not significantly predict digital entrepreneurial intention. Incongruous entrepreneurship education could be a major barrier to new graduates' ability to transform their concepts into actual business execution strategies (Alferaih, 2022).

5. Conclusion and Recommendations

This study set out to examine the digital entrepreneurship intention among Bumiputera university students using the TPB model with a particular focus on the role of entrepreneurial education. While theoretically compelling, our empirical findings revealed an intriguing insignificance of entrepreneurial education in predicting digital entrepreneurship intention within this particular demographic. These counterintuitive results suggest that a generic approach to entrepreneurial education, as currently implemented, may not be sufficient to ignite the specific intent to engage in digital ventures among Bumiputera university students.

The observed insignificance is likely due to several possible reasons, stemming from potential mismatches between the existing entrepreneurial curriculum and the dynamic demands of digital entrepreneurship, or a possible lack of perceived relevance by students. The digital landscape evolves rapidly. The educational content is at risk of becoming irrelevant to students contemplating digital ventures if it is not continuously updated to reflect the latest trends, technologies and business models in the digital economy. Many entrepreneurial education programs in universities might successfully contribute to students' engagement in entrepreneurship

(Lv et al., 2021), but they may lack sufficient depth and breadth in addressing the unique characteristics of digital entrepreneurship (Sitaridis & Kitsios, 2023), such as platform economics, e-commerce strategies, cyber security or digital marketing. If the curriculum doesn't directly equip students with the skills and mindset for the digital realm, its impact on digital entrepreneurship intention will be diluted. Students might also not perceive the entrepreneurial education they receive as directly relevant to their aspirations in digital entrepreneurship. They might view it as an academic requirement rather than a practical pathway to launching a digital business. In a highly academic environment, students may prioritize achieving good grades over genuinely internalizing entrepreneurial skills and mindsets, especially if the assessment methods do not adequately reward practical application and innovation.

Furthermore, the effectiveness of entrepreneurial education might be critically mediated or moderated by other factors such as digital literacy (Guo et al., 2025), access to specific digital resources (Tennakoon et al., 2024), or the presence of inspiring digital role models (Ardi et al., 2024). These factors are worth being considered in future research to see how entrepreneurial education plays a more impactful role in predicting the intention of digital entrepreneurship among Bumiputera university students. Thus, the findings emphasized a need for a better approach to encouraging digital entrepreneurial aspirations, moving beyond the usual classroom strategies and traditional entrepreneurship education to support digital business goals.

Based on the limitations and insights derived from this study, the following recommendations are put forth for policymakers and educational institutions to more effectively cultivate digital entrepreneurship intention among Bumiputera university students. Firstly, revisit entrepreneurial education with a digital-first focus. A dynamic curriculum beyond generalized entrepreneurship courses, with the inclusion of digital skills and topics is to be developed. Sitaridis and Kitsios (2023) emphasized the need to redefine entrepreneurship education in light of digital transformation, advocating for curriculum innovation that goes beyond traditional, generalized courses to meet the demands of the digital economy. The incorporation of cutting-edge topics such as AI in business or lean start-up methodologies for digital ventures may enhance the effectiveness of entrepreneurial education in cultivating a new generation of digitally-savvy Bumiputera entrepreneurs. Secondly, cultivate a conducive digital entrepreneurial ecosystem by establishing accessible funding or micro-grant programs with viable digital startup ideas. Autio et al. (2018) emphasized that accessible financial support mechanisms like micro-grants can lower entry barriers and stimulate innovation among early-stage entrepreneurs. They stressed that funding schemes and digital infrastructure play a critical role in shaping entrepreneurial ecosystems, especially in digital contexts. Universities, therefore, could develop dedicated digital accelerators that provide mentorship, networking opportunities, and technical support for digital ventures. Lastly, ensure equitable access to high-speed internet, essential digital tools, software licenses, and cloud computing resources within university campuses. These are among the important foundations for pursuing digital ventures. Disparities in access to reliable internet, digital devices and essential software were found to significantly impact students' ability to engage successfully online (Means et al., 2020).

By embracing these recommendations, educational institutions and policymakers in Malaysia can significantly enhance the effectiveness of entrepreneurial education in cultivating a new generation of digitally-savvy Bumiputera entrepreneurs, which is vital for the country's economic growth and digital transformation.

Acknowledgement: The paper is partially supported by the internal faculty grant 600-TNCPI 5/3/DDF (FPP) (038/2024)endowed by the Faculty of Business Management, University Technology MARA, Puncak Alam, Selangor.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Attachment Theory and Smartphone Addiction Among University Students: Investigating Psychological Dependence, Behavioral Patterns and Well-Being

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Abstract: Smartphones play a crucial role in students' daily routines, influencing social interactions and academic engagement. This study explores the relation between attachment styles, secure, avoidant, anxious, and disorganized and smartphone addiction among students at UiTM Puncak Alam's Faculty of Business and Management. Based on information from 256 respondents, findings reveal that all attachment styles significantly correlate with smartphone addiction, with avoidant attachment displaying the strongest relationship (r = .701), followed by disorganized (r = .554), anxious (r = .534), and secure attachment (r = .476). Regression analysis identifies avoidant attachment as the primary predictor, suggesting that individuals with avoidant tendencies rely heavily on smartphones to distance themselves from real-world interactions. Anxious attachment also contributes, reflecting excessive smartphone use driven by a need for social reassurance. In contrast, secure and disorganized attachments show minimal predictive impact. These results indicate that smartphone addiction is not merely a behavioral habit but is deeply rooted in psychological and emotional factors. Students with avoidant and anxious attachments may depend on smartphones for validation or coping, reinforcing problematic usage patterns. To address this issue, universities should implement structured interventions such as digital wellness programs, attachment-based counselling, and social engagement initiatives that encourage healthy offline interactions. Encouraging face-to-face communication and setting boundaries for smartphone usage can help mitigate addiction risks. Future studies should investigate the long-term academic and psychological effects of smartphone dependency, offering broader insights into the consequences of attachment-driven smartphone addiction in university settings.

Keywords: *Attachment styles, attachment theory, attachment, smartphone addiction.*

1. Introduction and Background

As digital connectivity becomes increasingly embedded in everyday life, smartphones have become necessary tools for communication, information access, and entertainment. They serve not only functional purposes but also reflect users' social identity and status (Abuhamdah & Naser, 2023). Their constant internet connectivity enables users to engage with social media, email, messaging apps, and other online services anytime and anywhere.

The widespread adoption of smartphones is driven by technological advancements such as mobile apps, online banking, GPS navigation, digital photography, and e-commerce (Liu et al., 2022). These features have made smartphones integral to many aspects of daily life. But, together with their benefits, concerns have arisen about excessive and uncontrolled use.

Smartphone addiction, also known as smartphone dependence or pathological use, is characterized by compulsive usage despite negative impacts on personal, academic, or professional life (Kim, 2021; Albursan et al., 2022). Research suggests that about 66% of users exhibit signs of addiction (Laborde, 2023). University students are particularly vulnerable due to their dependency on smartphones for both academic and social purposes.

A global study by McGill University, cited in *New Straits Times* (Dzulkifli, 2022), ranked Malaysia as the third-highest country in smartphone addiction among young users. Similar local research (Said et al., 2022; Ithnain et al., 2018) has shown that nearly half of public university students display signs of severe smartphone addiction, raising concerns about its impact on well-being and academic performance.

Even though awareness has increased, there is limited research examining the psychological factors underlying smartphone addiction, especially among business students. Attachment theory, traditionally used to explain interpersonal bonds, has recently been applied to human-object relationships, including with smartphones (D'Arienzo et al., 2019; Parent & Shapka, 2019).

Insecure attachment styles may drive individuals to use smartphones as a basis of comfort or connection. For example, anxious attachment may lead to excessive checking behaviors due to fear of missing out (FoMO), while avoidant and disorganized styles may contribute to maladaptive digital coping strategies (Holte & Ferraro, 2020; Mikulincer & Shaver, 2019).

Moreover, excessive smartphone usage has been associated with mental health issues and cognitive impairments, including reduced attention, memory, and social cognition (Wacks & Weinstein, 2021; Vowels et al., 2022). As students are particularly sensitive to social stimuli, they may form emotional dependencies on their devices (Hodge & Gebler-Wolfe, 2022).

This study investigates the prevalence and factors contributing to smartphone addiction among students at the Faculty of Business and Management, UiTM Puncak Alam. Specifically, it explores the role of attachment styles, secure, anxious, avoidant, and disorganized in shaping patterns of smartphone use.

2. Literature Review

Smartphones have become central to modern life due to their multifunctionality, including apps for communication, navigation, banking, shopping, and entertainment (Liu et al., 2021). Despite their advantages, they also present serious drawbacks. A growing concern is smartphone addiction**,** also referred to as pathological smartphone use, which involves compulsive use that disrupts daily functioning, education, and work performance (Cha et al., 2018; Panova et al., 2018).

This addiction is often driven by a need for stimulation, emotional relief, or comfort, and is marked by discomfort in the absence of smartphone access (Buctot et al., 2018). College students are particularly vulnerable due to having more freedom and fewer restrictions on phone use (Li et al., 2021). Studies show that high levels of smartphone usage can negatively affect academic performance, mental health, and physical well-being, including issues like back pain and eye strain caused by poor posture and overuse (Xie et al., 2018; Zirek et al., 2020; Ahmed et al., 2022).

The COVID-19 pandemic has further exaggerated smartphone dependency. Home quarantine and social distancing led to an increase in global internet and smartphone use, often as a way to manage pandemic-related anxiety and isolation (Chen et al., 2022; Hosen et al., 2021). Social media became a key coping tool during this period, providing real-time updates and maintaining social connections (Thygesen et al., 2021). However, overreliance on digital engagement can worsen stress and increase the risk of behavioral addiction, similar to the effects of gambling or substance use (Fineberg, 2018; Peeters et al., 2019; Vismara et al., 2020).

Attachment Theory

Attachment theory, introduced by Bowlby in 1969, provides a framework for understanding how early interpersonal bonds shape emotional regulation and behaviors throughout life. Individuals with insecure attachment styles, such as attachment anxiety or avoidance and may seek alternative sources of comfort and security. In the digital age, smartphones have become a substitute attachment target, fulfilling roles traditionally associated with human relationships (Parent & Shapka, 2019). Empirical evidence indicates that individuals with high attachment anxiety are more prone to problematic smartphone use, as they rely on their devices for reassurance, social validation, and emotional regulation (Parent, Bond, & Shapka, 2021). This dependency mirrors attachment behaviors, where smartphones serve as a secure base and haven, reinforcing compulsive usage patterns. By understanding smartphone addiction through an attachment lens, interventions can focus on addressing underlying emotional needs rather than solely treating it as a behavioral addiction.

Secure Attachment

Secure attachment involves confidence that one's emotional and physical needs will be met, encouraging

healthy social behavior, autonomy, and emotional stability (Hodge & Gebler-Wolfe, 2022). Individuals with secure attachment typically seek and benefit from social approval, which promotes validation, belonging, and a positive self-concept (American Psychological Association [APA], 2018; Sanford, 2023).

Public recognition and positive feedback not only boost morale but also enhance interpersonal relationships and performance. Research shows that consistent validation can foster motivation and engagement, particularly in social or team-based settings (Miles, 2022; Masionis, 2023; Santosh, 2024).

Avoidant Attachment

Avoidant attachment is marked by emotional detachment and a preference for self-reliance, often rooted in early life experiences of neglect or emotional unavailability (Wu & Chou, 2023). Individuals with this style may use escapism, including excessive smartphone use, to avoid confronting emotional discomfort. Poor mental health can exacerbate this behavior, particularly in environments where mental health issues remain stigmatized (Olivine, 2023).

In Malaysia, mental health issues are on the rise but often go unrecognized. The National Health and Morbidity Survey (NHMS, 2019) reported that 2.3% of adults and over 424,000 children aged 5 to 15 experienced mental health issues. Cultural stigma and limited awareness continue to discourage professional help-seeking (Raaj et al., 2021; Samsudin et al., 2024; Lee & Yeo et al., 2023).

Anxious Attachment

Anxious attachment is defined by a strong need for intimacy alongside the fear of rejection and abandonment, which often leads individuals to seek reassurance but remain insecure in relationships, resulting in emotional dependence and frequent concern over their social standing (Candel & Turliuc, 2019). This attachment style is tightly related to Fear of Missing Out (FoMO), a psychological phenomenon where persons feel anxiety over being excluded from rewarding experiences (Liu & Ma, 2019). FoMO is intensified by social media, where users are continually exposed to idealized depictions of others' lives, driving a compulsion to stay connected (Alabri, 2022). Studies show that 56% of individuals experience FoMO, contributing to digital overuse and feelings of inadequacy and dissatisfaction (Zhong, 2023).

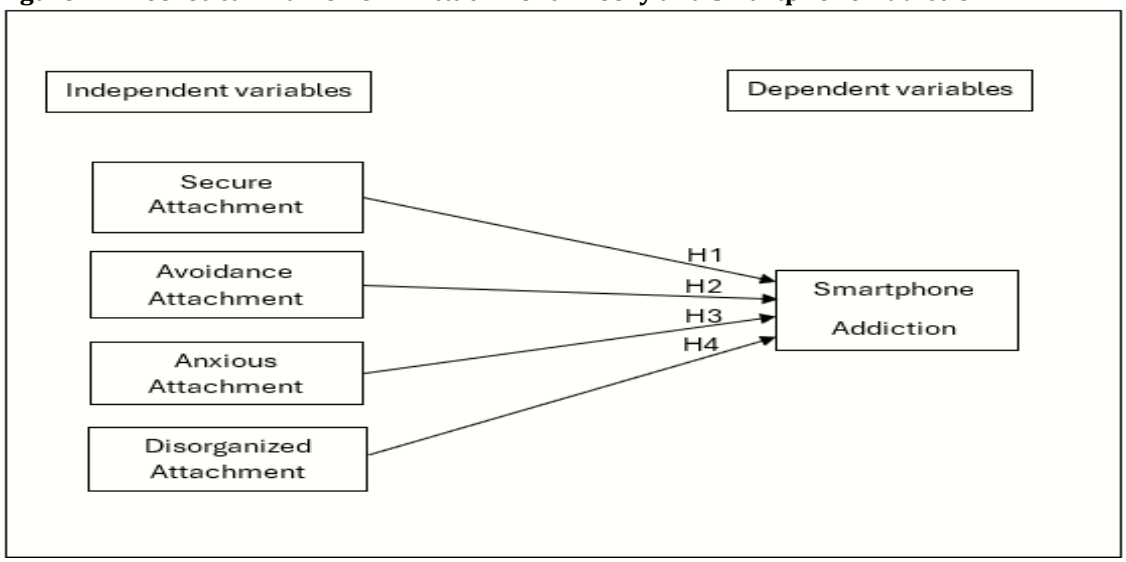
Disorganized Attachment

Disorganized or fearful attachment arises from inconsistent or harmful caregiving during early life. It is characterized by conflicting desires for closeness and fear of emotional pain, often leading to unstable relationships and a heightened fear of rejection (Decarli et al., 2022). These individuals may misinterpret feedback as criticism and struggle with emotional regulation, resulting in avoidance, aggression, or anxiety (Brumariu & Kerns, 2021). Though less common than other attachment styles, disorganized attachment is more likely among individuals with a history of trauma. Research estimates that 15%–20% of infants exhibit disorganized behavior, and many carry these patterns into adulthood, affecting long-term mental health and social stability (Linder, 2025; Avasarala, 2025).

Theoretical and Research Framework

Attachment theory by Bowlby (1969 presents a guiding framework to understand just how individuals form bonds and relate to others. It is pertinent for exploring attachment to smartphones, which differs from caregiver attachment but is influenced by the content accessed via these devices (Yip et al., 2017; Shay, 2020).

Figure 1: Theoretical Framework: Attachment Theory and Smartphone Addiction



Research Hypotheses

- There is a significant relationship between secure attachment and smartphone addiction among students of the Faculty of Business and Management, UiTM Puncak Alam.
- There is a significant relationship between avoidant attachment and smartphone addiction among students of the Faculty of Business and Management, UiTM Puncak Alam.
- There is a significant relationship between anxious attachment and smartphone addiction among students of the Faculty of Business and Management, UiTM Puncak Alam.
- There is a significant relationship between disorganized attachment and smartphone addiction among students of the Faculty of Business and Management, UiTM Puncak Alam.

3. Research Methodology

Research Design and Setting

This study explores the potential cause-and-effect relationships between smartphone addiction and various attachment styles (secure, avoidant, anxious, and disorganized) among students of the Faculty of Business and Management at UiTM Puncak Alam. Although the study is based on a correlational design and cannot establish definitive causality, the relationships examined are grounded in attachment theory, which suggests that early attachment patterns may influence coping behaviors such as smartphone use. Through statistical techniques like Pearson correlation and multiple regression analysis, the study investigates these directional patterns as a basis for understanding how attachment-related tendencies may contribute to problematic smartphone usage. Future longitudinal or experimental research is recommended to further test these proposed pathways.

Data collection was conducted in a natural, non-contrived setting during the May-June semester session, involving students across all eight faculty programs. To minimize research interference and maintain ecological validity, a self-administered online questionnaire was employed, allowing participants to respond anonymously at their convenience without direct researcher interaction. The primary unit of analysis was individual students, reflecting their attachment styles and smartphone behaviors. A cross-sectional design was used, capturing data at a single point in time over approximately one month.

Population and Sample

The target population consisted of 7,897 students enrolled in the Faculty of Business and Management. Based on Krejcie and Morgan's (1970) criteria, a minimum sample size of 364 was established to ensure representativeness. Convenience sampling was utilized to select accessible participants, balancing practicality with some limitations on generalizability.

Survey Instrument
Data were gathered using a structured questionnaire distributed via Google Forms, divided into three sections:

Demographics: Collecting age, gender, course program, smartphone ownership, and social media use.

Attachment Styles: Measuring secure, avoidant, anxious, and disorganized attachment via Likert-scale items adapted from Tai and Dai (2022) and McAulay (2022).

Smartphone Usage: Exploring frequency, dependency, behavioral patterns, and entertainment use, also via Likert-scale items (Tai and Dai, 2022).

Data Analysis
SPSS software was used for analysis. Descriptive statistics summarized demographic data. Pearson correlation examined relationships between each attachment style and smartphone addiction (RO1–RO4). Multiple regression analysis identified the primary predictor of smartphone addiction (RO5).

Table 1: Data Analysis

Research Objective	Research Question	Scale	Statistical Test
RO1	What is the correlation between secure attachment and smartphone addiction?	Likert scale	Correlation
RO2	What is the relationship between avoidant attachment and smartphone addiction?	Likert scale	Correlation
RO3	What is the relationship between anxious attachment and smartphone addiction?	Likert scale	Correlation
RO4	What is the correlation between disorganized attachment and smartphone addiction?	Likert scale	Correlation
RO5	What is the primary factor influencing smartphone addiction?	Likert scale	Multiple Regression

Ethical Considerations
Participation was voluntary, with informed consent obtained from all respondents. Anonymity and confidentiality were strictly maintained; no identifying information was collected. The study adhered to ethical standards to minimize any risks or discomfort to participants.

Limitations
The use of convenience sampling may limit the generalizability of findings beyond the studied population. The cross-sectional design restricts causal inferences over time, and self-reported data could be subject to response bias.

4. Results and Discussion

This study achieved a 70% response rate, gathering 256 valid responses from students of the Faculty of Business and Management, UiTM Puncak Alam. Data collection was conducted over a 4 4-week period, encountering challenges in motivating student participation. Although initial participation was low, multiple distributions of Google Forms were critical to ensure the number of responses continuously increased.

Data were analyzed using IBM SPSS software. Analytical techniques included frequency distribution tables to describe respondents' demographics, Cronbach's Alpha to assess the reliability and normality of the data, correlation analysis to explore the strength and direction of relationships between variables, and multiple regression to identify key predictors of smartphone addiction.

Demographic analysis

The demographic profile of the respondents provides valuable insights into their characteristics and potential behavioral patterns. Referring to Table 2, the sample consists of 256 participants, with a higher representation of females (62.9%) compared to males (37.1%), suggesting possible gender-based differences in engagement. The age distribution indicates that the majority (82.4%) fall within the 21–25 age range, highlighting a predominance of young adults who may have distinct preferences and digital behaviors. In terms of academic background, the most frequently enrolled program is the Bachelor of Health Administration (21.9%), followed by Customer Service Management (10.2%) and Event Management (12.9%), reflecting diverse educational interests. Nearly all participants (99.6%) own a smartphone, and an equally high percentage (99.2%) actively use social media, reinforcing the pervasiveness of digital connectivity within this group. These findings provide a critical foundation for understanding how demographic factors may influence behavioral tendencies and engagement patterns in the study.

