# INFORMATION MANAGEMENT AND BUSINESS REVIEW

Vol. 18 No. 4 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 the 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, that 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, Uzbekistan, New Zealand, Oman and Indonesia related to areas of e-commerce, information technology, business, education and contemporary management. 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 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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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# The Impact of Work Stress, Work Environment and Organizational Climate on Employee Performance: Empirical Evidence from an Emerging Region

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**Abstract:** In recent years, the demand placed upon today's workforce has increased while the expectations of today's organization have changed. Therefore, managing an employee's performance is still a major challenge facing many organizations. This study examines the relationship between employee performance and work stress, work environment and organizational climate among employees in an emerging region which is Southern Sarawak, Malaysia. A quantitative cross-sectional research methodology was utilized in this study. Data collection occurred utilizing structured questionnaires completed by 221 government employees working in Kuching Sarawak utilizing convenience sampling. A multiple regression analysis model was developed for each of the six dimensions: workload; role conflict; role ambiguity; physical work environment; psychological work environment; and organizational climate. The results indicate that none of the work stress variables (i.e., workload, role conflict, role ambiguity) or the physical work environment had a statistically significant relationship with employee performance. However, the psychological work environment and organizational climate demonstrated a statistically significant positive relationship with employee performance. Furthermore, Organizational Climate emerged as the strongest predictive variable. These empirical results demonstrate that psychosocial and organizational support systems provide greater leverage in promoting employee performance than either the physical or structural aspects of the workplace. Thus, this study provides additional empirical evidence to the growing body of literature in the developing regional area of Sarawak, Malaysia, which supports the notion that organizations should develop and implement proactive employee wellness initiatives and supportive leadership and communication strategies to maintain superior levels of employee performance.

**Keywords**: *Employee Performance, Organizational Climate, Workload, Role Ambiguity, Role Conflict, Physical work environment, Psychological work environment*

## 1. Introduction

The ability for an organization to be successful and sustainable in either the public or private sectors depends on the quality of an employee's performance. Modern workplaces today ask for much more from an employee than just performing a standard task associated with his or her position (Dumitriu et al., 2025). Today's positions require employee adaptability, team collaboration, creativity, and continued productive output. As such, many organizations are encountering challenges related to employee performance. The majority of challenges stem from increasing pressures associated with increased job expectations, changes in organizational structure and design, and increased pressure on employees to perform at increasingly higher levels. These challenges create stress in the workplace, changing working conditions, and continually changing organizational culture (Sharma et al., 2025).

Each type of organization experiences unique obstacles because of varying institutional environments created by geography, industry, and different types of leadership. These variations lead to differences in employee performance in part due to the presence of psychological and organizational stressors that remain unaddressed (Kamarudin, Zulkafaly, & Hassan, 2018). Moreover, it is likely that a negative work environment (both psychologically and physically) will increase problems associated with performance even further than would

be expected based upon role conflict and role ambiguity (Dumitriu et al., 2025).

An individual's work environment is made up of two categories: tangible and intangible. The tangible aspects of an employee's work environment include things like physical space, lighting, and noise levels that can affect an employee's comfort level and concentration (Kazlauskaitė, 2023). On the other hand, intangible aspects of a work environment relate to psychological comfort and can be affected by things like management support, communication style, and work-life balance (Gilbert & Karanika-Murray, 2023). Additionally, organizational climate is defined as how employees perceive their organization through its leaders, policies, and practices. An organizational climate that has been established positively will foster a sense of constructive ownership among employees along with high morale (Tsoni et al., 2025). However, a lack of positive ownership and/or a lack of support in the organizational climate can become destructive and hinder an organization's overall functioning. Although there have been previous studies concerning work stress, organizational climate, and work environment individually, there is little, if any, research investigating the relationship of all three constructs collectively in a regional setting similar to Sarawak, Malaysia.

This study uses the JD-R Model (Demerouti et al., 2001) and the Transactional Model of Stress (Lazarus & Folkman, 1984) to investigate the joint effect of work-related stress, workplace settings, and organizational climate on employee performance in Sarawak, Malaysia. By using an integrated approach, this study seeks to close the existing gap in performance by providing actionable recommendations to enhance the psychosocial work environment, leading to long-term organizational success.

## 2. Literature Review

### *Employee Performance*

Employee performance is a multidimensional construct that encompasses an individual's productivity, motivation, and overall contribution to an organization's strategic goals. In the modern workplace, effective performance requires more than just the completion of standard tasks; it involves adaptability, consistent output, and a strong sense of engagement. However, an employee's ability to maintain high performance levels is heavily dependent on the balance between their job demands and the resources provided to them. When demands exceed an individual's capacity, it directly impedes their productivity, dampens motivation, and negatively affects their overall sense of well-being, which are all critical components of performance (Chen et al., 2022).