Table 2: Demographic Profile (n=256)

Variables		Frequency (*n*)	Percentage (%)
Gender	Male	95	37.1
	Female	161	62.9
Age	18 - 20	34	13.3
	21 - 25	211	82.4
	26 - 30	7	2.7
	31 and above	4	1.6
Course	BA232: Bachelor's in Office Systems Management (Hons)	17	6.6
	BA233:Bachelor of Business Administration (Hons) Entrepreneurship	7	2.7
	BA234 - Bachelor of Customer Service Management (Hons)	26	10.2
	BA235 - Bachelor of Health Administration (Hons)	56	21.9
	BA236 - Bachelor of Event Management (Hons)	33	12.9
	BA240 - Bachelor of Business Administration (Hons) Marketing	7	2.7
	BA241 - Bachelor of Business Administration (Hons) Insurance	4	1.6
	BA242 - Bachelor of Business Administration (Hons) Finance	16	6.3
	BA243 - Bachelor of Business Administration (Hons) Human Resource Management	22	8.6
	BA244 - Bachelor of Business Administration (Hons) Operations Management	15	5.9
	BA245 - Bachelor of Business Administration (Hons) Retail Management	10	3.9
	BA246 - Bachelor of Business Administration (Hons) International Business	10	3.9
	BA247 - Bachelor of Business Administration (Hons) Transport	10	3.9
	BA249 - Bachelor of Business Administration (Hons) Islamic Banking	7	2.7
	BA250 - Bachelor of Business Administration (Hons) Business Economics	13	5.1
	BA290 - Double Degree	3	1.2
Smart-phone ownership	Yes	255	99.6

	No	1	0.4
Social Media Usage	Yes	254	99.2
	No	2	0.8

Descriptive analysis

The descriptive analysis (refer to Table 3) provides insight into the respondents' behavioral tendencies and attachment styles based on mean scores and standard deviations. Smartphone usage shows a relatively high mean (3.77) with a moderate level of variability (0.741), suggesting frequent engagement with smartphones among participants. Among attachment styles, avoidance attachment has the highest mean (3.56), followed closely by anxious attachment (3.45), indicating a tendency for participants to exhibit avoidance or anxiety in their relationships. Secure attachment, while lower (3.19), demonstrates some presence of healthy relational bonds, whereas disorganized attachment (3.26) suggests mixed or inconsistent attachment behaviors. The varying standard deviations reflect differences in individual attachment experiences, contributing to a nuanced understanding of how attachment patterns may relate to smartphone dependency. These results offer a foundation for further exploration of attachment styles and digital behavior within this population.

Table 3: Mean and Standard Deviation (n=256)

Variables	Mean	Standard Deviation
Smartphone Usage	3.77	0.741
Secure Attachment	3.19	1.033
Avoidance Attachment	3.56	0.849
Anxious Attachment	3.45	0.876
Disorganized Attachment	3.26	0.812

Normality test

As depicted in Table 4, the normality test assesses the distribution of the study variables using skewness and kurtosis values. Based on the criteria of skewness within ±3 and kurtosis within ±10, all attachment variables—secure, anxious, disorganized, and avoidance—exhibited normal distributions, indicating consistency in respondents' attachment patterns. However, smartphone addiction showed moderate left skewness (-0.662), suggesting that responses are slightly concentrated on higher addiction levels. Although the kurtosis value (0.237) remains within an acceptable range, the skewness indicates that the data for smartphone addiction is not perfectly normal. This deviation suggests the need for further statistical consideration, such as transformations or non-parametric methods, when analyzing relationships involving smartphone addiction.

Table 4: Normality and reliability analysis (n=256)

Variables	No. of Items	Skewness	Kurtosis	Remarks
Secure Attachment	5	-0.043	-1.122	Normal
Anxious Attachment	5	-0.250	-0.743	Normal
Disorganized Attachment	5	-0.094	-0.346	Normal
Avoidance Attachment	5	-0.386	-0.436	Normal
Smartphone Addiction	5	-0.662	0.237	Not Normal

Correlation analysis

The results indicate varying degrees of association between different attachment styles and smartphone addiction. Avoidant attachment exhibits the strongest correlation (.701, $p < .001$), suggesting that individuals with avoidant tendencies may rely on smartphones as a substitute for interpersonal connections. Disorganized (.554) and anxious attachment (.534) also show substantial relationships, reflecting tendencies to seek digital reassurance or escape emotional distress. Secure attachment demonstrates a moderate correlation (.476),

indicating that even individuals with healthier attachment patterns may engage with smartphones for social and emotional support. These findings underscore the significance of attachment styles in shaping smartphone dependence, providing valuable insights into behavioral mechanisms and potential intervention strategies.

Table 5: Relationship Between Attachment Styles and Smartphone Addiction (n=256) (N=256)

Attachment Style	Pearson Correlation	Sig. (2-tailed)
Secure Attachment	.476	<.001
Avoidance Attachment	.701	<.001
Anxious Attachment	.534	<.001
Disorganized Attachment	.554	<.001

Multiple regression analysis

Table 6 portrays that the model explains approximately 52.1% of the variance in smartphone addiction (R^2 = .521, Adjusted R^2 = .514), indicating a strong predictive capacity. Avoidant attachment demonstrates the highest positive influence (B = .489, β = .561, p < .001), suggesting that individuals with avoidant tendencies are significantly more likely to develop smartphone addiction. Anxious attachment also shows a significant positive relationship (B = .165, β = .196, p = .002), indicating that individuals with anxiety-driven attachment patterns may rely on smartphones for emotional regulation. In contrast, secure attachment (B = -.013, β = -.018, p = .782) and disorganized attachment (B = .053, β = .058, p = .378) do not exhibit significant relationships with smartphone addiction. The overall model is highly significant (F = 68.316, p < .001), reinforcing the importance of attachment styles in influencing smartphone dependency. Let me know if you need refinements!

Table 6: Regression Analysis Results (n=256)

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.
	B	Std.Error	Beta		
Constant	1.323	.156		8.472	<.001
Secure	-.013	.046	-.018	-.278	.782
Avoidance	.489	.056	.561	8.689	<.001
Anxious	.165	.054	.196	3.058	.002
Disorganized	.053	.060	.058	.883	.378
F-value			68.316		
Sig.			<.001		
Adjusted R^2			.514		
R^2			.521		

Hypotheses Testing

To make the findings from the hypothesis testing easier to follow, the results are summed up in Table 7 below. It gives a quick look at the relationships between each type of attachment style and smartphone addiction, showing how strong those links are and whether they're statistically significant. It also highlights which attachment style turned out to be the strongest predictor in the regression analysis.

Table 7: Summary of Hypothesis (n=256)

Hypothesis	Attachment Style	Correlation Coefficient (r)	Correlation Coefficient (r)	Result
H1	Secure	0.476	< 0.001	Supported
H2	Avoidant	0.701	< 0.001	Supported
H3	Anxious	0.534	< 0.001	Supported
H4	Disorganized	0.554	< 0.001	Supported
H5	Avoidant (β = 0.561), Anxious (β = 0.196)	-	< 0.001 (for both)	Avoidant = Strongest predictor

Discussion

The findings from the hypothesis testing reinforce the theoretical framework that attachment styles play a critical role in shaping smartphone addiction behaviors. The Pearson correlation results confirm that all four attachment styles—secure, avoidant, anxious, and disorganized—show significant associations with smartphone addiction ($p < 0.05$). Avoidant attachment exhibits the strongest correlation ($r = 0.701$), suggesting that individuals who tend to withdraw from interpersonal relationships may compensate by relying more heavily on digital interactions. The moderate correlations observed for secure ($r = 0.476$), anxious ($r = 0.534$), and disorganized attachment ($r = 0.554$) indicate that while these attachment styles contribute to smartphone addiction, their influence is not as pronounced as avoidant attachment.

Furthermore, regression analysis demonstrates that attachment styles collectively account for 52.1% of the variance in smartphone addiction ($R^2 = 0.521$). Avoidant attachment emerges as the strongest predictor, with the highest beta coefficient, reinforcing the idea that individuals with avoidant tendencies might use smartphones as a psychological buffer against social discomfort or emotional detachment. Anxious attachment also contributes significantly, reflecting a pattern where individuals seek reassurance and validation through constant connectivity. In contrast, secure and disorganized attachments do not exhibit significant unique effects, indicating that their relationship with smartphone addiction may be influenced by additional variables.

These results provide valuable insights into the underlying psychological mechanisms driving smartphone addiction. Understanding these associations can inform intervention strategies, emphasize emotional regulation techniques and promote healthier digital habits, particularly for individuals with avoidant and anxious attachment tendencies. Let me know if you'd like me to refine or expand further.

Hypotheses Test	Results
H1: Significant relationship between secure attachment and smartphone addiction	SUPPORTED
H2: Significant relationship between avoidant attachment and smartphone addiction	SUPPORTED
H3: Significant relationship between anxious attachment and smartphone addiction	SUPPORTED
H4: Significant relationship between disorganized attachment and smartphone addiction	SUPPORTED

5. Conclusion and Recommendations

This study examines how different attachment styles, secure, avoidant, anxious, and disorganized, contribute to smartphone addiction among students at UiTM Puncak Alam's Faculty of Business and Management. Using a correlational design with a sample of 256 respondents, the analysis confirms significant positive relationships between all attachment styles and smartphone addiction. Avoidant attachment shows the strongest correlation ($r = .701$), followed by disorganized attachment ($r = .554$), anxious attachment ($r = .534$), and secure attachment ($r = .476$). Regression analysis further identifies avoidant attachment as the most influential predictor of smartphone addiction, followed by anxious attachment, while secure and disorganized attachments show minimal unique predictive impact.

These results offer meaningful insights through the lens of attachment theory, which suggests that early relationship experiences shape the way individuals handle emotional needs and social interactions later in life. The theory helps explain why students with avoidant attachment styles, who often withdraw from close

relationships, may turn to smartphones as a way to regulate emotions or avoid face-to-face engagement. Those with anxious attachment may use smartphones compulsively to seek reassurance or social validation. Even students with secure attachment can develop smartphone addiction when digital communication becomes a primary tool for staying connected. Disorganized attachment, marked by internal conflict and inconsistency, also appears to lead to dependence on smartphone use.

By applying attachment theory in this context, the study offers a deeper understanding of the psychological roots of smartphone addiction and opens the door to theory-driven interventions. Addressing underlying attachment concerns through counselling or digital wellness programs may help students build healthier relationships with technology. Future research could explore these pathways further using longitudinal data to assess how attachment patterns influence digital behaviour over time. These findings not only deepen our understanding of the emotional factors behind smartphone addiction but also remind us that meaningful human connection, whether offline or online, all begins with how we relate to ourselves and others.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Factors Influencing the Intention to Collaborate in Inclusive Teaming with Visually Impaired Peers: A Theory of Planned Behavior Approach

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Abstract: This study examined the factors influencing non-disabled university students' intention to collaborate with visually impaired (VI) peers in inclusive team settings. Guided by the Theory of Planned Behavior (TPB), the research focused on four key variables: attitudes, subjective norms, perceived behavioral control (PBC), and awareness. A cross-sectional survey was conducted among 113 non-disabled students at Universiti Teknologi MARA (UiTM) Puncak Alam using convenience sampling. Data were collected through a structured questionnaire and analyzed using SPSS version 27 to assess the correlation between the independent variables and students' intention to collaborate with VI peers. Findings revealed that non-disabled students generally demonstrated high levels of intention to collaborate, with awareness being the most influential factor. While attitudes, subjective norms, and perceived behavioral control were positively associated with intention, only awareness was found to be a significant predictor, highlighting students' recognition of the importance of understanding the needs and challenges faced by VI individuals. The study emphasizes the crucial role of awareness in fostering inclusive behavior. It suggests that increasing disability-related awareness through education and campus initiatives could significantly enhance inclusive collaboration practices among university students.

Keywords: *Visually Impaired, Theory of Planned Behavior, Attitudes, Subjective Norms, Perceived Behavioral Control, Awareness, University.*

1. Introduction and Background

In recent years, inclusive education has gained momentum as a vital approach to ensuring that all students, regardless of capability, are provided with equitable chances to be involved in academic and social life. However, for students with visual impairments (VI), navigating higher education remains a significant challenge, particularly in environments that demand peer collaboration. Visually impaired students often face not just academic obstacles, but also barriers to social interaction that can lead to isolation and exclusion. According to Manitsa and Doikou (2020), limited social engagement in educational settings can negatively impact the socioemotional development of visually impaired individuals. At the university level, these barriers are compounded by a lack of awareness among peers, resulting in misunderstanding and social distancing. A recent report from the Department of Services and Development for Disabilities, UiTM (2024), revealed that at the Puncak Alam campus alone, 17 out of 49 registered students with disabilities are visually impaired, further underscoring the importance of addressing inclusive practices at the institutional level.

Research by Baepler (2023), Lourens and Swartz (2016) and Firat (2021) highlights that students with visual impairments are often excluded from group work because their peers feel uncertain, uncomfortable, or ill-equipped to engage with them. In classroom settings where collaboration is essential, this discomfort can translate into avoidance, which reinforces exclusion. As noted by Delgado-Gil et al. (2023), inclusive attitudes require reinforcement through sustained awareness-building programs. Yet, as Brewer et al. (2023) observed, the social dimension of disability is still underappreciated in higher education discourse.

The consequences of this exclusion extend beyond academics. Social rejection and judgmental attitudes not only undermine visually impaired students' self-esteem but can also lead to mental health issues such as anxiety and depression (Kızılaslan & Kızılaslan, 2018). When peers treat visually impaired students as incapable or burdensome, it perpetuates harmful stereotypes and discourages meaningful social interaction.

Miyauchi and Paul (2020) also found that feelings of not being accepted or fully aware of their social environments can intensify VI students' sense of loneliness. Addressing these multifaceted challenges requires more than policy—it demands proactive cultural change. As the student research highlights, increasing awareness, debunking stereotypes, and providing targeted support can dramatically improve the educational and emotional well-being of VI students.

This study, therefore, seeks to examine the factors that influence non-disabled students' intention to collaborate in inclusive teaming with visually impaired peers. By applying the Theory of Planned Behavior (TPB), the research examined how attitudes, subjective norms, perceived behavioral control, and awareness contribute to this behavioral intention. The findings aim to inform strategies that not only enhance inclusive practices but also foster a campus culture grounded in empathy, understanding, and mutual respect.

2. Literature Review - Intention to Collaborate with Visually Impaired Peers: A TPB Approach

Attitudes towards individuals with disabilities profoundly influence interaction and collaboration. Students with positive perceptions tend to be more inclusive, while those with doubts or fear of the unknown may withdraw. According to the project, "some non-disabled students display favoritism...and leave them in vain," reinforcing the need for intervention. Meanwhile, subjective norms referring to a peer and societal expectations were found to shape intentions subtly, as students often act based on what is perceived as acceptable. Likewise, perceived behavioral control captures whether students feel confident and prepared to collaborate, while awareness elevates that intention into action.

Concerning intention, as conceptualized by Ajzen (1991), captures the motivational factors that influence a behavior. It indicates how much effort individuals are willing to put into performing a given act. In inclusive teaming, intention is a strong predictor of whether students will engage with visually impaired peers. Brookes (2023) emphasizes that the stronger the intention, the higher the likelihood of behavioral performance. Thus, to relate, the stronger the intention, the higher the intention of individuals to collaborate with visually impaired (VI) peers. This is particularly important in collaborative learning environments, where the presence of intention can lead to supportive behaviors such as including VI peers in group activities. Such participation not only facilitates academic engagement but also boosts the social skills, acceptance, and self-esteem of all involved students (Acheampong et al., 2020; D'Allura, 2002). However, intention alone is not always sufficient. The study by Mulu and Geta (2023) noted that some non-disabled students who initially expressed supportive attitudes later displayed favoritism or exclusionary behaviors, and as a result, left their VI peers further isolated. This indicates that without supportive environments and awareness-building interventions, good intentions may not always translate into inclusive actions.

As discussed above, attitude has long been a central topic in behavioral research due to its predictive power over actions. In the TPB framework, it refers to an individual's judgment of performing a behavior and, in this case, collaborating with a VI peer. Attitudes can be favorable or unfavorable and are shaped by past experiences, perceived outcomes, and emotional responses (Altmann, 2008). Another research by Albarracin and Shavitt (2018) describes attitudes as being directed toward an object or target, perhaps, be concrete (e.g., a peer) or abstract (e.g., inclusion). These evaluations can also generalize across contexts, explaining why some students might consistently avoid collaborating with disabled peers, regardless of specific experiences (Hepler & Albarracin, 2013).

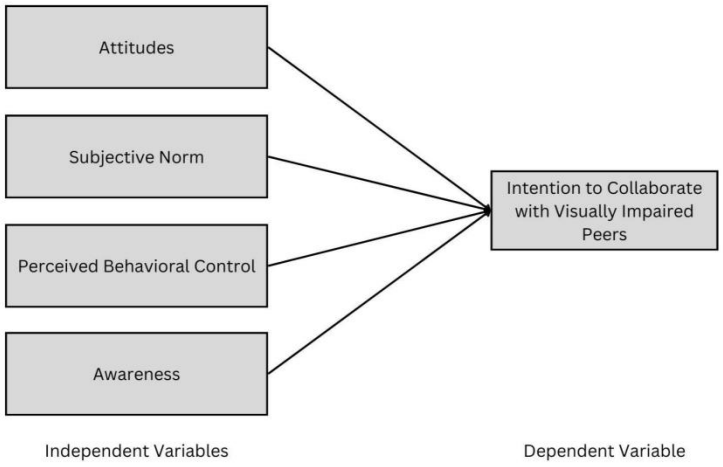
Another significant aspect of intention is subjective norm, which refers to perceived social pressure to perform or refrain from a particular behavior (Ajzen, 1991). It encompasses both injunctive norms—beliefs about what others expect—and descriptive norms—beliefs about what others do (Ajzen, 2020). For this study, which took place in the university context, these norms manifest through classroom dynamics, faculty expectations, and peer behaviors. When students believe that their lecturers or close friends support inclusion, they are more likely to follow suit. Conversely, in environments where inclusion is not openly discussed or practiced, students may hesitate to engage, even if their attitudes are neutral or favorable. Previous studies confirm the importance of fostering positive social expectations through awareness campaigns, peer-led training, and inclusive policies. As Ajzen (2020) noted, normative influence is strongest when the referent group (e.g., classmates or instructors) is emotionally significant to the individual.

Turning now to experimental evidence on perceived behavioral control, it refers to an individual's belief about their capability to execute a behavior. It incorporates both internal factors (self-efficacy) and external constraints (resources, time, support) (Ajzen, 2002). In academic settings, students may support inclusion in general but feel unprepared to collaborate with VI peers due to unfamiliarity, lack of training, or perceived communication barriers. According to Bandura (1986), self-efficacy is one's belief in their ability to perform a task that drives motivation and persistence. If students lack confidence in their ability to include VI peers meaningfully, they are less likely to initiate or sustain collaboration. On the other hand, it is also important to distinguish between real and perceived limitations. Parkinson et al. (2025) emphasize that perceived behavioral control (PBC) largely reflects external constraints and situational controllability; meanwhile, self-efficacy captures internal resilience and confidence in one's abilities. Therefore, universities must create environments that enhance both actual capability and students' perceptions of control.

What follows is an account of awareness, though not a traditional component of TPB, which is a crucial addition in this study. It refers to a person's conscious understanding and sensitivity to a particular issue or group and in this study, refers to the lived experiences of VI individuals. Spunt (2015) defines awareness as "the extent to which the subject has conscious access to the stimulus that initiates a process, the operation of the process itself, and/or the output of the process". Reinhardt et al. (2012) describe six forms of awareness: activity, cultural, social, workplace, location, and knowledge. In inclusive teaming, social and knowledge awareness are especially relevant—students must understand both the social context of disability and the specific needs or strengths of their VI peers. As Straw (2024) points out, awareness helps individuals better navigate social spaces and relationships. When students are informed and empathetic, they are more likely to challenge stereotypes, respond appropriately, and engage meaningfully with their disabled peers.

Based on the literature discussed above, the four factors that are expected to directly affect the intention to collaborate with VI peers are illustrated in the conceptual framework below.

Figure 1: Proposed Conceptual Framework



The Theory of Planned Behaviour (TPB), introduced by Ajzen (1991), provides a comprehensive framework for understanding the psychological and social underpinnings of human behaviour. At its core, TPB proposes that an individual's intention to initiate a specific behaviour is influenced by three main constructs: attitude toward the behaviour, subjective norms, and perceived behavioural control. This study extends the TPB model by introducing 'awareness' as an additional variable, based on the understanding that knowledge and sensitivity toward disability can significantly influence inclusive behaviour.

In the context of higher education, particularly within team-based academic tasks, these constructs help explain why some students are willing to collaborate with visually impaired peers while others hesitate. Attitudes

capture a student's evaluation of inclusive collaboration, whether they view it as positive or burdensome. Subjective norms reflect the influence of peers, lecturers, and institutional culture in shaping perceived expectations. Perceived behavioural control considers whether students feel confident and capable of engaging meaningfully. Awareness, in turn, deepens the model by recognizing the role of empathy, understanding, and familiarity with diverse abilities. Despite its relevance, a noticeable gap in the literature concerning the application of TPB to inclusive teaming with students with disabilities, especially visually impaired peers, is arguable. To date, few empirical studies have examined the behavioural intentions of non-disabled university students in this context using TPB. Thus, this study aims to fill this gap by exploring how these four constructs collectively influence students' intention to collaborate inclusively.

3. Research Methodology

Guided by the Theory of Planned Behavior (TPB), the study aimed to examine the four above-mentioned factors within the real-life context of university group interactions. The investigation employed a correlational, cross-sectional approach, focusing on a single sample of students from Universiti Teknologi MARA (UiTM) Puncak Alam. The research maintained minimal interference, as no experimental manipulation was introduced. UiTM Puncak Alam was selected as the research site due to its diverse student population, which provided a meaningful backdrop for studying inclusive practices. The field-based design facilitated data collection within students' regular academic environment, supporting the reliability and relevance of findings. To ensure sufficient statistical power, G*Power software (Faul et al., 2009) was used to determine the appropriate sample size. Based on parameters including a medium effect size (0.15), a significance level of 0.05, and a power of 0.80, a minimum of 92 participants was recommended. Anticipating incomplete responses, the survey was distributed to 113 students. This strategy helped preserve data integrity and allowed for more robust hypothesis testing.

The study employed convenience sampling, a non-probability technique where participants were recruited based on accessibility. Although this limits generalizability, efforts were made to distribute the survey across multiple faculties to reduce bias and improve respondent diversity. The questionnaire consisted of Section A for demographics, Section B for assessing the four TPBs. Section B utilized closed-ended questions with a fixed range of possible answers using a 5-point Likert scale with the following values: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree options to measure all variables. The items were modified to get the required responses to answer the research questions. The study applied descriptive statistics (mean and standard deviation). The questionnaire items were adapted and adopted from previous validated instruments developed by Faúndez and María (2018) and Madhesh (2022), which were tailored to fit the study's context of inclusive teaming in higher education. These sources provided well-established measures aligned with the TPB constructs and ensured the content validity of the survey. Meanwhile, in section C, this section measured the intention to collaborate with visually impaired peers, integrating several factors from the TPB model, using a consistent 1 to 5 rating scale. The questions were structured similarly to "I am ready to collaborate with visually impaired peers." Changes include "I intend to," "I am willing to," and "I am motivated to," replacing "am ready to" in other items (Faúndez & María, 2018). These statements aimed to assess the respondents' readiness and commitment to collaborate.

4. Results

This section discusses results relating to the demographics of respondents' intentions towards collaboration with VI peers, the characteristics of the total sample, and the comparison of participants based on demographic and geographic characteristics (gender, age and background of studies).

Profile of Respondents: Table 1.0 presents the demographic profile of the 113 respondents from UiTM Puncak Alam, categorized by gender, age group, faculty affiliation, and academic program. A female student comprised a substantial majority (75.2%, n = 85), compared to male students (24.8%, n = 28). This gender distribution may reflect broader enrolment trends within the institution and could influence the overall attitudinal and behavioral responses captured in the study, particularly given the documented gender differences in empathy and inclusive behavior in educational contexts. In terms of age distribution, the data show that the sample group is largely composed of students aged 21–23 years (80.5%, n = 91), who are likely in the mid to final

stages of their undergraduate programs. This maturity level may correlate with greater exposure to collaborative projects and more developed social awareness, potentially affecting their readiness to engage in inclusive teaming. In contrast, quite a small number of respondents fell into the younger (18–20 years; 9.7%) and older (24–26 years; 8.0%) age brackets, with just 1.8% of students above 26 years old, suggesting that findings may primarily reflect the perceptions of students in early adulthood. A significant concentration of respondents were originated from the Faculty of Business and Management (63.7%, n = 72), including Accountancy and Education (8.8%, n = 10 each), Creative Arts and Health Sciences (6.2%, n = 7 each), Hotel and Tourism Management (3.5%, n = 4), and Pharmacy (2.7%, n = 3).

Table 1: Demographic and Geographic Information of Respondents (N-113)

VARIABLE	FREQUENCY	PERCENTAGE
Gender		
Male	28	24.8%
Female	85	75.2%
Total	**100**	**100**%
Age		
18-20 years old	11	9.7%
21-23 years old	91	80.5%
24-26 years old	9	8.0%
>26 years old	2	1.8%
Total	**113**	**100**%
Faculty		
Accountancy	10	8.8%
Business and Management	72	63.7%
Creative Arts	7	6.2%
Education	10	8.8%
Health Science	7	6.2%
Hotel and Tourism Management	4	3.5%
Pharmacy	3	2.7%
Total	**113**	**100**%

Descriptive Statistics: Descriptive statistics for the non-disabled students pertaining to their intentions to collaborate with the VI were conducted and Table 2 below displays the results. These provide the average mean scores of the students regarding their attitude, subjective norms, perceived behavioral control, awareness and intentions to collaborate with VI peers at the campus.

Table 2: Descriptive Statistics

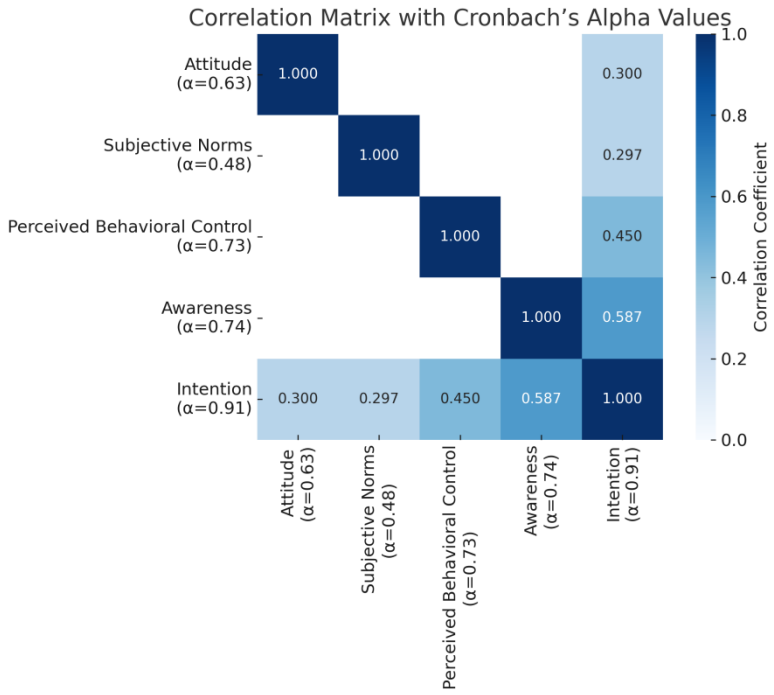
	Descriptive Statistics		
Variable	**Factor Name**	**Mean**	**Std. Dev.**
A	Attitude	3.20	0.49
SN	Subjective Norms	2.60	0.48
PBC	Perceived Behavioral Control	3.62	0.56
Aw	Awareness	3.64	0.45
I	Intention	4.00	0.66

Among all variables, intention scored the highest mean (M = 4.00, SD = 0.66), indicating a strong willingness among respondents to collaborate with VI peers. This was followed by awareness (M = 3.64, SD = 0.45), suggesting a good level of understanding regarding the needs of visually impaired individuals. Perceived behavioral control also showed a relatively high mean (M = 3.62, SD = 0.56), reflecting confidence in respondents' ability to engage in inclusive behavior. Attitude scored moderately (M = 3.20, SD = 0.49), while subjective norms had the lowest mean (M = 2.60, SD = 0.48), indicating limited influence of social pressure on students' intentions.

Reliability and Correlation:

Table 3 presents an overview of the Correlation matrix displaying relationships between key variables; Attitude (α=.63), Subjective Norms (α=.48), Perceived Behavioral Control (α=.73), Awareness (α=.74), and Intention (α=.91). All correlations with Intention to collaborate with VI peers are statistically significant at p < .01. However, except for subjective norms, the variables scale showed insufficient reliability due to its low Cronbach's Alpha value of 0.486. Despite this, previous research, such as Fathy & Fouad (2022), has shown that subjective norms could still be a significant predictor of intention. Their study demonstrated that hotel managers with hiring authority were strongly influenced by the views and opinions of their colleagues regarding the hiring of people with disabilities (PWDs) (Fathy & Fouad, 2022). This finding aligns with earlier studies, supporting the continued use of subjective norms in this study, despite the lower reliability score. This finding was important for interpreting survey data because scales with low internal consistency, such as Subjective Norm, should be handled with caution when concluding respondents' intentions to collaborate with visually impaired peers.

Table 3: Results of Reliability and Correlation - Correlation Matrix



Notes: **. Correlation is significant at the 0.01 level (1-tailed); * Correlation is significant at the 0.05 level (1-tailed Cronbach's alphas in the parentheses along the diagonal; N=113

Regression Analysis:

Further analysis in Table 4 illustrates the results of the regression analysis for this study. A multiple regression analysis was used to identify the students' intention to collaborate with VI peers. The regression analysis showed that the predictive coefficient was statistically significant, as indicated by the F-value (p-value < 0.001). This suggested that the independent variables: Attitude, Subjective Norms, Perceived Behavioural Control, and Awareness were together accounted for a significant percentage of the variance in the dependent variable, that is, Intention to Collaborate with VI Peers. The R^2 score of 0.359 showed that the regression model explained roughly 35.9% of the variation in the dependent variable. However, the adjusted R^2 value, which accounted for the number of variables, was significantly lower at 33.6%. This adjustment prevented the regression model from exaggerating its explanatory power as a result of the inclusion of several variables.

Furthermore, Awareness was the only significant variable (coefficient = 0.820, p < 0.001), indicating that it was positively correlated with the dependent variable. This shows that as awareness grows, so does the willingness to work with visually impaired peers. On the other hand, Attitude (coefficient = -0.053, p = 0.692),

Subjective Norms (coefficient = 0.183, p = 0.227), and Perceived Behavioral Control (coefficient = 0.209, p = 0.168) were not statistically significant since their p-values surpassed the standard p-value criteria of 0.05. These data suggested that these variables had no significant impact on the dependent variable in this model. Overall, the regression model was statistically significant, although only one variable, which was Awareness, had shown to be statistically significant in predicting the dependent variable. Hence, the model accounted for roughly 33.6% of the variation in the dependent variable. However, it also implies that the remaining 64.1% of the variance is influenced by other unmeasured factors not captured within the current model, which is further discussed in the discussion section.

Table 4: Results of Multiple Regression Analysis

Variables	Std Beta Coefficients
Attitude	-0.053
Subjective Norms	0.183
Perceived Behavioral Control	0.209
Awareness	0.820
R^2	0.359
Adjusted R^2	0.336
F value	15.144
Sig. F value	<.001

Notes: ** significant at the 0.05 level

Discussion

This section examined the key findings by evaluating the relationships and significance between the independent variables: Attitude, Subjective Norms, Perceived Behavioral Control, and Awareness and the dependent variable, which was the Intention to Collaborate with VI Peers. It was also connecting these findings to the research questions and existing literature.

	Hypothesis	Results
H^1	There is a significant relationship between the attitudes and intention to collaborate with visually impaired peers.	Supported
H^2	There is a significant relationship between subjective norm and intention to collaborate with visually impaired peers.	Supported
H^3	There is a significant relationship between perceived behavioural control and intention to collaborate with visually impaired peers.	Supported
H^4	There is a significant relationship between awareness and intention to collaborate with visually impaired peers.	Supported

Based on the results, this study confirmed that attitude had a low positive relationship with intention to collaborate with visually impaired peers. Attitude could be either positive or negative. This finding is consistent with a study by Kersh (2011), the idea of the word "haters" reflects how individuals consistently have negative feelings regardless of the object. This result further supports that when a person has a positive attitude, the intention to collaborate with visually impaired peers increases. For instance, a study on employers' intentions to hire visually impaired individuals. The findings showed that the employers had a negative attitude towards hiring visually impaired individuals due to doubts about their capabilities in the workforce and they believed that it might be economically disadvantageous. Hence, it is proven that attitudes significantly influence someone's intention to collaborate with visually impaired peers and H1: There is a significant relationship

between attitudes and intention to collaborate with VI peers is supported.

What follows is an account of the subjective norm that shows a low positive relationship with intention to collaborate with visually impaired peers. Based on Ajzen (1991), subjective norms are related to the sense of social obligation to perform or avoid a given behavior. In this situation, it meant that non-disabled students felt obligated either to collaborate or not to collaborate with VI peers because they were influenced by their environment. It is encouraging to compare this finding with found in an article from the United Nations mentioned that students' intentions to participate in collaborative procedures with VI peers were reinforced when they believed that their teachers and friends encouraged these practices together. So, it was evident from the example that a person's intention to work with visually impaired peers was greatly influenced by the subjective norm; thus, H2: There is a significant relationship between subjective norms and intention to collaborate with VI is supported.

Turning now to the result of the perceived behavioral control, which had a moderate positive relationship with the intention to collaborate with visually impaired peers and supported H3. Based on Ajzen (2002), PBC refers to an individual's perception of the ease or difficulty of performing a particular behavior. When a person had a positive perceived behavioral control, they highly believed that they could perform a behavior with ease. A study by McDonnall & Lund (2019) highlighted that perceived behavioral control was one of the factors of intention to hire employees with visual impaired. The study indicated that when individuals felt more in control and confident about their abilities to interact in these situations, they were more likely to actively participate and engage with people with disabilities. Therefore, these results further support the idea that perceived behavioral control could influence the intention to collaborate with visually impaired peers.

Another significant aspect of the variables is awareness. In contrast to the previous findings, this study highlights its important role in shaping inclusive behavioral intention. Results indicated that Awareness had a moderate positive relationship with the intention to collaborate with visually impaired peers, which later supported H4: There is a significant relationship between awareness and intention to collaborate with VI peers. This result findings may be related to, who are more adjusted to the needs, experiences, and challenges of VI individuals who are more likely to engage positively in collaborative settings. This aligns with R.P. Spunt (2015), as cited in Cook & Polgar (2014), the level of awareness depended on the integrated brain function, which involved receiving and selectively processing sensory information and relating it to memory and emotion to fully appreciate the value of sensory input. It seems possible that these results are due to, when people increased their level of awareness, their understanding and sensitivity toward others also improved. Another possible explanation for this is, having friends or family members who have suffered from a particular condition can significantly boost one's awareness of their surroundings and the challenges faced by others (Lu & Liu, 2022). This study clearly illustrated how awareness could influence the intention to collaborate with visually impaired peers.

About the results of this study, the findings showed that the three independent variables, attitude, subjective norms, and perceived behavioral control, were collectively explained by 35.9% of the variance in non-disabled students' intention to collaborate with their visually impaired peers ($R^2 = 0.359$). This indicates a moderate level of predictive power and indicates the partial applicability of the Theory of Planned Behavior (TPB) in the context of inclusive education at the university level.

However, the model also left 64.1% of the variance unexplained, suggesting the presence of additional factors beyond those discussed by this study via the TPB construct. These unmeasured influences may include prior personal experiences with disability, exposure to inclusive environments, institutional or policy-level support, levels of empathy or altruism, or sociocultural norms surrounding disability. The above-mentioned unexplained variance may reflect the multifaceted nature of inclusive intention, indicating that non-disabled students' willingness to engage with visually impaired peers may be shaped by a broader array of cognitive, emotional, and contextual factors.

5. Future Research and Recommendations

Writing at this level, it is worth noting that this highlights the importance of extending future research beyond

the TPB framework to include more diverse and situational predictors. For example, variables such as disability-related awareness training or knowledge, peer or buddy modeling, inclusive academic exposure, and past interaction with persons with VI could provide a more comprehensive understanding of the determinants of inclusive behavior, especially for VI peers. Perhaps, addressing these factors could significantly improve the design of interventions aimed at fostering a more inclusive and empathetic learning environment in higher education institutions for VI.

Furthermore, these findings perhaps underscore the importance of intentional awareness-building. As students shared, they were often unsure how to help or include peers with VI. This suggests a need for targeted programs such as workshops that involve VI peers or peer-led dialogues that normalize inclusion. The disability center at the university could also actively host campaigns that "promote the advantages of helping people with visual impairments among family and friends.

Conclusion

In conclusion, while TPB constructs of attitude, norms, and perceived behavioral control matter, awareness closes the gap between intention and action. This research not only affirms TPB's utility in educational contexts but also invites stakeholders to foster a culture where all students and the campus community, regardless of ability, to feel seen, valued and included in the system.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Stakeholder-Related Factors Facilitating the Success of the Halal Food Control System: A Systematic Review in the Malaysian Context

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Abstract: The halal food control system in Malaysia involves multiple stakeholders whose roles are critical in ensuring food complies with Islamic dietary laws. However, challenges such as fragmented coordination, inconsistent implementation, and limited stakeholder integration hinder its effectiveness. This review aims to identify and analyze stakeholder-related factors that facilitate the success of the halal food control system in Malaysia. This study adopts a systematic literature review approach by identifying relevant publications from 2018 to 2023 across major academic databases. Articles were filtered based on titles, abstracts, and relevance to stakeholder-related factors. A total of 938 articles were reviewed to construct a thematic discussion. This paper identifies six main stakeholder-related factors that may facilitate the success of Malaysia's halal food control system: halal knowledge, assurance factors, organizational environmental factors, management and strategies, technology and tools, as well as consumer feedback and handling. This paper contributes new knowledge by synthesizing fragmented literature into a comprehensive thematic framework grounded in stakeholder theory. It offers theoretical insights and serves as a reference for researchers, policymakers, and halal industry players seeking to understand and strengthen stakeholder roles in halal governance. The findings provide practical guidance for improving policy, governance, and strategic collaboration in halal food control. However, the review is limited to the food sector and relies solely on secondary data. Future research needs to expand beyond the perspectives discussed in the paper to other halal industries, involve comparison across countries, time span, and different databases.

Keywords: *Halal food, control system, stakeholders, factors, systematic literature review*

1. Introduction

The halal industry is expanding globally as well as in Malaysia due to the increasing demand for halal products from the global population. With 33.2 million Muslims making up 63% of the population, Malaysia has shown itself to be a successful global player in the halal industry. Malaysia is determined to maintain its lead in the development of the Islamic Digital Economy (IDE) in the region (MIDA, 2022). This is evidenced by the fact that Malaysia is acknowledged globally for the quality of its halal certification, the standards it upholds, and its organized halal business ecosystem. With an index score of 209.8 for the Halal Food Indicator (HFI) in 2020, Malaysia outperformed several other countries, including Singapore (125.2), the United Arab Emirates (104.4), Indonesia (71.5), and Saudi Arabia (51.1). This score was established based on the following factors: public knowledge of halal and product prices, Malaysia's dominance in the trade of halal food goods, and regulations and standards about halal (Bedford, 2020).

According to the Ministry of Investment, Trade and Industry (MITI), with the support of the Halal Industry Master Plan 2030 (HIMP 2030), it is anticipated that Malaysia's halal business will reach US$113.2 billion (RM500 billion) by 2030 and contribute 8.1% to GDP by 2025. This is evidenced by the fact that Malaysia's halal exports increased in 2022, totaling RM59.46 billion—a 63.8 percent rise over the previous year. Food and beverages continue to be the largest sector contributor to the Malaysian halal economy, accounting for 46.8% of all Malaysian halal exports with a total export value of RM27.84 billion (HDC, 2023). Over the past ten years, Malaysia has seen an increase in the amount of imported food goods entering the country, which has also impacted the increase in halal food imports from other countries (Rusmita et al., 2023). According to a report by the Malaysia External Trade Development Corporation (MATRADE, 2020), food imports rank among the top ten largest import products into Malaysia annually (Handayani, 2022).

The government policies that encourage and facilitate the growth of the halal industry are a sign of the nation's strong commitment to realizing its goal of becoming a global leader in the halal sector. Reflecting back on the

Eleventh Malaysia Plan (11MP) (2016–2020) and further elaborated in the Twelfth Malaysia Plan (12MP) (2021–2025), the halal sector was included as a main focus area for high-potential industrial development. Along with the introduction of the Shared Prosperity Vision 2030 in 2019, the government outlined seven (7) Strategic Thrusts, the second of which focuses on Key Economic Growth Activities (KEGA). One of the 15 KEGA activities under KEGA 6, which centers on the Halal Hub and Food, explicitly states this. To facilitate the execution of projects under KEGA 6 of the Shared Prosperity Vision 2030, which is aligned with the 12MP (2021–2025) and 13MP (2026–2030), the Halal Industry Master Plan 2.0 was introduced.

In recent years, Malaysia's halal food industry has been under growing pressure due to rising global demand, more informed consumers, and increasingly complex international supply chains. As prior information, the Malaysian halal food control system consists of a few components, including halal food legislation, management control, inspection, laboratory services, education, communication, and training, which collectively aim to ensure compliance with Islamic dietary laws (Ahmad et al., 2018). Despite advancements, systemic weaknesses persist, including misuse of halal logos and questionable certification integrity (Azizah, 2021; Arif & Sidek, 2015). Shortcomings in the Department of Islamic Development Malaysia (JAKIM) procedures, coupled with insufficient human resources and overlapping administrative jurisdictions, have led to enforcement inefficiencies (Aziz et al., 2022). High-profile incidents, such as the 2020 illegal meat cartel scandal in Senai, Johor Bahru, exposed vulnerabilities in halal logo labelling, raw material purity, and supply chain security (Ali & Suleiman, 2018; Laporan Penyata Rasmi, 2020). Further investigations revealed that the syndicate smuggled illegal meat from China, Ukraine, Brazil, and Argentina using falsified customs and halal documents to bypass official checks. The illicit products were repackaged with fake halal logos (Laporan Penyata Rasmi, 2020; Ahmad, Shamsu & Ariffin, 2023) and distributed to the market, generating public outrage and eroding trust in halal governance. The meat supplier was found using dummy payment documents, halal certificates, and import permits (Muhammad Shahrulnizam, 2020). To hide it from local authorities, the supplier combined meat imported from trustworthy sources with meat lacking a valid halal certification (Rusni et al., 2020). Similar cases of halal fraud, such as mixing beef with buffalo meat, substituting pork or dog meat, and selling carcass or diseased meat, have been documented (Abd Razak, Ramli, Jamaludin, 2020). Not only that, a reported case at the Port of Tanjung Pelepas, where halal and non-halal frozen meat were stored together, illustrates ongoing operational lapses (Azizah, 2021; Said, 2017).

The cartel's scandal and misuse of halal logo cases highlighted weaknesses in inter-agency coordination between JAKIM, the Royal Malaysian Customs Department (JKDM), the Department of Veterinary Services (DVS), and the Malaysian Quarantine and Inspection Services (MAQIS). Mixing halal with non-halal meat, falsifying origins, and using expired certificates ruins Malaysia's international halal reputation. It was found that factors contributing to these loopholes included operational procedures (Berita Harian, 2021), enforcement issues (Parzi, 2020), overlaps in the scopes of agencies that complicated control implementation (Mohamed Arshad, 2020), weaknesses in standard operating procedures (SOPs) (Astro Awani, 2021), problems in halal enforcement coordination (Ishak, 2020), and integrity issues (Ab Rahman & Muhamed, 2021). Therefore, it would mean that leakage would occur in the situation where the halal control mechanism is weak and has numerous flaws. The violations not only contravene religious rules but also pose risks to the health of the population and harm the credibility of the world being halal-approved.

Contrary to its status as a world-leading halal governance agency, the halal fraud issues, including the 2020 meat cartel scandal in Malaysia, revealed the prominent vulnerabilities of the system, such as the lack of coordination between the agencies, a decentralized enforcement policy, and an out-of-date monitoring framework. Lack of a specific halal law in Malaysia has resulted in jurisdiction gaps that have forced central agencies to exercise laterality in enforcing halal standards (Abdullah et al., 2017). These gaps are going to jeopardize Malaysia as a global leader of halal unless prompt reforms are undertaken. The shortcomings have highlighted the need to ensure that all stakeholders implement transparent, ethical, and socially responsible practices that can help maintain the integrity of the Malaysian halal ecosystem. To reduce such issues, higher enforcement, built-in traceability systems, and collaboration amongst stakeholders are necessary. Halal governance is a matter of integration among the agencies having different responsibilities: DVS and JAKIM are involved in pre-importation management, including livestock evaluation, hygiene, and compliance with slaughter, whereas Customs and MAQIS are involved in border management and verification of documents and the monitoring of products (Mohd Riza et al., 2022). Such interlocking functions are critical to collaboration,

but manpower and jurisdictional overlap make it inefficient (Abdul Wahab et al., 2015).

Although there are several studies conducted to support the global reputation of Malaysia as a hub of halal certification, limited research has been conducted regarding its stakeholder integration approach. The novelty of this literature review lies in synthesizing fragmented studies into a comprehensive stakeholder-based framework, filling the gap left by prior works that largely focused on supply chain or certification processes without fully addressing the interrelationships, accountability, and collaborative mechanisms among the key players. Due to several cases of fraud arising from deficiencies in halal control, coupled with limited prior research, this review paper attempts to explore the factors that facilitate the halal food control system. The research is driven by the fact that there was a glaring need to find solutions to the persistent lapses in the halal food control system in Malaysia. It is motivated by the ongoing issues of the halal food control system of Malaysia, the lack of coordination among stakeholders, overlapping jurisdiction, and the recorded incidences of fraud, like the meat cartel. It is anticipated that the findings will be used as a guide and reference for all stakeholders involved and also help empower the halal food industry in Malaysia. The study will also be able to boost consumer confidence in Malaysian halal certification and capability to help the country become one of the leaders in the global halal food industry. The paper consists of four (4) sections. The first section will give a brief background on the halal food control system of Malaysia, and the second section will explain the methodology of identifying the factors related to the stakeholders that will make the halal food control system successful. The third section gives the results and discussion, followed by the conclusion and contributions of this research in the last section.

2. Literature Review

The halal food regulation system is based on Islamic law, which refers to numerous details of the life of Muslims, including their food habits (Othman et al., 2019). “Halal” is an Arabic word meaning “permissible” or “lawful” to describe goods and foods Muslims can eat (Azam & Abdullah, 2020). Halal is also known as the lack of vague or prohibited ingredients to keep the product safe and clean (Jaswir, Sari, & Che Daud, 2021). It could also be defined as anything that is acceptable, authorized, and compliant with Islamic law (Mohamed, Abdul Rahim, & Ma'aram, 2020). Halal are the food and drinks that Muslims are allowed to eat, and they might be created and processed following a specific code, including the practice of killing animals and the kind of materials utilized (Azam & Abdullah, 2020; Razak et al., 2019). For example, halal meat must come from animals slaughtered by Islamic law and must not contain any prohibited ingredients, such as alcohol, pork, or their by-products. According to Abbas, Abdullah, and Umar (2021), the word “haram” is the opposite of “halal” and means “forbidden”, “unlawful”, or “illegal”. It is also mentioned in many verses of the Holy Quran and hadith. Anything that is prohibited, illegal, or not permitted in Islam is referred to as haram, the opposite of halal. The concepts of halal and haram have a significant influence on many aspects of a Muslim's life. Islamic principles prohibit participation in usury, gambling, deceit, fraud, and other unethical or exploitative activities. The basic concepts of halal and haram determine what Muslims are allowed to do in their daily lives. These terms are widely used to discuss various topics, including choices about what to eat and what is permissible to consume. In the context of halal food, the preservation of the goals of Islamic law, specifically in religion and life, is highly valued. Consuming halal food may safeguard both physical health by providing healthy and fit food and the religious commitment by enhancing an individual become closer to Allah SWT.

Most of the Islamic countries have established their regulatory bodies in order to certify halal products and services. The system of halal food management in Malaysia has transformed with time (Razak et al., 2019). Halal certification is one of the primary reasons that make Malaysia a potential global leader. To complement Sustainable Development Goal (SDG) 12, which focuses on responsible production and consumption, it develops a halal-based knowledge economic chain. A lot of things have to be taken into consideration in an attempt to ensure the long-term economic sustainability of halal food chains. The most notable is the halal control system, with several stakeholders that operate to manage all activities of the food chain (Ahmad et al., 2018). Halal control is are process and systems adopted to certify that foods and consumer products are within the Islamic dietary injunctions. The Malaysian system of controlling halal food employs numerous stakeholders, namely all governmental agencies and bodies, consumers, and businesses. It is principally under the supervision of JAKIM, who works with several stakeholders to ensure that the food substances and premises pass the test of being halal. The Ministry of Health (MoH), Customs, and DVS are among the

organizations that support the halal food control system. However, each stakeholder performs their duties uniquely and independently. No official system is in place to coordinate any of these responsibilities (Soraji, Awang, & Yusoff, 2017). The application of halal certification has deficiencies, especially with regard to control, as evidenced by a number of reported fraud and malpractice cases. Problems with jurisdiction and coordination among various stakeholders further complicate monitoring and control, potentially compromising transparency and the free flow of information between agencies (Ahmad et al., 2018; al-Busaidi & Jukes, 2015). Furthermore, it is thought that the current conventional approaches to food safety, especially in the halal food control system, are inadequate to stop fraud (Ahmad et al., 2018).

A review of past studies, as summarized in Table 1 below, shows that research on halal food control systems in Malaysia is robust but hindered by persistent implementation gaps. Most of the prior research was often separated by stakeholder (regulator, firm, or consumer), resulting in a lack of cross-stakeholder coordination. At the system level, Malaysia's control system covers legislation, inspection, laboratories, and education, yet results show uneven enforcement and persistent coordination gaps across agencies, which dampen policy intent at ground level (Ahmad et al., 2018). Studies on enforcement practices show weaknesses after certification, especially in the monitoring and renewal stages, which can lead to integrity issues (Daud, Zarmani, & Tumiran, 2021). On the compliance side, entrepreneurs' behavior improves with perceived benefits, awareness, and recognition of risk, indicating that stakeholder engagement shifts compliance outcomes (Basarud-din, Al Jaffri Saad, & Aminullah, 2022). On the company level, evidence shows that adoption of MS1500 correlates with stronger process control and integrity, particularly when paired with audits and capacity-building (Jaswir, Sari, & Che Daud, 2021). In terms of supply chain, findings show that environmental and organizational factors drive traceability, but limited visibility across all stakeholders hinders prevention and quick action (Ab Rashid & Bojei, 2019; Mohamed, Abdul Rahim, & Ma'aram, 2020). Some studies show that greener logistics need knowledge, technology, strategy, and context (Ahmad et al., 2023), while consumer research shows that trust depends on credible labels and transparent handling (Ibrahim et al., 2023).

Numerous studies on food control have been conducted in other nations, but the patterns echo the same. Prior research concludes that differences across borders, unclear roles, and poor data-sharing between organizations keep happening; therefore, results rely as much on how well governance systems work together as on any one control method. In Austria, national control data shows that enforcement depends on resource use and sector focus, but routine checks miss some fraud, highlighting the need for risk-based action (Lueckl et al., 2019). Germany's experience shows that coordinated roles among authorities, industry, and auditors reduce malpractice, but poor information sharing creates gaps (Wisniewski & Buschulte, 2019), as in the U.S., halal market expansion has outpaced harmonization, yielding fragmented stakeholder expectations and uneven assurance (Atalan-Helicke, 2023). There are studies on slaughter oversight that highlight that consistent supervision and clear records throughout the process are key to compliance (Fuseini, Teye, & Lever, 2022). Another perspective, which focuses on digital retailing, shows that to maintain trust, traceability, and online sales, clear records and consistent labeling are required (Hamid & Alemu, 2023).

When looking at the perspective of technology and laboratory science, past studies show promise but remain restricted. Blockchain and IoT can secure provenance and automate audits internationally, though adoption is slowed by interoperability, cost, and capability gaps (Kurniawan, Suparno, & Vanany, 2023). Analytical methods, such as spectroscopy, proteomics, and DNA testing, offer increasingly sensitive authenticity checks, but their impact relies on integration into risk-based regulatory programs (Kua et al., 2022). Laboratory syntheses provide workable conformity-testing workflows for control systems (Al Olan & Yossouf, 2023), and design studies show that machine-readable halal rules can encode chain-wide constraints (Mohamad Hashim et al., 2023). Yet, without aligned incentives, standardized data frameworks, and coordinated governance, these largely tool-centric pilots struggle to progress beyond limited-scale applications.

Across Malaysian and global evidence, the consistent gap is the absence of an integrated, stakeholder-centered synthesis that connects governance, assurance, supply chain practice, technology, and consumer trust into a single, decision-ready model. Prior research reports strong but fragmented results, and the field still lacks a clear framework explaining how different players work together to ensure halal integrity. Previous studies have focused more on control systems within the halal food supply chain (Mohamed, Abdul Rahim, & Ma'aram, 2020; Ab Rashid & Bojei, 2019; Supian & Abdullah, 2019). There is a study that examines the food control

system in terms of processes and halal food control activities without directly linking it to stakeholders or the agencies involved (Ahmad et al., 2018), and an earlier study related to halal control and assurance activities focusing on logistics aspects (Tieman & Ghazali, 2014). No studies were found on the halal food control system from the perspective of stakeholders as an integrated framework. Although prior research has contributed valuable insights into halal certification and supply chain management, critical gaps remain. Many studies have focused on isolated dimensions such as certification procedures or logistics compliance, with limited emphasis on the interconnected roles of diverse stakeholders. Geographically, most research is either global in scope or limited to single-country perspectives without deep engagement in Malaysia's regulatory ecosystem. Therefore, this study addresses this by assembling recent literature into a holistic stakeholder framework comprising all interrelated factors. The novelty of the study lies in its systematic literature review of related publications that consolidates fragmented research into a unified thematic framework grounded in stakeholder theory. By identifying the interrelated factors, this study bridges regulatory, industry, and consumer perspectives in Malaysia's halal food control system by applying a structured, systematic literature review methodology and synthesizing evidence from multiple stakeholder groups to provide actionable insights into the halal food control system. It combines the dimensions in an evidence-based thematic model that responds to the coordination, enforcement, and integration issues noted in previous studies and provides a transferal framework suitable for other halal-related industries and foreign halal governance situations.

Table 1: Prior research on halal food control systems

Authors	Year	Title of Study	Journal Title	Method Used	Results
Ahmad, N., Ungku Zainal Abidin, U. F., Othman, M., & Abdul Rahman, R.	2018	Overview of the Halal Food Control System in Malaysia	Food Control	Policy/system review	Reviewed legislation, management, inspection, laboratory, and education functions; identified coordination gaps and uneven enforcement.
Daud, M. Z., Zarmani, N. F., & Tumiran, M. A.	2021	Analysis of halal assurance management on imported food products in Malaysia	International Journal of Halal Ecosystem and Management Practices	Document analysis/case evaluation	Found vulnerabilities in post-certification surveillance and renewal cycles.
Basarud-din, S. K., Al Jaffri Saad, R., & Aminullah, A. A.	2022	Malaysian halal certification: A study of compliance behavior of Muslim entrepreneurs	Global Journal Al-Thaqafah	Survey (Muslim entrepreneurs)	Perceived benefit, awareness, and risk salience significantly predicted certification compliance.
Jaswir, I., Sari, D. P., & Che Daud, M. R.	2021	Implementation and impact of halal food standard: An empirical study in Malaysia	Journal of Islamic Monetary Economics and Finance	Empirical survey	MS1500 implementation is linked to stronger process control and integrity outcomes, effective with training and audits.
Ab Rashid, N., & Bojei, J.	2019	The relationship between halal traceability system adoption and environmental factors on halal food supply chain integrity in Malaysia	Journal of Islamic Marketing	Survey: Structural Equation Modeling (SEM)	Environmental and organizational factors drive traceability system adoption; cross-stakeholder visibility remains partial.
Mohamed, Y.	2020	The effect of halal	Journal of Islamic	Survey;	Halal supply chain

H., Abdul Rahim, A. R., & Ma'aram, A.		supply chain management on halal integrity assurance for the food industry in Malaysia	Marketing	Quantitative analysis	management practices significantly enhance integrity assurance.
Mohamad Hashim, S. F., Salim, J., Mohd Noah, S. A. M. N., & Wan Mustapha, W. A.	2023	Ontology-based traceability system for halal status of flavour	Malaysian Journal of Information and Communication Technology	Design/prototype	Demonstrated machine-readable semantics can encode halal rules for improved traceability.
Ahmad, H., Mohamed Udin, Z., Nor, N. F., & Ariffin, A. S.	2023	Knowledge management, technology, strategy, and environment in the halal food industry green supply chain and logistics performance	Journal of Technology and Operations Management	Survey: Partial Least Squares Structural Equation Modeling (PLS-SEM)	Linked knowledge management, technology, strategy, and environment to improve green supply chain and logistics performance.
Ibrahim, I. I., Md Nor, M. N., Ahmad, Z., Mohd Razali, M. F., & Mansor, Z.	2023	Examining the awareness of Muslim consumers towards halal food	International Journal of Entrepreneurship and Management Practices	Survey	Moderate awareness, high sensitivity to certification; trust relies on credible labels and transparency.
Lueckl, J., Weyermair, K., Matt, M., Manner, K., & Fuchs, K.	2019	Results of official food control in Austria 2010–2016	Food Control	Administrative data analysis (2010–2016 inspection decisions)	Showed how resource allocation and sector targeting impact enforcement outputs; routine controls are useful, but limited in non-compliance detection.
Wisniewski, L., & Buschulte, A.	2019	Food control as a means of addressing fraud and malpractice in the food industry in Germany	Food Control	Case-based policy analysis	Coordinated roles among authorities, industry, and auditors reduce malpractice risks; siloed information flows create enforcement blind spots.
Atalan-Helicke, N.	2023	Halal certification in the United States and the expansion of halal markets	Religious Economies in Secular Context: Halal Markets, Practices and Landscapes	Qualitative institutional study	Market growth has outpaced alignment, causing fragmented stakeholder expectations and inconsistent assurance practices.
Fuseini, A., Teye, M., & Lever, J.	2022	An update on halal slaughter: Current methods and ongoing research and their implications for animal welfare	Animal Welfare	Review and appraisal of animal-welfare evidence	Compliance verification depends on standardized supervision and transparent record-keeping throughout the chain of custody.
Kurniawan, M., Suparno,	2023	Implementation of blockchain	Proceedings International	Systematic literature review	Blockchain and IoT can enhance provenance and

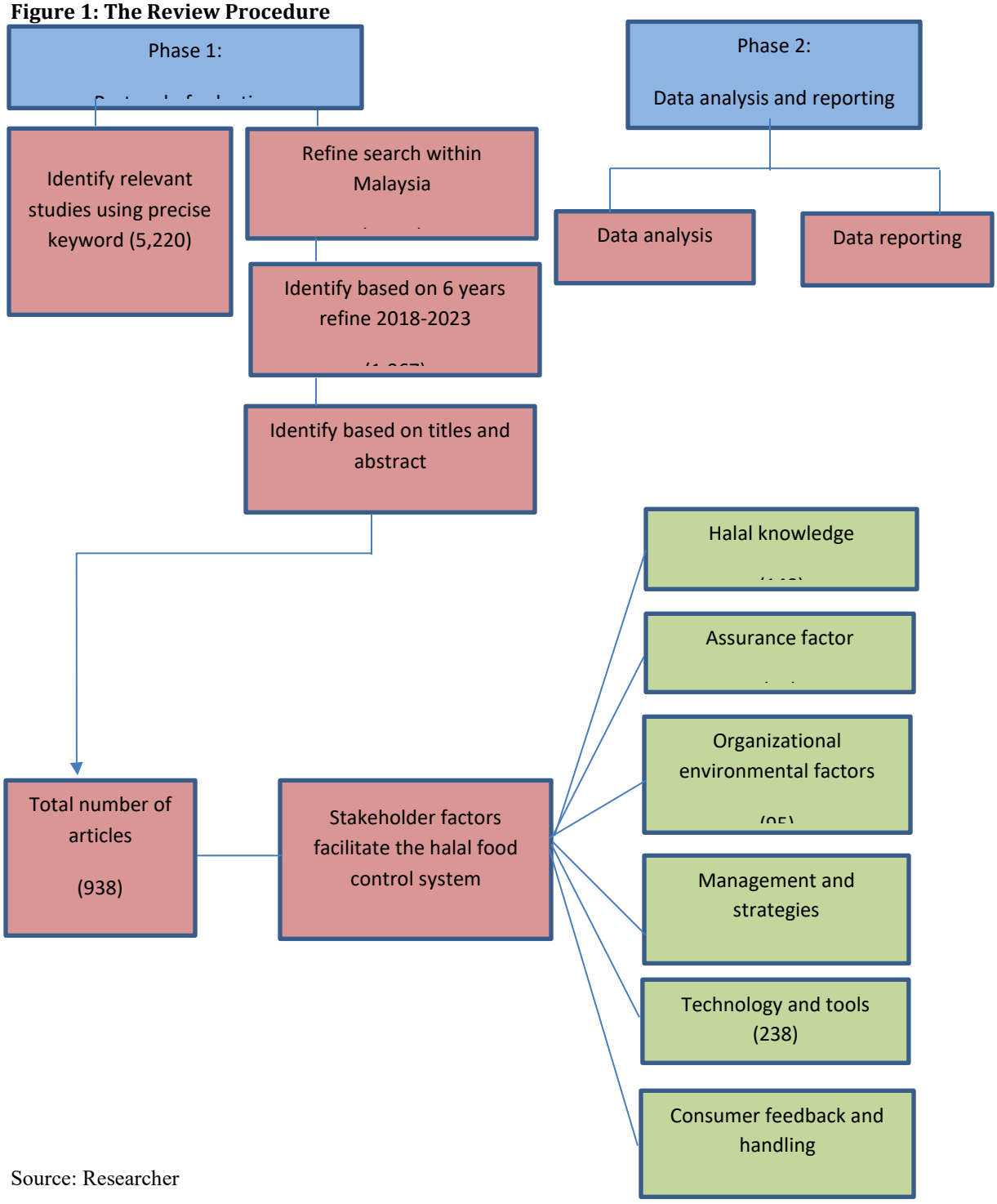
S., & Vanany, I.		technology and the Internet of Things in halal supply chain traceability and food safety: A systematic literature review	Conference on Technology on Community and Environmental Development		automate audits, but adoption has been slowed by interoperability, cost, and capability gaps.
Kua, J. M., Azizi, M. M. F., Abdul Talib, M. A., & Lau, H. Y.	2022	Adoption of analytical technologies for verification of authenticity of halal foods—A review	Food Additives & Contaminants: Part A	Methods review in analytical science	Lab techniques are increasingly sensitive but must be embedded in risk-based regulatory programs for meaningful impact.
Al Olan, M. S. M., & Yossouf, A. A. P.	2023	Laboratory methods for authenticating the conformity of halal foods	Halal and Kosher Food: Integration of Quality and Safety for Global Market Trends	Chapter-level synthesis of laboratory authentication methods	Detailed practical workflows for conformity testing as part of halal control systems.
Hamid, A. A., & Alemu, A. E.	2023	Technology and halal retailing sector: Digital transactions and what is new?	Technologies and Trends in the Halal Industry	Qualitative analysis of technology and retailing trends	Clear audit trails and consistent labeling are essential for consumer trust in traceability and e-commerce oversight.

3. Methodology

This paper utilizes a systematic literature review to determine the stakeholder-related issues that enhance the success of the halal food control system in Malaysia. Employing such a systematic approach in literature review was necessary to guarantee a focused and systematic literature review into factors surrounding stakeholders that helped make Malaysia's halal food control system successful in two stages as follows: (1) Phase 1: Protocol of data selection; and (2) Phase 2: Data analysis and reporting. The initial step was developing a structured and open procedure for selecting relevant literature. Defining inclusion and exclusion criteria, selecting the period of the publications, and implementing the initial screening were involved in this. The halal food control system included stakeholders and their contributions that were considered in the choice process. Articles were reviewed depending on their title and abstracts, as well as the complete texts where they were necessary, to ensure only those that aligned with the purpose of the research were retained. In the second phase, analysis and synthesis of the articles chosen played the greatest role. This analysis was based on the stakeholder theory model (Freeman, 1984), which gave the conceptual framework for determining how to identify and classify the roles of different stakeholders. The understandings obtained as a result of the reviewed literature were interpreted into a conceptual model using stakeholder theory. In this model, the interaction and the impact of each type of stakeholder on the efficacy, integrity, and transparency of the halal food control system are depicted.

In this section, the theoretical framework methods of the systematic review conducted in this study are explained more elaborately as described below, with a summary of the steps involved illustrated in Figure 1 below:

Figure 1: The Review Procedure



Source: Researcher

Phase 1: Protocol for Data Selection

Phase 1 involves the identification of the most dependable past research to be used as sources for the review. This phase began by searching for reliable studies using the keywords "factors facilitating halal food control system" in reputable databases. The databases used were Emerald Insight, Google Scholar, ResearchGate, and ScienceDirect. The selection of these databases was driven by their broad coverage of peer-reviewed publications and their accessibility for multidisciplinary halal-related research, including both journal articles and relevant conference proceedings. Although publishers such as Springer, Sage, and Wiley, along with

indexing platforms like Web of Science and Scopus, also contain relevant literature, the initial scoping revealed substantial overlap with the selected databases for the 2018–2023 period. However, it is acknowledged that comprehensive coverage in systematic reviews can be strengthened through the inclusion of other databases such as Web of Science and Scopus databases, which are known to index a wider range of high-impact literature. To ensure comprehensiveness, future research should integrate these databases to enhance both the extensiveness and quality of retrieved studies.

A total of 5,220 articles were retrieved based on the initial keywords. To further narrow the scope of the search, we refined it to focus on the context of Malaysia, resulting in 1,505 related articles. Then, the search was further refined by limiting it to six (6) years of publication, from 2018 to 2023, yielding 1,067 articles. After that, the researchers examined the titles and abstracts of each article to select those relevant to the keywords, and only original research articles were considered. Finally, the researchers successfully identified 938 articles related to the factors facilitating the halal food control system in Malaysia. The selection protocol and the total number of articles identified are shown in Figure 1 above.

Phase 2: Data Analysis and Reporting:

The review analysis is based on the stakeholder model established by Freeman in 1984. According to Freeman (1984), there are several key stakeholders involved in organizations who can make positive contributions, as they all play vital roles in ensuring the organization's successful operation. The attributes specified in Freeman's model include governments, local communities, employees, media, and competitors, which correspond to the stakeholder model that the researchers intended to apply in this study. All of these stakeholder attributes play key roles in ensuring that organizations can contribute to both the community and themselves. Jones, Wicks, and Freeman (2017) further established a broad definition of a stakeholder as "any group or individual who can influence or is affected by the achievement of the organization's objectives." This definition emphasizes the trust relationship between a business and its stakeholders, which include suppliers, customers, workers, shareholders, local communities, and management bodies.

According to Shalini, Neeliah, and Goburdhun (2008), and as indicated by Hopper and Boutrif (2006), stakeholder analysis is a method for identifying and assessing the relevance of groups of individuals and institutions that influence the food control system. Accordingly, they defined stakeholders as individuals or organizations with an interest in, or influence over, the quality and safety of food. They include:

- Those with direct or leading roles in the food control system, including government ministries, departments, and agencies.
- Those in secondary or supporting roles, such as organizations that provide information to food control authorities.
- Those affected by food control management, including consumer organizations.

Based on the stakeholder theory model (Freeman, 1984) and stakeholder analysis techniques (Shalini, Neeliah, & Goburdhun, 2008; Hopper & Boutrif, 2006), the halal food control system can be grouped into three (3) types of stakeholders. It involves commitment from multiple stakeholders, and each must ensure that food control is carried out effectively according to their distinct roles. Table 2 and Figure 2 below illustrate the halal food control system stakeholder model adopted from Freeman's stakeholder theory model and the stakeholder analysis approach.

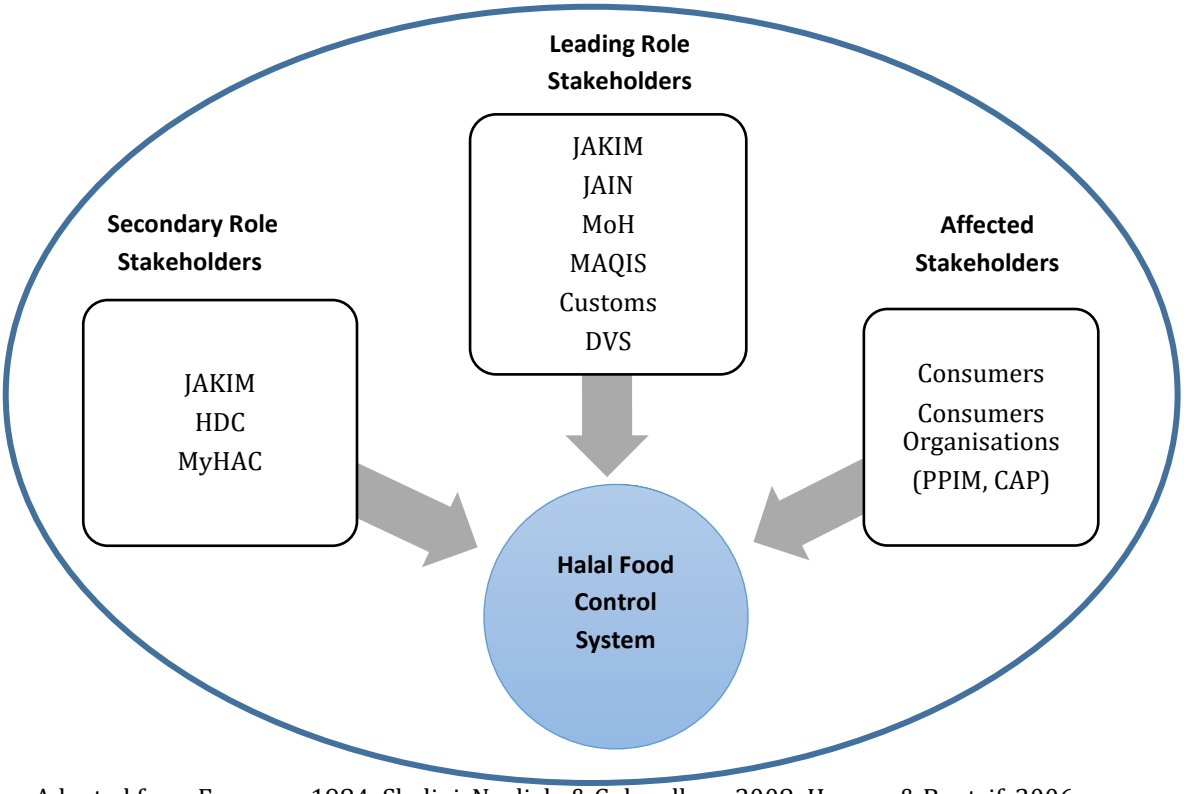
Table 2: Groups of Stakeholders in the Halal Food Control System

Type of Stakeholders	Roles	Institutions
Leading Role Stakeholders (The bodies directly responsible for and playing a leading role in the food control system)	‣ Inspection and Enforcement Body ‣ Control Management Body ‣ Legislation Body, Standards, and Fatwas	1. Department of Islamic Development Malaysia (JAKIM) 2. State Islamic Religious Council (JAIN) 3. Ministry of Health (MoH) 4. Malaysian Quarantine and Inspection Services (MAQIS) 5. Royal Malaysian Customs Department (Customs) 6. Department of Veterinary Services (DVS)

Secondary Role Stakeholders (The bodies that play supporting or secondary roles in the implementation of the food control system)	• Halal Analysis/ Laboratory • Halal Education and Training Bodies	Department of Islamic Development Malaysia (JAKIM) Halal Development Corporation Berhad (HDC) MyHAC
Affected Stakeholders (Entities or individuals who are indirectly affected by the certification process and its outcomes but do not directly participate in it)		Consumers Consumer organizations: • Persatuan Pengguna Islam Malaysia (PPIM) • Consumers Association of Penang (CAP)

Source: Researcher

Figure 2: Model of Stakeholders in the Halal Food Control System



Source: Adapted from Freeman, 1984; Shalini, Neeliah, & Goburdhun, 2008; Hopper & Boutrif, 2006

The analysis was based on 938 articles that were identified through several levels of refinement, as described in Phase 1 above. From these 938 articles, the researchers analyzed each article using the keyword "factors" involving any stakeholder in halal food control and grouped them under common themes. As a result, six (6) themes emerged based on the keyword "factors" that facilitate the success of the halal food control system in Malaysia: halal knowledge, assurance factors, organizational environment, management and strategies, technology and tools, and finally, consumer feedback and handling. The data analyzed were then reported in descriptive form, focusing on the factors that facilitate the success of the halal food control system as well as the stakeholders involved in each factor.

4. Results

This section presents the findings based on 938 articles published between 2018 and 2023, identified through searches on Emerald Insight, Google Scholar, ResearchGate, and ScienceDirect. Out of the total 938 articles, 194 articles were cited from ScienceDirect, 196 from Google Scholar, 208 from Emerald Insight, and 340 from ResearchGate. Among the selected search engines, the highest number of articles was cited from ResearchGate,

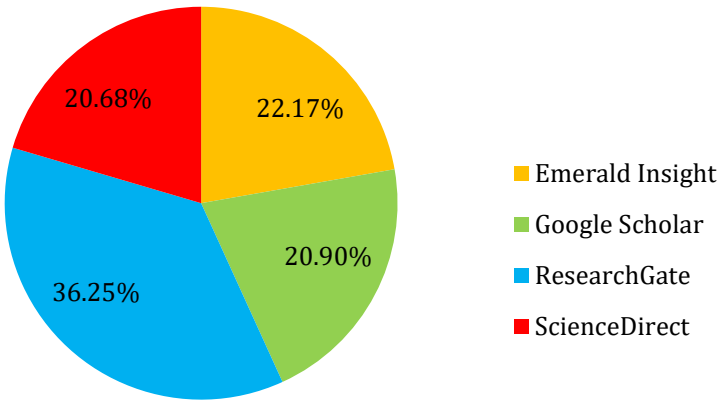
while the lowest number was cited from ScienceDirect. The number and percentage of articles cited from each search engine are detailed in Table 3 and illustrated in Figure 3 below.

Table 3: The number of articles cited using selected engines

Search Engine	Number of Articles
ScienceDirect	194
Google Scholar	196
Emerald Insight	208
ResearchGate	340
Total	**938**

Source: Researcher

Figure 3: Percentage of articles cited from selected search engines



Source: Researcher

From the total of 938 articles identified, the researchers conducted an analysis based on the keyword "factors" involving any stakeholder in halal food control and grouped them under common themes. As a result, the researchers successfully identified six (6) groups of articles with the same themes, along with the total number of articles for each theme, as shown in Table 4.

Table 4: Factors that facilitate the success of the halal food control system

Factors	Total Articles Identified
Halal knowledge	140
Assurance factor	96
Organizational environmental factors	95
Management and strategies	100
Technology and tools	238
Consumer feedback and handling	269
Total	**938**

Source: Researcher

As previously stated, the analysis of the factors that facilitate the success of the halal food control system focused on the involvement of stakeholders. Each factor identified involves several stakeholders and will be explained in more detail in the following discussion. Table 5 shows the stakeholders involved in each factor:

Table 5: Stakeholder-related factors that facilitate the success of the halal food control system

Factors	Stakeholders involved	
Halal knowledge	JAKIM	DVS
	JAIN	MyHAC
	MoH	HDC
	Customs	PPIM
	MAQIS	CAP
Assurance factor	JAKIM	DVS
	JAIN	MyHAC
	Customs	HDC
	MAQIS	
Organizational environmental factor	JAKIM	MAQIS
	JAIN	DVS
	MoH	MyHAC
	Customs	HDC
Management and strategies	JAKIM	MAQIS
	JAIN	DVS
	MoH	MyHAC
	Customs	HDC
Technology and tools	JAKIM	MAQIS
	JAIN	DVS
	Customs	MoH
Consumer feedback and handling	JAKIM	PPIM
	JAIN	CAP
	HDC	

Source: Researcher

Discussion

Referring to Table 4 above, there are 938 articles published over six (6) years that discuss stakeholder-related factors facilitating the success of the halal food control system in Malaysia. Given the extensive number of studies, the researchers categorized them according to thematic patterns. Articles falling under the same pattern were grouped into one theme. As a result, six (6) thematic groups of articles were identified that consider stakeholder-related factors facilitating Malaysia's halal food control system.

The analysis of the review showed that 140 articles discuss halal knowledge possessed by stakeholders, which is one of the factors facilitating the success of the halal food control system in Malaysia. Another 96 articles with a similar thematic pattern discuss the assurance factor as one of the stakeholder-related factors facilitating the success of Malaysia's halal food control system. This is followed by the organizational environment theme, which emerged as one of the stakeholder-related factors, with 95 articles identified under this category. Next, 100 articles that discuss management and strategies were also identified as a thematic group and considered stakeholder-related factors facilitating the success of Malaysia's halal food control system. Additionally, 238 articles were identified under the theme of technology and tools, while a total of 269 articles discuss consumer feedback and handling; both themes are also considered stakeholder-related factors facilitating the success of the halal food control system in Malaysia. Altogether, these articles make up a total of 938. A detailed discussion of each factor is provided as follows:

Halal Knowledge

The term halal knowledge refers to information possessed by a person or entity with a connection to halal products (Nuraini & Sucipto, 2021; Rahman et al., 2022). For organizations to operate successfully, halal knowledge is essential (Rahman et al., 2022). In order to guarantee adherence to halal standards, uphold integrity, and satisfy customer expectations, halal knowledge is crucial for all parties involved in the halal sector (Mohamed, Abdul Rahim, & Ma'aram, 2020). Every stakeholder involved in halal should have a comprehensive understanding of the fundamental principles outlined by Islamic laws (Hanafi & Nurdin, 2022). Halal knowledge is important, as it includes knowledge about permissible and forbidden ingredients, processing

methods, and practices prescribed by Islamic teachings (Romadlon, Istikomah, & Haryanto, 2023). Stakeholders involved in halal, including JAKIM, JAIN, MoH, Customs, MAQIS, DVS, MyHAC, and HDC, need to be familiar with halal requirements and procedures, as they are responsible for obtaining halal certification and controlling the halal process (Pratama, 2022). If there are loopholes in any part of the control process, it indicates that halal knowledge may not have been properly applied during the process (Muhammad, Elistina, & Ahmad, 2020). This statement proves that all stakeholders involved in managing halal processes should have expertise in halal knowledge.

Every related stakeholder should be aware of the halal logo, since all products related to its use are sensitive and require careful handling (Temizkan, 2022). This is because the majority of Malaysians are Muslims, who are highly attentive to the use of halal food in everyday life (Ibrahim et al., 2023). In order to ensure that the materials used in production adhere to halal standards (Mustafa, 2023), it is necessary for stakeholders handling halal control to closely monitor every step of the product development and manufacturing process (Ahmed Osman, 2023b). The most important aspect for those following JAKIM—the body that establishes halal standards—is that everyone involved must adhere strictly to these standards to prevent integrity issues when dealing with halal food (Awang, 2021).

In practice, the main bodies that handle halal processes in Malaysia are JAKIM and JAIN. However, there are also other agencies involved in related processes, namely MAQIS, Customs, DVS, MoH, HDC, and MyHAC (Sabri et al., 2021). The stakeholders are divided by their roles in the halal process (Ahmad, Mafaz & Rahman, 2023). JAKIM is the authority responsible for issuing halal certification (Razif & Yoyo, 2021) after several processes. MAQIS and Customs handle products imported at the border (Rahim, Ahmi, & Rahman, 2020), DVS oversees slaughtering, MoH manages production safety, while HDC and MyHAC are involved in training and halal analysis (Daud, Zarmani, & Tumiran, 2021). All these requirements demand halal knowledge in order to facilitate the success of the halal food control system (Riaz & Riaz, 2023). Meanwhile, PPIM and CAP represent consumers and act as stakeholders who voice concerns related to consumer issues, particularly regarding halal matters (Mahamud et al., 2023). This proves that every stakeholder needs halal knowledge (Azizan & Ahmad, 2019) to recognize any non-halal substances or non-compliance with requirements (Nazaruddin et al., 2023).

All processes involved in handling halal must stay updated on the regulatory requirements and guidelines related to halal certification, as this is crucial including compliance in their respective regions (Prawiro & Fathudin, 2023). With a better understanding of halal, Muslims can make more informed decisions about the integrity of their halal products (Assyarofi & Wulandari, 2023). This includes halal standards monitoring and continuous compliance audits (Tuan Sidek & Ahmad, 2018). Updating and expanding stakeholders' halal knowledge requires ongoing education (Umami, Puspa, & Irawan, 2023) and training initiatives (Widianti & Putri, 2023). Training events, workshops, and certification courses are some of the strategies that can be employed to increase the awareness of the halal laws, practices, and principles (Raimi, Adekunle, & Shabbir, 2023). The regulations on halal packaging and labelling should be learned by the stakeholders involved so that they may label halal products correctly and provide their consumers with accurate information (Muhamad et al., 2023). These include knowledge of certification marks of halal products, labeling, and the truthfulness of the claims that are identified about the items (Zainuddin et al., 2023).

The skills required to screen and verify the ingredients should also be provided to participants involved in the development and procurement of the products as well as manufacturing so that they can ensure ingredient compliance with halal standards (Eldaw & Ahmed Osman, 2023). All these include knowing the proper sources, processing equipment, and potential sources of contamination (Sulaiman, Zaini, & Othman, 2023). The stakeholders should also understand the processes and procedures of halal processing to ensure that what manufacturers produce complies with halal standards (Yuswan et al., 2020). One of them is the knowledge of halal slaughtering methods (Fuseini et al., 2022), procedures of handling halal food (Myat Min @ Mohd Omar et al., 2018), and cleanliness (Abd Razak & Ramli, 2019), which is used to avoid mix-contamination and keep halal intact. This will help food manufacturers to retain the integrity and purity of their halal products by following the right production procedures (Talib et al., 2020) and maintaining halal standards (Ahmed Osman, 2023a). Kashim et al. (2018) defined it as processing food according to hygienic and ethical requirements and assuring the separation of halal and non-halal foods.

Financing of the halal education and training programs enables the employees within the halal food sector to work more efficiently. These programs involve the training of the halal auditors, inspectors, food handlers, and management personnel to make sure that they are equipped with the knowledge and abilities necessary to uphold halal integrity (Chong et al., 2022). Within the halal food control system, knowing halal foods facilitates continual learning and improvement (Rahman, Rahman & Zahari, 2018). Stakeholders may improve their practices and strengthen the integrity of the halal food supply chain by keeping abreast of new developments in halal science, emerging trends, and legislation (Abdullah & Mohamed Adil, 2019). Overall, halal knowledge serves as the foundation of Malaysia's halal food control system, supporting consumer confidence, regulatory compliance, and the long-term viability of the halal sector (Kamarul, 2019).

Assurance Factor

The manufacture of products must adhere to proper halal practices in Malaysia, as evidenced by the MS1500 standard certification (Ab Talib, Chin, & Hamid, 2018). The ability of an organization to preserve its halal assurance status is a challenge (Othman et al., 2019), as certification must be renewed every two years (Zakaria & Abdullah, 2019). Due to the stringent certification process, most producers are unable to maintain their halal accreditation, ultimately impacting their halal assurance (Sucipto, Fadhila & Astuti, 2021). The stakeholders related to the assurance factor are those who are responsible for certifying the halal logo, namely JAKIM and JAIN (Razif & Yoyo, 2021). In order to maintain continuous assurance, the halal certificate must be renewed after its two-year validity (Haleem, Khan & Khan, 2021).

In order to implement effective control during the entire halal supply chain, it is necessary to learn the nature of the halal assurance systems (Shalifillizam et al., 2018) and best practices (Abderahman et al., 2021). All stakeholders must learn the concepts of traceability (Dehghani, Popova & Gheitanchi, 2021), quality assurance (Chong et al., 2022), and risk management (Riska Alifia et al., 2023) so that the integrity of halal products can be ensured. Producers or manufacturers would need to ensure that organizations that are involved with the halal certification process are legitimate (Rahman et al., 2022), accredited (Rafidah & Rozahan, 2021), and recognized by the authorities (Husna, Wong, & Osman, 2022). Having certification with well-known organizations will also ensure that the halal standards are adhered to and meet consumer trust (Nuraini & Sucipto, 2021).

As a recommendation, the industry should engage with the governments in terms of regular auditing and inspection provided to the auditors or certifying organizations to enforce halal requirements accordingly (Sharif & Ghani, 2019). Haleem, Khan, and Khan (2021) argued that producers should collaborate with auditors, provide access to facilities and documentation, and promptly correct any non-compliance concerns. The maintenance of quality and safety of the halal products requires putting in place comprehensive quality assurance and control processes. This includes monitoring activity of production, assessment of the quality of the products produced, and corrective measures when applicable halal requirements are violated (Sari, Jaswir & Che Daud, 2021). Halal producers should be transparent and tell consumers the truth about ensuring the halal status of their product (Amin, 2020). This involves providing effective information to customers on ingredients, manufacturing processes, certification marks, and clear labelling to enable them to make an informed choice. When running their halal business, they are supposed to be responsive to the ethical and social norm of responsibility. This involves the observation of labor ethical standards and safeguarding the interests of animals as well as positive movements in the societies in which they undertake their practice.

The producers should always enhance and be innovative in what is considered halal. This includes the use of the most advanced technology, exploring the green sourcing procedures, and keeping abreast with the consumers' tastes and emerging trends in the halal industry. They ought to liaise with the industry players, state regulatory bodies, and the certification authorities to realize the shared concerns and ensure best practices within the halal facility. This will involve joining industry forums where the exchange of information and experience will be shared, and legislative changes that safeguard the integrity of halal cuisine will also be encouraged. By giving prominence to these assurance elements, they can demonstrate their commitment to the maintenance of industry integrity, increase consumer trust, and promote the growth and sustainability of the halal industry. Therefore, the halal food control system is more successful due to the assurance factor.

Organizational Environment Factor

The adoption of technology and the exchange of information within an organization are referred to as the organizational environment (Saleh & Ibrahim, 2021). Supportive components that aid in the communication and dissemination of correct information and improve performance make up organizational environments (Bidin et al., 2021). Organizational environment variables play a key role as far as halal stakeholder operations and practices are concerned (Iwaya, Babar & Rashid, 2023). These variables cover external and internal factors that influence the overall business strategy of an organization (Mubin et al., 2021), halal compliance (Setik et al., 2023), and certification (Sharif & Ghani, 2019). The culture of an organization has a huge impact on halal practices (Ramli et al., 2022). Hudaefi and Jaswir (2019) revealed that stakeholders will remain more committed to preserving the standards of halal when they operate within an environment where honesty, integrity, and ethical conduct are respected. JAKIM, MOH, JAIN, MAQIS, Customs, MyHAC, HDC, and DVS have shown a collaborative approach to addressing issues related to halal, as shown by the effectiveness of having the halal control system operating (Abid Haleem et al., 2018).

In order to ensure compliance and favor an integrity-based culture, the organizational leadership (Azizan & Ahmad, 2019) will need to show full commitment to halal principles (Heidingsfelder, 2020). Halal-related initiatives are assorted and bolstered by the leadership (Wibowo et al., 2023), investments of resources, and the involvement in certification practices (Ahmed Osman & Saeed, 2023) that acts as a guiding principle of being halal-compliant throughout the company. An effective management approach (Ahmed Osman & Saeed, 2023) is also compulsory in assuring halal compliance, and this includes food safety management system (FSMS) and quality management system (QMS). Halal principles have the potential to be applied in a systematic way and are constantly enhanced by incorporating halal standards into the current management systems (Sakti & Ramadhani, 2023). The organizational structure should facilitate effective coordination, communication, and oversight of halal operations (Lubis & Fatwa, 2023). By having clearly defined roles, responsibilities, and reporting lines (Raimi, Adekunle, & Shabbir, 2023), accountability is ensured, and halal compliance activities across departments and functions are streamlined. Halal stakeholders work within a regulatory framework that governs compliance and certification (Basarud-din, Al Jaffri Saad, & Aminullah, 2022). Components of the organizational environment crucial for halal stakeholders include understanding and adhering to relevant laws, regulations, and guidelines (Ahmad, Mafaz & Rahman, 2023).

By embracing a culture of continuous improvement, halal stakeholders can remain responsive to changing consumer demands, emerging risks, and evolving market dynamics (Morneh et al., 2023). Regular evaluation, feedback, and adaptation help continuously improve halal processes and performance (Atalan-Helicke, 2023). By addressing specific organizational environment elements, halal stakeholders can establish a conducive atmosphere for halal certification, compliance, and business success (Voak, Fairman & Wahyuni, 2023). A strong organizational environment fosters a culture of integrity, accountability, and continuous improvement, empowering stakeholders to achieve halal requirements and maintain consumer trust (Azkiya & Azizah, 2023). Thus, the organizational environment facilitates the success of the halal control system by contributing to improvements in the halal food control system.

Management and Strategies

The methods used to control an organization's direction and achieve its objectives include management and strategies (Wong, Hussin & Moidin, 2023). Stakeholder management and strategies are employed to ensure that organizations can meet their established goals (Susanty et al., 2022). For halal stakeholders, management and strategy elements are crucial to navigating the industry's complexities, ensuring adherence to halal standards, and promoting business success (Mohamad Hashim et al., 2023). The stakeholders involved in management and strategy factors include JAKIM, JAIN, MoH, MAQIS, DVS, MyHAC, HDC, and Customs, as they play roles in halal control according to their respective functions. To align organizational goals with halal compliance requirements and market opportunities, it is essential to develop a comprehensive halal strategy (Mirghani & Elnour, 2023). To make halal initiatives and investments directed, stakeholders ought to outline specific goals, objectives, and action plans (Mustafa, 2023). Effective risk management approaches will help the stakeholders of halal understand, analyze, and mitigate risk related to market dynamics, the integrity of the supply chain, and halal compliance (Alserhan et al., 2022). Chik et al. (2018) stated that proactive risk management reduces the likelihood of non-compliance and protects the reputation of the company.

According to Muda et al. (2020), halal manufacturers will be able to adapt to the changing demands and wants of the halal consumers by investing in developing and innovating their products. The innovation in new halal products, flavors, and packaging becomes more competitive and leads to market differentiation (Bashir et al., 2019). In building a strong brand, they should manage to communicate effectively their commitment to halal authenticity, quality, and integrity (Purnomo, 2023). It is possible to enhance the brand awareness and improve customer loyalty among the population of halal consumers by interacting with halal influencers, utilizing digital media, and implementing relevant targeted marketing strategies (Chong et al., 2022). Continuous improvement provides the impetus in the halal industry to be innovative, efficient, and competitive (Noorliza, 2020). To enhance halal performances and performance outcomes, stakeholders are supposed to engage in performance reviews regularly and consult other stakeholders as well as implement process improvements (Abdullah & Mohamed Adil, 2019). When the funding of training and capacity-building efforts occurs, they will all be more knowledgeable and skillful with regard to halal (Muhammad, Elistina, & Ahmad, 2020; Susanty et al., 2022). Stakeholders ought to commonly train on the principles, procedures, and legislation of halal to ensure exemplary professional demonstration and continuous adherence as a key strategy in solving issues on halal (Eldaw & Ahmed Osman, 2023).

Through managing key management and strategy considerations, halal stakeholders can manage halal compliance successfully, corporate growth can be encouraged, and the integrity and sustainability of the halal industry can be maintained. An initiator and planning management and strategy will assist the stakeholders to overcome difficulties, exploit opportunities, and prosper in the dynamic halal market (Ahmad et al., 2023).

Technology and Tools

Technology and tools have significant implications on enhancing the effectiveness, integrity, and transparency of the halal processes for those involved in the industry (Kurniawan, Suparno & Vanany, 2023). Mortas, Awad, and Ayvaz (2022) believed that special halal certification regulated software systems facilitate the application, audit, and renewal of halal certification operations. JAKIM, JAIN, MAQIS, MoH, Customs, and DVS have been using these technologies and tools since they must verify documents and data in the process of handling and assessing halal requirements (Abidin & Perdana, 2020). These tools make document management, scheduling of audits, tracking of compliance, and reporting all easier, as well as working to make managing the halal certification more effective and accurate (Rahmawati et al., 2023). To monitor the distribution of halal products throughout the supply chain, kinetic systems use technologies such as barcoding, RFID (Radio-Frequency Identification), and blockchain (Al Olan & Yossouf, 2023). The systems promote accountability and transparency by enabling stakeholders to track the origins, distribution, and manufacturing processes of halal products (Hamid & Alemu, 2023).

Quality assurance and control software automate the process of monitoring the safety and quality of products in the halal production sites (Khairuddin, Tengku Amanshah, & Norman, 2023). Through these software solutions, stakeholders will be able to monitor non-conformances, conduct inspections, and produce reports (regarding compliance) to monitor the halal standards (Islam, Alam & Alam, 2023). Blockchain technology is able to provide a decentralized and unaltered database that stores data on transactions associated with halal products (Kua et al., 2022). Blockchain technology can assist various stakeholders in enhancing their level of trust and integrity by generating open and impregnable records of supply chain exchange and product information and their halal labeling (Islam, Ab Talib & Muhamad, 2023). The data analytics and artificial intelligence (AI) are applied to large data sets to identify halal compliance trends, patterns, and anomalies of customer preferences (Dehghani, Popova & Gheitanchi, 2021). This information may be used by the halal stakeholders to make their decisions more accurate, predict market requirements, and modify production operations.

All the stakeholders can collaborate by using communication and collaboration tools, such as project management software, messengers, and virtual conference platforms (Sidarto & Hamka, 2021). Through these tools, the stakeholders will be able to discuss, synchronize, and engage with dispersed teams and chains (Kurniawan, Suparno, & Vanany, 2023). The responsible use of technology and tools allows halal stakeholders to address an ever-evolving customer base better, advance halal compliance, and increase supply chain transparency (Kua et al., 2022). Moreover, when a company has invested in innovative technologies and uses digital solutions, the stakeholders of the halal industry can enhance sustainability, competitiveness, and

efficiency (Kashim et al., 2018). Overall, halal food control systems cannot be successful without technology and tools (Sharif & Ghani, 2019).

Consumer Feedback and Handling

Customer feedback and how stakeholders deal with it is critical to customer satisfaction, maintaining customer trust, and consistent enhancement of goods and services (Zainuddin et al., 2023). Aji et al. (2023) noted that stakeholders in the halal industry are expected to deliver outstanding customer services by responding professionally and on time to customer questions and concerns as well as their inputs. Some of the stakeholders include JAKIM, HDC, PPIM, CAP, and JAIN with respect to taking care of and responding to customer feedback. They contact customers through the phone and email, social media, and face-to-face appointments (Ramlan, Jeffrey, & Sahari, 2022). The stakeholders are advised to be honest and open about discussing the halal status of their goods, ingredients, manufacturing details, and certification details (Ahmed Osman & Sulieman, 2023). The correct and clear information to the customers enhances their trust (Sultanov et al., 2021). Additionally, it will be necessary to develop knowledge and trust among the customers by providing them information on the fundamentals of halal, the certification process and the importance of halal products. It is a high-level design described by Yaacob, Abd Razak, & Ishak (2021).

Informational resources, including FAQs, blogs, and educational texts, should be provided by halal stakeholders to assist the consumers in making any choice. Industry participants should answer any concern, inquiry, and issue of consumers with regard to halal in an expedited and respectful manner (Tieman & Ruiz-Bejarano, 2020). It can feature answering questions regarding particular ingredients, defining the process of halal certification, or any differences in the product labelling that appear to be present (Shaikh, Dilshad & Batool, 2023). It is of fundamental importance to set up the procedures of gathering, evaluating, and acting upon the consumer feedback to enable continuous progress (Amrullah, 2023). Alongside using the data analytics technologies to acquire data concerning consumer preferences and expectations, the halal stakeholders should seek feedback reviews with the help of surveys and feedback forms (Sari, Hermadi, & Hasanah, 2023). Customer feedback must inform the innovation and product improvement project in order to enable the stakeholder to manage the evolving needs of customers through identifying aspects that require refinement and development of new products or services (Fuad et al., 2023; Zuhudi & Dolah, 2018). It is also beneficial to monitor online forums and social media where people post comments and engage in textual communication regarding halal brands and products to maintain the interest of the consumers (Mustaqim & Mulyana, 2023). To facilitate goodwill and loyalty, stakeholders involved in halal ought to engage the consumers and respond to reviews and comments, as well as participate in relevant discussions (Toshmirzaev et al., 2022).

The prominent stakeholders of halal should always consider keeping their conversations and establishing relations with consumers to facilitate advocacy and reinforce halal assurance (Burhanudin & Daldiri, 2023). This might include conducting functions, providing loyalty schemes, and trying to find a way that they can interact with the consumers on a person-to-person basis (Damayanti & Puspita, 2023). Thus, to enhance trust among the stakeholders of halal, achieve higher levels of customer satisfaction, and stimulate a further evolution of this sector, customer handling and feedback systems should be adequately developed (Palomba, 2020). By being customer-centered, listening to criticism, and acting swiftly to address problems, the stakeholders can increase their reputation and position themselves to achieve long-term success (Ma'arif, HMZ, & Arif, 2023). This makes effective consumer handling and feedback responsible for the success of the halal food control system, as this brings to the fore the importance of dealing with consumers.

5. Conclusion and Recommendations

Finally, Malaysia is a country where a halal control system is in place to ensure that everything consumed by the population is food and consumer goods that comply with Islamic dietary regulations and are uncontaminated and non-halal products. Malaysia has also emerged as a global leader through the implementation of robust and comprehensive halal control measures. A number of stakeholders influence the operation of the halal food control system, and they all contribute to the safety of the halal food and its assurance to the customer that it is safe. This study has been able to identify stakeholder-related factors that facilitate effective functioning of the halal food control system in Malaysia through a systematic literature review. The researchers analyzed 938 articles that were published since 2018 and divided their results into six

key themes: halal knowledge, assurance factors, organizational environment, management and strategies, technology and tools, and consumer feedback and handling. Each of the six determinants is highly interrelated with the discussed parts of the responsibilities of stakeholders, thus emphasizing the significance of making their duties and cooperation stronger. The enhancement of the stakeholder functions and collaborative halal governance position will not only support the consumer confidence but also establish the leadership of Malaysia in the global halal market.

The findings of the study introduce a fresh insight into the factors concerning the stakeholders that reinforce the halal food control system in Malaysia. This study contributes to the current understanding of the system's functioning by enlightening the roles and involvement of different stakeholders. It also provides a solid theoretical framework for further study in this field. Through a systematic identification and analysis of stakeholder-related factors, this paper significantly advances the development of theoretical frameworks for halal food governance and stakeholder engagement. Moreover, this study can provide a theoretical foundation for additional research in this area. Theoretically, this study advances stakeholder theory into the halal governance domain, demonstrating its applicability in structuring roles, responsibilities, and collaborative mechanisms in complex regulatory environments. It demonstrates how multi-level stakeholder engagement influences compliance, integrity, and consumer trust. Practically, policymakers can leverage the identified factors to refine national halal strategies, while industry players can align operations with the identified best practices to strengthen market competitiveness. As this study is limited to food-related articles and did not include empirical data from field surveys or interviews, future research should extend analysis to other halal-related sectors such as pharmaceuticals, cosmetics, and logistics, include multi-country comparisons, increase the temporal coverage, and broaden database inclusion such as Scopus and WOS to capture emerging trends and best practices from diverse contexts.

Acknowledgement: The study is funded by the Ministry of Higher Education (MOHE) of Malaysia through the Fundamental Research Grant Scheme (FRGS), No: FRGS/1/2021/SS0/UTEM/02/2. The authors would also like to thank Universiti Teknikal Malaysia Melaka (UTeM) and Institut Pengurusan Teknologi dan Keusahawanan (IPTK) for all the support.

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Information Management and Business Review (IMBR)
Vol. 17, No. 2(S), August 2025 (ISSN 2220-3796)

Exploring the Influential Power of Embedding the Gamification Approach in Mobile Payment: The Case of Gen Z in Malaysia

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Abstract: This study examines the factors influencing behavioral intentions of Generation Z individuals in Malaysia towards adopting mobile payments, specifically from a gamification perspective. The sample comprised 602 participants who completed a Google Forms survey, and the data were analyzed using SPSS software. The sample was predominantly undergraduate students, with the largest concentration of respondents from the Federal Territories. Reliability testing was conducted to ensure the validity of the independent and dependent variables, and normality tests were performed to assess distribution characteristics. Most independent variables demonstrated a positive correlation with the dependent variable, except for perceived cost, which exhibited a negative correlation. Multiple regression analysis revealed that performance expectancy, trust, perceived cost, gamification, and social influence significantly affected the intention to adopt mobile payments, albeit to varying degrees. The findings contribute to the existing body of knowledge on gamification by empirically validating its impact on the adoption of mobile payments. This study extends the theoretical framework of gamification by demonstrating that game-like elements in mobile payment applications significantly influence user adoption intentions among Generation Z. Educational institutions and programs that aim to enhance digital literacy can benefit from these findings by incorporating gamified learning modules. These modules can effectively teach Generation Z members about the benefits and usage of mobile payment systems, thus promoting wider adoption.

Keywords: *Gamification, Mobile Payment, Gen Z, Malaysia.*

1. Introduction and Background

Generation Z, born between 1997 and 2012, is a digital age native cohort raised with pervasive access to the internet and social media. Business Insider (2020) projects that by 2020, Gen Z will be the predominant user of e-wallets and other electronic payment methods. This trend reflects the significant evolution of mobile payments over time, with a notable decline in cash transactions as digital payment options become more prevalent (Rahman, Ismail & Bahri, 2020).

The history of payment systems dates back to the 1800s, but technological advancements have led to the emergence of the current digital payment landscape. In Malaysia, the transition to electronic payments is viewed as a cost-saving measure and a driver of economic growth (Bank Negara Malaysia, 2020). Electronic payments could theoretically save Malaysia 1% of GDP, or around RM13 billion, by replacing paper-based instruments such as bank drafts and checks (Tan, 2020). Despite this, only 67% of Malaysians currently prefer cashless transactions (Business Insider, 2020). E-money transactions were valued at RM13.9 billion in 2019, up from RM11 billion a year earlier, according to Central Bank figures (Tan, 2020). A total of 1.72 billion transactions were processed. It is evident from these statistics that e-wallets and e-payments represent a growing trend in Malaysia, despite their gradual adoption. Moreover, credit card transactions increased in 2019, totalling RM117.3 billion. E-wallets are used by almost 48% of Malaysia's 32.6 million inhabitants (Tan, 2020), or 15.7 million people. GrabPay, Boost, and Touch 'n Go eWallet are three prominent Malaysian e-wallet companies. There has been a rise in the usage of e-wallets, which has been primarily attributed to the Covid-19 pandemic (Aji, Berakon & Husin, 2020). Karim, Haque, Ulfy, Hossain & Anis (2020) predict that e-wallets will become an immensely popular method to pay for products and services in the future, indicating a potential increase in the desire to use them in Malaysia.

Mobile payments involve carrying out financial transactions using digital tools like smartphones and computers. This method includes internet-based purchases, digital wallets, and electronic banking. The rise in mobile payments corresponds with a decline in cash transactions, driven by the widespread use of mobile

devices. Statista (2021) reports that there were over 6.4 billion smartphone users globally, with this number expected to grow.

Gamification has emerged as a prevalent strategy to enhance user engagement and motivation in various industries. Pandey and Ansari (2023) state that the current study identifies gamification as a potentially effective strategy that can increase users' intention to use the service going forward, in addition to their actual usage conduct, which will enhance customer retention. With millions of dollars spent by businesses on acquiring and retaining customers, this may be an essential tactic for the sector to use. Gamification is defined as the use of design elements of games in non-gaming contexts (Deterding et al., 2011). Games have been added to a growing number of mobile applications in areas including learning, coding, fitness, exercise, and sustainable energy use in recent years. According to industry projections, the gamification market is expected to grow at an accelerating rate and reach USD 37 billion by 2027 (Insights, 2020). Increased usage, user engagement, customer loyalty, and user motivation are among the goals of these interventions (Mitchell, Schuster & Jin, 2020). Although these impacts are evident, certain research (Koivisto & Hamari, 2019; Xi & Hamari, 2019) has drawn criticism for treating gamification as a black-box concept without exploring the precise definition of what defines ‘gamifying' an application.

Incorporating game elements into mobile payment systems has been shown to increase user intention and loyalty. Despite the rise in mobile payment usage, research on the impact of gamification on mobile payment adoption among Generation Z consumers in Malaysia remains limited. This study aims to bridge this gap by investigating how gamification affects customer behaviors and enhancing our understanding of mobile payment adoption, especially as there have been no previous studies exploring this issue in the context of mobile payments. Specifically, the research will examine how the incorporation of gamification into mobile payment systems influences Malaysian Generation Z consumers. To assess the factors influencing Generation Z individuals aged 18 to 26 in Malaysia regarding their acceptance of mobile payments, this study will employ a survey methodology. The sample comprised 602 participants who completed a Google Forms survey, and the data were analyzed using SPSS software.

This study contributes to existing literature on mobile payments and gamification by providing insights into the factors that influence Gen Z's acceptance of mobile payments in Malaysia. Businesses can use these findings to enhance their mobile payment systems and increase user engagement through gamification. Understanding the factors influencing the behavioral intent of Generation Z individuals in Malaysia towards adopting mobile payments is crucial for businesses and policymakers. This study aims to provide valuable insights that can inform future strategies and enhance the adoption of mobile payments among this demographic.

2. Literature Review

As per the research from Wong, Liu, Meng-Lewis, Sun, and Zhang (2021), an increasing trend in recent years has been to include game-like elements in business apps in an effort to increase user engagement and utilization of mobile payment technologies. This strategy, dubbed gamification, seeks to enhance user experience by promoting adoption and active involvement. Gamification was first used in health-related technologies such as gerontechnology, with the goal of increasing user engagement. Its use has grown over time, attracting the attention of the financial industry. Even though mobile payments are widely used, little is known about the potential and effectiveness of gamification in promoting the use of these payments. Furthermore, research on gamification frequently focuses on younger audiences.

Performance Expectancy (PE) and Behavioral Intention to Adopt Mobile Payment.

Another factor that has been influential in affecting adoption decisions is the performance expectations of the system. For instance, Al-Saedi et al. (2020) claim that performance expectancy is the most influential factor affecting acceptance of M-payments. The results show that performance expectancy is a significant, positive determinant of technology adoption and is congruent with the findings of Koksal (2016) and Yu (2012). For Singh and Srivastava (2018), performance expectancy was one of the important dimensions impacting adoption. According to Patil et al. (2020), the performance expectancy within consumers has a positive relationship with attitude. Further, according to Shaikh et al. (2015), performance expectancy affects the behavioral intention to adopt mobile payment. The hypothesis of this study is: Performance expectancy may

increase customer acceptance of mobile payment.
H1: Performance expectation influences consumer behavioral intention to adopt mobile payments favorable manner (BI).

Social Influence (SI) and Behavioral Intention to Adopt Mobile Payment.
As Lu (2014) points out, social influence is important during the first stages of adoption, but its effects fade as time passes. In agreement with Koenig-Lewis et al. (2015), social influence affects the acceptance of highly technological innovations. However, few studies have examined its impact on the behavioral intention to adopt mobile payments from a societal viewpoint. As a result, it has been proposed that this social influence concept serves as an external force that may influence customer acceptance of contactless payments.
H2: The acceptance of mobile payments by customers is positively influenced by social influence (BI)

Trust (TR) and Behavioral Intention to Adopt Mobile Payment.
Online payments are considered to be a form of mobile payment. This indicates some risks may be associated with certain payment methods, including the possibility of security breaches, hacking, and other issues. Utilizing technology, particularly online payments, without risks is almost impossible (Grabner-Kräuter & Faullant, 2008). Therefore, trust is one way to deal with the issue in an entirely unpredictable scenario. Previous studies have demonstrated that trust is crucial in a person's decision to use technologies (Kalinic et al., 2019; Sabbir, Islam, and Das, 2020). In light of this justification, the following hypotheses for this study can be proposed:
H3: Behavioral intention to adopt mobile payments (BI) is significantly influenced positively by trust

Perceived Cost (PC) and Behavioral Intention to Adopt Mobile Payment.
The degree to which a person feels that using mobile payments will cost money is known as perceived cost (Luarn & Lin, 2005). Users must pay two extra fees to use mobile payments. On the one hand, consumers must pay for brand-new mobile devices like iPads, smartphones, and Wi-Fi gadgets. However, users must also pay some costs for communication, services, and subscriptions. The costs associated with mobile payments are higher for users than those associated with internet payments. Consumers would assess this extra cost. They could conclude that adopting mobile payments is not financially advantageous if these costs are higher than anticipated. Users are less likely to utilize mobile payment services if they believe they cost more. Similarly, Chong et al. (2012) claimed that in Malaysia and China, customer decisions to adopt mobile commerce are significantly correlated negatively with perceived cost. As per Lu et al. (2014), consumers' inclination to use mobile payment services is negatively impacted by their perception of cost. As stated in Hanafizadeh et al. (2014), adoption of m-banking services is negatively impacted by perceived cost. Furthermore, Ahmad and Khalid (2017) stressed that cost is one of the main barriers to user adoption of m-government. As a result, the following theory is put forth:
H4: Behavioral intention to adopt mobile payments (BI) is adversely affected by perceived costs

Gamification (GA) and Behavioral Intention to Adopt Mobile Payment.
Gamification, which is defined as using game design concepts outside of gaming environments (Deterding et al., 2011), has been the subject of much research on how user behaviors are affected by motivation and engagement (Koivisto & Hamari, 2019). According to Landers, Auer, Collmus, and Armstrong (2018), more research is required to understand how gamification affects people's attitudes and behaviors fully. Research recently indicates that gamification increases user engagement through relatedness, competence, and autonomy, positively influencing users' intentions by making participation enjoyable (Lee & Jin, 2019). The intention to utilize is thereafter strengthened by this involvement (Bitrian, Buil and Catalán, 2021). These results are corroborated by recent systematic studies, which emphasize how gamification may affect users' intentions to utilize.
H5: Behavioral intention to adopt mobile payments (BI) is positively impacted by gamification.

Theories and Theoretical Grounding
The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), the Technology Acceptance Model (TAM) (Davis, 1989), and the Theory of Planned Behavior (TPB) are some other models that may be used to gauge the acceptance and use of technological instruments. However, we selected the UTAUT for this study (Venkatesh et al., 2003). Adoption models suggest a relationship between consumer beliefs (Lu, 2014). Venkatesh et al.

(2003 indicated that the most important theory is the UTAUT, which integrates the correlation between the constructs. In the field of information systems, the UTAUT has been used and proven to be valid and reliable (Shaikh & Karjaluoto, 2015). Expanding upon the Unified Theory of Acceptance and Use of Technology (UTAUT), UTAUT2 adds new components such as price value, habit, and hedonic motivation to improve the model's predictive power in various technological scenarios. To analyze Malaysian consumers' behavioral intention to adopt mobile payments, UTAUT2 is the best model.

UTAUT2 can represent how customers conduct financial transactions, following Tan et al. (2010). Building upon the UTAUT2 model, performance expectancy, social influence, trust, perceived cost, and gamification are the most important variables influencing digital payment adoption. Malaysian customers' acceptance of digital payment systems is unaffected by price, value, or habit, so this study uses a hedonistic incentive. UTAUT2 can provide a more detailed understanding of how customer behavior affects mobile payment acceptance. These information technology considerations primarily drive the behavioral intention to adopt mobile payment. These elements could affect the spread of mobile payments. In a cashless economy, customers transfer goods and services electronically instead of using actual money. Six hypotheses are put forth in this study based on the literature review and the current theoretical evaluations of the UTAUT and UTAUT2 models (Venkatesh et al., 2003).

3. Research Methodology

In this study, self-administered surveys were conducted using Google Forms to gather primary data from Malaysian individuals belonging to Generation Z, aged between 18 and 26 in the year 2024. The choice of Google Forms for the online survey was made due to its practicality, reliability and ability to maintain confidentiality. Additionally, it enables regular response tracking, which boosts the accuracy of data collection. Out of 732 responses received through email and other communication channels like LinkedIn and Instagram, 602 complete responses were utilized for analysis after data cleaning and removal of incomplete responses, forming the final sample without nonresponse bias.

Given the substantial sample size, this study utilizes non-probability convenience sampling to select reachable participants and achieve the target sample size. By using the Krejcie and Morgan (1970) formula, the population size of 10,025,664 (representing 29% of Malaysia's current population as of Thursday, March 21, 2024; Worldometer, n.d.) and the number of respondents (732) were considered to determine the appropriate sample size. According to the Krejcie and Morgan table, a population size of 10,000,000 and a 95% confidence level suggest a sample size of approximately 383. However, the number of respondents (732) exceeded the suggested sample size, providing a robust dataset for improved statistical power and analysis precision. Despite this, a larger sample size can enhance the study's statistical power and accuracy of analysis, leading to more reliable conclusions.

The collected data were standardized and measured to facilitate statistical analysis using SPSS, enabling the examination of causal relationships. The study's design provided a comprehensive analysis of the connections between variables, making the primary data well-suited for the research. The online survey comprised 23 items using 5-point Likert scales, excluding demographic information. The survey was derived from previous studies by Phonthanukitithaworn et al. (2016) and Rahman et al. (2020) to ensure validity.

In this work, the pre-adoptive appraisal model theory, through data analysis, is tested using the SPSS program. SPSS has been extensively employed, especially in quantitative research, due to its efficacy for performing various statistical tests, including comparative and Pearson correlation. In this framework, the correlational methodology is used to clarify the connection between the variables. Cronbach's alpha values are a component of SPSS that enable the assessment of the reliability of constructs. They indicate the degree of positive correlation among items and are considered reliable if above 0.5 (Chiu, Zhu & Corbett, 2021). Principal component analysis ensures validity, while inferential testing assesses the hypothesis. Multi-collinearity is also investigated through tolerance and the variance inflation factor (VIF) of the individual components. There will be three sequential stages of the examination. The Pearson Correlation Test aims to demonstrate that the independent variables are not multicollinear, ensuring the predictors' independence and preventing biased outcomes. Correlation values reflecting the direction and magnitude of correlations among the independent

variables will be shown, ranging from -1 to +1. Multiple regression measures the model where the Behavioral intention to adopt mobile payment (AMP) is predicted by Performance Expectancy (PE), Social Influence (SI), Trust (T), Perceived Cost (PC), and Gamification (GA).

The following tests are outlined: descriptive statistics (including average, maximum, minimum, standard deviation, variance and frequency distribution) to provide a thorough picture of the data; Pearson correlation test to prove the independence of independent variables by ensuring no multicollinearity, with correlation values ranging from -1 to +1; multiple regression to measure the model predicting behavioral intention to adopt mobile payment (AMP) by Performance Expectancy (PE), Social Influence (SI), Trust (T), Perceived Cost (PC), and Gamification (GA). For robustness, Cronbach's Alpha will be conducted to analyze the internal reliability of variables, and ANOVA (Analysis of Variance) will be performed to verify the overall significance of the model, ensuring the reliability of the regression analysis.

The regression equation will be formulated as follows:

$$\text{AMP} = \beta\beta_0 + \beta_1 PE + \beta_2 SI + \beta_3 T + \beta_4 PC + \beta_5 GA \qquad (1)$$

Cronbach's alpha was used to analyze the internal reliability of the variables, and ANOVA was used to verify the overall significance of the model and the dependability of the regression analysis.

4. Results

The dependent variable in this study is behavioral intention to use mobile payments. In contrast, independent variables include perceived cost (PC), performance expectancy (PE), social influence (SI), trust (TR), and gamification (GA). This connection is demonstrated in various important sections. This study utilized online questionnaires (Google Forms) to distribute the surveys. The survey successfully collected 731 respondents; however, 129 responses were disregarded since one of the variables was not included in the pilot test. Consequently, 602 replies were selected for analytical testing. The data analysis and presentation were conducted using SPSS software.

Descriptive Analysis

Table 1: Demographic information of respondents in the main survey (N = 602)

Demographic variables	Category	Number of people	Percentage
Gender	Male	225	37.4
	Female	377	62.6
Age	18 to 21 years old	261	43.3
	22 to 26 years old	341	56.6
Education background	SPM	67	11.1
	Professional Certificate	34	5.6
	Foundation/Diploma	118	19.6
	Undergraduate	314	52.2
	Postgraduate	54	9
	Others	15	2.5
Location	Federal Territories	133	22.1
	Melaka	38	6.3
	Pahang	31	5.1
	Selangor	103	17.1
	Penang	55	9.1
	Kedah	11	1.8
	Perlis	5	0.8
	Perak	57	9.5
	Negeri Sembilan	37	6.1
	Kelantan	9	1.5
	Johor	63	10.5

	Terengganu	4	0.7
	Sabah	23	3.8
	Sarawak	33	5.5
Experience in Mobile Payment Usage	< 1 year	38	6.3
	1 year to 2 years	110	18.3
	Over 2 years	454	75.4
Occupational Status	Student	427	70.9
	Full-time employee	133	22.1
	Freelancer	29	4.8
	Unemployed	13	2.2

Based on the data collected, the survey respondents encompassed both male and female participants, with 225 men (37.4%) and 377 women (62.6%) out of 602 respondents. This indicates a significant gender disparity, with a higher proportion of female respondents participating in the online survey than male respondents. The age distribution of respondents was divided into two categories: 18 to 21 years old and 22 to 26 years old. Most respondents (341, or 56.6%) fell within the 22 to 26 age group, while the remaining 261 respondents (43.4%) were aged between 18 and 21. This demonstrates that the study was more representative of individuals in the older age range within the given categories. Regarding educational attainment, the survey data revealed a diverse range of educational backgrounds. The largest respondents were undergraduates, comprising 52.2% (314). This was followed by those with a foundation/diploma (19.6%, or 118 respondents), SPM (or equivalent) qualifications (11.1%, or 67 respondents), postgraduate degrees (9%, or 54 respondents), professional certificates (5.6%, or 34 respondents), and others (2.5%, or 15 respondents). The predominance of undergraduate respondents suggests a relatively high level of educational achievement among the survey participants.

The geographical distribution of respondents encompassed 14 states and the Federal Territories (Kuala Lumpur, Labuan, and Putrajaya). The Federal Territories comprised the largest share of respondents, with 133 participants (22.1%). Selangor followed with 103 respondents (17.1%), while other significant states included Johor (10.5%, or 63 respondents), Perak (9.5%, or 57 respondents), and Penang (9.1%, or 55 respondents). The lowest participation came from Terengganu, with only four respondents (0.7%). This distribution highlights the varied regional representation within the survey, with a substantial concentration of respondents in the Federal Territories and Selangor. Regarding mobile payment experience, the data reveal that most respondents (75.4%, or 454 individuals) have been using mobile payments for more than two years. This is followed by those with one to two years of experience (18.3%, or 110 respondents), and a smaller group with less than a year of experience (6.3%, or 38 respondents). These statistics indicate a well-established familiarity with mobile payment systems among the respondents, with most having substantial experience.

The occupational status of respondents was classified into four groups: students, full-time employees, freelancers, and unemployed individuals. The largest group was students, 70.9% (427) of the respondents. Full-time employees represented 22.1% (133 respondents), freelancers accounted for 4.8% (29 respondents), and unemployed individuals comprised 2.2% (13 respondents). The prevalence of student respondents is significant, reflecting the demographic composition of the survey sample.

Table 2: Descriptive information

	PE	SI	TR	PC	GA	BI
Mean	4.4070	3.7000	3.9743	2.0282	4.3252	4.4668
SD	0.67833	0.94	0.90073	0.93954	0.69454	0.67331
Skewness	-1.634	-0.559	-0.797	1.097	-1.329	-1.449
Kurtosis	3.622	-0.182	0.181	0.937	2.099	2.281

Note. PE is Performance Expectancy, SI is Social Influence, TR is Trust, PC is Perceived Cost, GA is Gamification, and BI is Behavioral Intention to Adopt Mobile Payment.

In data analysis, descriptive statistics are employed to summarise and describe the fundamental characteristics of a dataset. This approach enables researchers to present data meaningfully, allowing readers to understand

the underlying patterns and trends. One crucial component of descriptive statistics is the measurement of variability, often expressed by the standard deviation. The standard deviation indicates how much variation exists within the data, offering insights into the distribution and dispersion of the variables relative to the mean. In addition to standard deviation, skewness and kurtosis are vital metrics for assessing the distributional properties of the data, as shown in Table 2. Skewness measures the degree of asymmetry in a distribution, with values indicating whether the distribution is skewed to the left (negative skewness), to the right (positive skewness), or is perfectly symmetrical (skewness of zero). A negative skewness value implies that the distribution has a longer tail on the left side, suggesting the presence of more extreme values in the negative direction. Conversely, a positive skewness value denotes a longer tail on the right side, with more extreme values in the positive direction.

The data in Table 2 demonstrates that the dependent variable, Behavioral Intention to Use Mobile Payment (BI), exhibits a negative skewness of -1.449. A negative skew means the tail of the distribution is on the lower end, so the data is concentrated at the higher end of the scale. Similarly, the skewness values for the independent variables are as follows: Performance Expectancy (PE) at -1.634, Social Influence (SI) at -0.559, Trust (TR) at -0.797, Perceived Cost (PC) at 1.097, and Gamification (GA) at -1.329. These values provide insight into the asymmetry of the distributions for each variable. Kurtosis, alternatively, measures the tailedness of a distribution, indicating whether the data have heavy or light tails compared to a normal distribution. High kurtosis values suggest the presence of more extreme outliers, while low kurtosis values indicate fewer outliers and a distribution more concentrated around the mean. The dependent variable, Behavioral Intention to Adopt Mobile Payment (BI), has a kurtosis value of 2.281, implying a distribution with heavier tails. For the independent variables, the kurtosis values are as follows: Performance Expectancy (PE) at 3.622, Social Influence (SI) at -0.182, Trust (TR) at 0.181, Perceived Cost (PC) at 0.937, and Gamification (GA) at 2.099.

The kurtosis values for Performance Expectancy (PE) and Gamification (GA) signify distributions with heavier tails, suggesting more extreme values than those expected in a normal distribution. Conversely, the lower kurtosis values for Perceived Cost (PC), Trust (TR), and Social Influence (SI) indicate distributions with lighter tails, showing that these variables are more tightly clustered around the mean. According to Sovey, Osman, and Mohd-Matore (2022), acceptable kurtosis values should range between -10 and +10, while acceptable skewness values should fall within the range of -3 to +3. Hair et al. (2010) propose that normal data typically exhibit kurtosis values between -7 and +7 and skewness values between -2 and +2. Furthermore, Tabachnick and Fidell (2019) observe that deviations from normality in skewness and kurtosis are typically negligible in sample sizes exceeding 200. In this analysis, all items' skewness and kurtosis values fall within the acceptable ranges of -1.634 to 3.622, indicating that the data distribution lies within the acceptable limits of normality.

Pearson Correlation Analysis

Table 3: Pearson correlation analysis

	PE	SI	TR	PC	GA	BI
Performance Expectancy (PE)	1	0.405**	0.501**	-0.254**	0.612**	0.660**
Social Influence (SI)	0.405**	1	0.586**	-0.175**	0.464**	0.377**
Trust (TR)	0.501**	0.586**	1	0.290**	0.563**	0.563**
Perceived Cost (PC)	-0.254**	-0.175**	-0.290**	1	-0.277**	-0.299**
Gamification (GA)	0.612**	0.464**	0.563**	-0.277**	1	0.700**
Behavioural Intention to Adopt Mobile Payment (BI)	0.660**	0.377**	0.531**	-0.299**	0.700**	1

This study will examine the relationship between the dependent and independent variables using Pearson's correlation. Pearson correlation is commonly employed when the data follows a normal distribution, whereas Spearman correlation is used when the data is non-normally distributed. However, while the frequency analysis indicates that not all variables in this study have a normal distribution, the Spearman correlation method is not applicable here because the variables involved are continuous rather than ordinal. Therefore, despite the non-normal distribution, Pearson correlation will still be utilised to analyse the relationships between variables. Pearson correlation coefficients range from -1 to 1, where -1 indicates a perfect negative

correlation, 1 indicates a perfect positive correlation, and 0 indicates no correlation between the variables (Tabachnick & Fidell, 20; Pallant, 2007).

The Pearson correlation coefficient (r) for Performance Expectancy (PE) and Behavioral Intention to Adopt Mobile Payment (BI) is 0.660, indicating a substantial positive relationship between the two variables. This suggests that the Behavioral Intention to adopt mobile payments increases as Performance Expectancy increases. The R^2 value is 0.436, meaning that 43.6% of the variability in Behavioral Intention (BI) can be explained by Performance Expectancy (PE). The p-value is less than 0.05, and the significance level is below 0.001, leading to the acceptance of Hypothesis 1. A correlation coefficient of 0.377 demonstrates a moderate positive relationship between Social Influence (SI) and Behavioral Intention to Adopt Mobile Payment (BI). This correlation indicates that social influence shapes the intention to use mobile payment systems. The R^2 value of 0.142 implies that Social Influence accounts for 14.2% of Behavioral Intention (BI) variability. Given that the significance level is below 0.001, Hypothesis 2 is accepted.

According to the data in Table 3, Trust (TR) demonstrates a significant positive correlation with Behavioral Intention to Adopt Mobile Payment (BI), with a correlation coefficient of 0.531. The R^2 value is 0.282, indicating that Trust explains 28.2% of the variability in behavioral intention (BI). The significance criterion is less than 0.001, supporting the acceptance of Hypothesis 3.

Perceived Cost (PC) exhibits an inverse relationship with Behavioral Intention to Adopt Mobile Payment (BI), as indicated by a correlation coefficient of -0.299. This suggests that as the perceived cost of using mobile payments increases, the intention to adopt such payments decreases, and vice versa. The significance level is less than 0.001, and the R^2 value is 0.089, meaning that Perceived Cost accounts for 8.9% of Behavioral Intention (BI) variability. Consequently, Hypothesis 4 is accepted. The correlation coefficient for Gamification (GA) and Behavioral Intention to Adopt Mobile Payment (BI) is 0.700, demonstrating a strong positive relationship. This indicates that incorporating gamification features significantly enhances the intention to use mobile payment systems. The R^2 value is 0.489, meaning Gamification explains 48.9% of Behavioral Intention (BI) variability. With a significance level below 0.001, Hypothesis 5 is accepted.

Overall, the findings from Pearson correlation analysis reveal that most independent variables maintain a significant positive relationship with the dependent variable, Behavioral Intention to Adopt Mobile Payment (BI), except for Perceived Cost (PC), which shows a significant negative correlation. Among the independent variables, Gamification (GA) demonstrates the strongest positive correlation with Behavioral Intention (r = 0.700), while Social Influence (SI) exhibits the weakest positive correlation (r = 0.377). The correlation values across the independent variables range from moderate (±0.377) to strong (±0.700), indicating that none of the variables are highly correlated. This suggests that multicollinearity is not a concern in this analysis, as a correlation exceeding 0.8 could indicate significant multicollinearity (Simon Fraser University, n.d.).

Multi-Regression Analysis

Multiple regression analysis (Table 4) was employed to ascertain whether there is a significant link between the dependent and independent variables because correlation analysis cannot indicate whether such a relationship exists, as well as an independent variable. The significance threshold of 5% was applied in this investigation to evaluate the hypotheses.

Table 4: Multi Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.769	0.591	0.587	0.43261

a) Predictors: GA, PC, SI, PE, TR
b) Dependent Variable: BI

The correlation coefficient, or R, in the table above indicates how strongly the dependent and independent variables are related. R is 0.769 in this research, suggesting that the dependent and independent variables have a substantial connection. R-squared demonstrates the extent to which the independent variables explain the variability in the dependent variable. R^2 equals 0.591, indicating that the independent factors account for 59.10% of the variation in behavioral intention to use mobile payment (BI). However, additional variables not

included in the model account for 40.90% of the variation. An additional metric for evaluating goodness of fit is R-squared. R-squared may be used to determine the model's reliability.

Faraway (2004) states that 0.6 is the minimal R-squared benchmark, indicating that the independent variables should explain 60% of the variations in the dependent variable. The R-squared for this study is 0.591, which is marginally lower than the 0.6 benchmark. The efficacy of the regression model typically increases with higher R^2.

Nevertheless, this does not mean the regression model used in this study is inappropriate, even though the R^2 value falls below the required threshold. Although a high R-squared merely indicates that the current model fits the available data, it is not a sole indicator of a model's usefulness for prediction. R^2 is a quantitative measure of goodness of fit. It solely displays the relationship between the dependent variables and the independent variables. R^2 was below 0.6 in the studies by Bùi & Bùi (2018) and Rahman et al. (2020) (R2 = 0.510). Therefore, the regression model employed in this study can be considered suitable.

Table 5: ANOVA

Model	df	Sum of squares	F value	F	*P*
Regression	5	160.916	171.96	171.96	<0.001
Residual	596	111.545			
Total	601	272.461			
Dependent Variable: BI – (Dependent)					
Predictor: Constant), GA, PC, SI, PE, TR					

The ANOVA in Table 5 describes how well the regression equation fits the data. Determining whether the regression model predicts the dependent variable's significance depends critically on the data in the regression row. According to Pallant (2005), the hypothesis is accepted if the p-value is less than 0.05. The F-test indicates that this model contains a regression relationship, with a significant value of 0.001 and a p-value of less than 0.05, as shown in the above table. Given these circumstances, it is reasonable to conclude that this model significantly impacts the behavioral intention to use mobile payment (BI).

Brereton (2018) asserted that the F-value is obtained by dividing the mean square by the mean square residual, which is computed by the sum of squares and mean square. In order to calculate the p-value, which is located under the Sig. Column, the F-value computation is essential. The significant value (represented by p) that the independent variable has on the dependent variable is displayed in this column. If the p-value is less than or equal to 0.05, it indicates that there is a significant relationship between the two variables, and the null hypothesis will be rejected; if the p-value is greater than 0.05, it indicates that there is no significant relationship between the two variables, and the null hypothesis will not be rejected. Additionally, the degree of freedom (df) indicates the number of independent variables; to calculate it, subtract 1 from the total number of variables (df = n-1). The degree of freedom provided by five factors, including Performance Expectancy (PE), Social Influence (SI), Trust (TR), Perceived Cost (PC), and Gamification (GA), is shown in Table 5, where the df is 5. Furthermore, the sample size of 602 responses received corresponds to the residual degrees of freedom. The five variables are subtracted from this 602-sample size to provide 596. Then, 5 is added for the degree of freedom calculation, yielding a total degree of freedom of 601. Thus, it can be concluded that the degree of freedom, df, increases as the sample size increases. Additionally, the computation yields the 171.96 F-ratio displayed in Table 5 from the mean square regression division to the mean square residual (32.183/0.187=171.96), which is significant at p values greater than or equal to 0.05. Furthermore, the alternative hypothesis is accepted and the null hypothesis is rejected based on the significance level of 0.000, which is less than 0.05. 95% of the time, the alternative hypothesis is correct. Thus, there is a substantial correlation between Behavioral Intention to Adopt Mobile Payment (BI) and Performance Expectancy (PE), Perceived Cost (PC), Social Influence (SI), Trust (TR) and Gamification (GA).

Table 6: Multiple Regression Analysis

Model	Unstandardized Coefficients (B)	Standardized Coefficient	t	*P*	Collinearity Tolerance	Statistics VIF
Constant	1.045	0.15	6.967	<0.001		
PE	0.335	0.034	9.848	<0.001	0.584	1.714
SI	-0.031	0.024	-1.317	0.189	0.626	1.597
TR	0.098	0.027	3.616	<0.001	0.519	1.927
PC	-0.047	0.02	-2.37	0.018	0.819	1.122
GA	0.408	0.035	11.59	<0.001	0.521	1.918

The final coefficient values of the multiple regression analysis are displayed in the table above. When the effects of the other predictors in the model are considered, the beta values in this regression model, which represent the standardized coefficients, indicate the strength of the association between the dependent and independent variables. With a p-value of no more than 0.05, the coefficients table shows the findings of whether each independent variable influences the dependent variable. Additionally, each variable in the model has a variance inflation factor (VIF) value that shows the extent to which the other independent variables influence the variance of that specific variable. Therefore, if the value of VIF is not more than 10, there is no multicollinearity (James, Witten, Hastie & Tibshirani, 2013).

Gamification (GA) has the highest Standardized Coefficients Beta value of β = 0.421 with a significance value of less than 0.001, as shown by the data in Table 21. Based on this, it can be demonstrated that the behavioral intention to utilize mobile payment (BI) is most significantly impacted by Gamification (GA). The VIF for Gamification (GA) is at 1.918, where it can be concluded that there is no multicollinearity. Furthermore, with a significance value less than 0.001 and a Standardized Coefficient Beta value of β = 0.338, Performance Expectancy (PE) is the second most influential factor on the behavioral intention to utilize mobile payment (BI). Performance Expectancy (PE) has a VIF of 1.714, indicating the absence of multicollinearity. Additionally, with a Standardized Coefficients Beta value of β = 0.132 and a significance value of less than 0.001, Trust (TR) has the third highest influence on the behavioral intention to use mobile payment (BI). With a VIF of 1.927, Trust (TR) does not exhibit multicollinearity.

Conversely, Social Influence (SI) has a coefficient of -0.031. This indicates that the behavioral intention to utilize mobile payment (BI) will decrease by 3.1% for every unit increase in complexity. The beta value of Social Influence (SI) is β=-0.044. The standard deviation of the dependent variable will then decrease by 0.044 units for every unit rise in the Social Influence (SI) standard deviation. The results show that Social Influence (SI) has a p-value of 0.189, which is more than 0.05 (p-value > 0.05). We demonstrate that behavioral intention to utilize mobile payment (BI) is not significantly influenced by Social Influence (SI). Therefore, it can be said that Social Influence (SI) has no detrimental effect on the behavioral intention to use mobile payment (BI), and the null hypothesis is accepted. Social Influence (SI) does not show multicollinearity, with a VIF of 1.597.

Finally, -0.047 is the coefficient for perceived cost (PC). This suggests that the behavioral intention to utilize mobile payment (BI) is reduced by 4.7% for every unit rise in perceived cost (PC). The standardized coefficient is -0.066 for perceived cost (PC). Consequently, a rise of one standard deviation unit in the dependent variable's standard deviation will decrease by 0.066 units as a result of the perceived cost (PC). The p-value for the independent variable, perceived cost (PC), is 0.018, meaning that the value is less than 0.05 (p-value < 0.05). We conclude that perceived cost (PC) has a significant impact on behavioral intention to utilize mobile payment (BI). With a VIF of 1.122, perceived cost (PC) does not exhibit multicollinearity.

The relationship between Performance Expectancy (PE) and Behavioral Intention to Adopt Mobile Payment (BI)

There is a positive relationship between Performance Expectancy (PE) and Behavioral Intention to Adopt Mobile Payment (BI) constitutes the first hypothesis in this study. The findings demonstrated a correlation between Behavioral Intention to Adopt Mobile Payment (BI) and Performance Expectancy (PE), with the latter exhibiting a standardized beta (0.338) and a sig value of p<0.001. This study indicates that Performance Expectancy (PE) represents a crucial and influential variable. The standardized beta value indicates a positive correlation between Behavioral Intention to Adopt Mobile Payment (BI) and Performance Expectancy (PE).

This aligns with studies by Yu (2012) and Koksal (2016), who found that performance expectations positively and significantly impact technology adoption. The 2020 research by Patil et al. revealed a high correlation between customer perceptions and performance expectations. Shaikh et al. (2018) assert that behavioral intention to accept mobile payment is influenced by performance expectation, where this study develops the following hypothesis: Customers' adoption of mobile payments may be enhanced by performance expectations. Furthermore, customers are more inclined to accept cashless payments if they believe doing so will increase their expectations for overall performance, according to a study by Rahman, Ismail, and Bahri (2020). This finding corroborates the findings of previous research by Patil, Dwivedi, and Rana (2017). Consequently, Hypothesis 1, which states that Performance Expectancy (PE) and Behavioral Intention to utilize mobile payment (BI) are related, is supported.

The relationship between Social Influence (SI) and Behavioral Intention to Adopt Mobile Payment (BI
The second hypothesis in this study is that Behavioral Intention to Adopt Mobile Payment (BI) and Social Influence (SI) are positively correlated. The results of this study show that social norms have a standardized beta value of -0.044 and a significance value of 0.189, indicating no significant association between social influence (SI) and behavioral intention to use mobile payment (BI). Stated differently, the results of this investigation do not support the second hypothesis. Consequently, this study's findings run counter to some of the earlier research that this study cited, which found that social effect strongly predicts users' propensity to use (Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2019; Islam et al., 2024). As Lu (2014) notes, social influence has a significant role in the early stages of adoption but loses impact with time. It is agreed with Kulviwat, Bruner, and Al-Shuriah (2009) that social factors influence the adoption of highly technical innovations. However, Singh and Sravistava (2018) have shown that social influence minimally impacts behavioral intention to use mobile devices and e-wallets.

Nevertheless, research by Bùi & Bùi (2018) found no evidence to support the notion that behavioral intention and social influence are related. Specifically, one reason for this finding might be that a transaction is more likely to result from an individual's decision rather than influence from friends, family, or other third parties. According to some earlier research by Schierz et al. (2010), social influence is one of the elements driving the use of mobile payment services. This contradicts those findings. Few studies, meanwhile, have examined its impact on behavioral intentions to use mobile payments from a societal perspective. Therefore, social influence has been proposed as an external factor that might affect consumers' adoption of contactless payments. Thus, to conclude, Hypothesis Two is unsupported.

The relationship between Trust (TR) and Behavioral Intention to Adopt Mobile Payment (BI)
There is a positive relationship between Trust (TR) and Behavioral Intention to Adopt Mobile Payment (BI), which is the third hypothesis in this study. The study's results indicate a substantial correlation between Behavioral Intention to Adopt Mobile Payment (BI) and Trust (TR), with a significance value of less than 0.001. Its standardized beta value is 0.132. In terms of mobile payment methods, according to Chandra et al. (2010), trust has an impact on adoption. Zhou (2011) looked into user trust in mobile payments by considering self-perception-based characteristics like ubiquitous connectivity and effort expectation in addition to transference-based characteristics like structural certainty and faith in online payment systems. Perceived system trust substantially impacts attitudes, especially among women, according to José Liébana-Cabanillas et al.'s (2014) examination of how a consumer's gender influences the behavioral intention to use mobile payments. Zhou (2011) found a favorable association between online payment trust and mobile payment perceptions after conducting an empirical inquiry on customers' moves from online to mobile payment methods. Therefore, it has been established that Hypothesis 3, which states a strong correlation between behavioral intention to use mobile payment (BI) and trust (TR), is validated.

The relationship between Perceived Cost (PC) and Behavioral Intention to Adopt Mobile Payment (BI)
The fourth hypothesis in this study is that Behavioral Intention to Adopt Mobile Payment (BI) and Perceived Cost (PC) have a negative relationship. The study's findings show a significant relationship, with a significance value of 0.018 for perceived cost (PC), between behavioral intention to utilize mobile payment (BI) and perceived cost (PC). Moreover, the standardized beta value of -0.066 provides additional insights into the type and direction of this correlation. A negative beta value implies an inverse relationship, indicating that behavioral intention to utilize mobile payments decreases as perceived cost increases. These findings suggest

that higher perceived prices are inversely connected with people's intentions to use mobile payment solutions. Several studies show that one of the main obstacles to the adoption of new technologies in mobile services is perceived cost (Wang, Lin, & Luarn, 2006). One of the barriers that emerged during a similar study by Wei et al. (2009) on the findings in Malaysia was the cost of the services, which also relates to this research. The impact that cost has on m-banking adoption is significant.

Moreover, Zhou (2011) says that high expenses related to mobile payments, such as transaction and transmission fees, could be another simple reason for the extreme use. Thus, perceived cost is analogous to the relative advantage component of Innovation Diffusion Theory (IDT) and determines the decision about adopting innovations. The higher the perceived costs of a mobile payment system are, the less likely users are to use it. Similarly, Chong et al. (2012) also said a significant negative correlation exists between consumer decisions to adopt mobile commerce and perceived cost in Malaysia and China. Lu et al. (2011) also mentioned that customers' impression of the cost of mobile payment services hurts their inclination to adopt them. According to Hanafizadeh et al. (2014), perceived cost detrimentally affects m-banking service acceptance. Ahmad and Khalid (2017) also emphasized that cost is a significant obstacle to m-government user uptake. Consequently, based on all these preceding illustrations, it is proven that Hypothesis Four is supported, in which there is a significant relationship between Perceived Cost (PC) and Behavioral Intention to Adopt Mobile Payment (BI).

The relationship between Gamification (GA) and Behavioral Intention to Adopt Mobile Payment (BI)

There is a positive relationship between gamification (GA) and behavioral intention to adopt mobile payment (BI), states the fifth hypothesis in this study. The results indicated a relationship between behavioral intention to use mobile payment (BI) and gamification (GA), with a significance value of $p<0.001$ and the highest standardized beta (0.421) for GA. This suggests that gamification (GA) has the most significant impact and importance research variable. Recent research shows that relatedness, competence, and autonomy are how gamification boosts user engagement. This, in turn, favorably improves users' intentions by making participation joyful (Lee & Jin, 2019). This engagement thus reinforces the intention to use (Bitrian, Buil, and Catalán, 2021). Bùi and Bùi (2018) discovered that the research model verifies the association between gamification and behavioral intention about the Gamification construct, a unique inclusion in our study. This is consistent with previous research from Sin et al. (2025). While gamification has a minimal impact on consumers' adoption of new technology compared to other factors, it indicates that consumers would likely react favorably to the prospect of a pleasant banking experience and extrinsic incentives like discounts, points, and rewards.

5. Conclusion

This study comprehensively examines factors influencing the behavioral intention of Generation Z individuals in Malaysia (aged 18 to 26 in 2024) towards mobile payment adoption. By assessing the relationships between independent variables (performance expectancy, social influence, trust, perceived cost and gamification) and the dependent variable (behavioral intention to adopt mobile payment), the study aims to test and evaluate these relationships using survey data from 602 respondents in Malaysia. The findings suggest a significant relationship between performance expectancy, trust, perceived cost and gamification with behavioral intention, while social influence plays a lesser role. In particular, gamification emerges as the most influential factor affecting the intention to adopt mobile payment. This study contributes to research on mobile payment determinants and gamification effects, offering valuable insights for academics and practitioners to enhance service design and implementation strategies for improving customer acceptance rates. This study aims to test, verify and evaluate the relationships between independent factors and dependent variables using 602 responses from Generation Z in Malaysia, comprising individuals aged 18 to 26 (in 2024).

The hypothesis that social influence (SI) positively impacts behavioral intention (BI) is not supported. There is a significant relationship between performance expectancy (PE), trust (TR), perceived cost (PC), and gamification (GA) with behavioral intention to adopt mobile payment (BI); only social influence (SI) has a relatively minor role in deciding behavioral intention to adopt mobile payment (BI). The performance expectancy (PE), perceived cost (PC), trust (TR), and gamification (GA) hypotheses have been accepted, and the results show that gamification (GA) has the most decisive influence on behavioral intention to adopt mobile

payment (BI). Therefore, it can be said that the main element that will have the most significant impact on the desire to utilize mobile payments. In summary, this study expands on previous research about the causes of mobile payments and the gamification effects, which provides valuable information for academics. Meanwhile, the results help practitioners better understand the major factors influencing customers' behavioral intentions, which is crucial for designing, improving and implementing services to increase customer acceptance rates.

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