Furthermore, an employee's performance output is highly sensitive to systemic organizational factors, such as workload management and competing expectations (Diestel, 2022). There is substantial evidence demonstrating that when employees operate under chronic strain, they experience a sharp decline in productivity, reduced decision-making capabilities, and ultimately, severe disengagement from their work (Maslach, 2016). To optimize and sustain employee performance, organizations must provide adequate workplace resources to counterbalance these demands. According to Sharma et al. (2025), key resources that drive positive performance include job autonomy, role clarity, and perceived managerial support. Overall, employee performance is not an isolated individual trait but a responsive outcome that significantly declines when employees perceive little to no support from their management in navigating their daily responsibilities (Sharma et al., 2025).

### *Work Stress*

When employees' job demands exceed their capacity to manage them or provide adequate resources to handle these demands, then work-related stress emerges. In addition to being a source of mental and physical fatigue, this excessive stress affects an employee's productivity, motivation, and overall sense of well-being (Chen et al, 2022). While there are many sources of work-related stress, including too much work and conflicting expectations (Diestel, 2022), two major types of stressors are role conflict and role ambiguity. Role conflict exists when employees have competing expectations from different parties. Employees who experience conflicting expectations may be asked to simultaneously meet several different sets of expectations. For example, one manager may tell an employee to focus on sales, but another manager wants him or her to focus on customer service. An employee experiencing role conflict cannot satisfy either party. Role ambiguity exists when employees do not understand what is expected of them. In ambiguous situations, employees may receive

no clear definition of their roles and responsibilities. They may know they need to accomplish certain things, but they do not know exactly how they are supposed to accomplish these things. Like role conflict, ambiguity can lead to confusion, frustration and ultimately to dissatisfaction with the job and the employer.

There is substantial evidence demonstrating that chronic stress leads to decreased productivity, burnout, and eventually disengagement from the job (Maslach, 2016). Chronic stress is very debilitating for both employees and employers. It creates a negative cycle where the longer an employee experiences stressors related to his or her job, the less productive he or she becomes. Over time, this can result in a variety of negative emotions, including emotional exhaustion, anxiety, poor decision-making skills, and low job satisfaction.

Sharma et al. (2025) stated that workplace resources are insufficient to counterbalance excessive job demands, and then employees develop work-related stress. Resources included in this model are job autonomy (the degree to which an employee feels independent in completing his or her job), role clarity (an employee understands what he or she is expected to do), and support (employees feel they receive sufficient assistance). Overall, work-related stress negatively impacts employee performance in general, especially when employees perceive little or no support from management.

***Work Environment***

The work environment represents both a physical space and a psychological space. Physical characteristics of a workspace include design features (e.g., layout), lighting, temperature, ergonomics (how furniture fits the body), and noise levels. All of these physical factors contribute to employee comfort and focus (Kazlauskaitė, 2023; Abdul Hamed et al., 2026).

Conversely, psychological characteristics represent how employees think about their emotional connection to their workplace and their supervisor(s). Psychological aspects of the work environment include how much emotional support employees receive from supervisors or managers, communication quality (both upward and downward), perceived leadership behavior, and work-life balance (Gilbert & Karanika-Murray, 2023). A physically comfortable workplace contributes positively toward increasing focus and productivity while reducing distractions caused by discomfort. A mentally comfortable workplace promotes loyalty to the company and improves performance.

On the other hand, an uncomfortable workplace contributes negatively to productivity and employee engagement. Poor communication, lack of input and control over decisions made regarding employees' jobs, and inadequate recognition of employees' contributions can contribute positively toward increased stress levels and lowered performance levels. In recent years, it has become apparent that psychological aspects of a workplace are more important than physical aspects in terms of producing effective performance outcomes. As such, companies should pay attention to designing workplaces that promote a positive psychological environment, as providing employees with a supportive environment will promote employees' commitment to the company and their desire to produce effective work.

***Organizational Climate***

Organizational climate is a conceptualization of collective perceptions among employees of a company's policies/practices, management styles and methods of interacting with employees, and interpersonal relationships among employees (Tsoni et al., 2025; Schneider et al., 2017). Essentially, organizational climate defines the "personality" of an organization. It influences the day-to-day experiences of its employees.

An organization's climate provides context for understanding why some employees thrive in an organization while others do not. Organizations with climates characterized by trusting relationships between managers and subordinates, open communication between superiors and subordinates, equitable treatment of all employees based on merit, and supportive supervisory behaviors tend to foster environments conducive to learning and innovation. Conversely, organizations with climates that exhibit poor leadership practices and limited opportunities for growth and development will undermine employee motivation and commitment.

Climate can play a buffering role against job-related stressors; climates can help individuals frame challenging job demands as developmental opportunities instead of threats (Schneider et al., 2017). More importantly,

research has indicated that organizational climate is a significant determinant of organizational effectiveness (Rozman et al., 2021). Additionally, organizational climate is found to be more influential on organizational performance than other organizational environmental factors, including physical factors.

***Underpinning Theory***

The two models used in this study are the Job Demands-Resources (JDR) model and the Transactional Model of Stress.

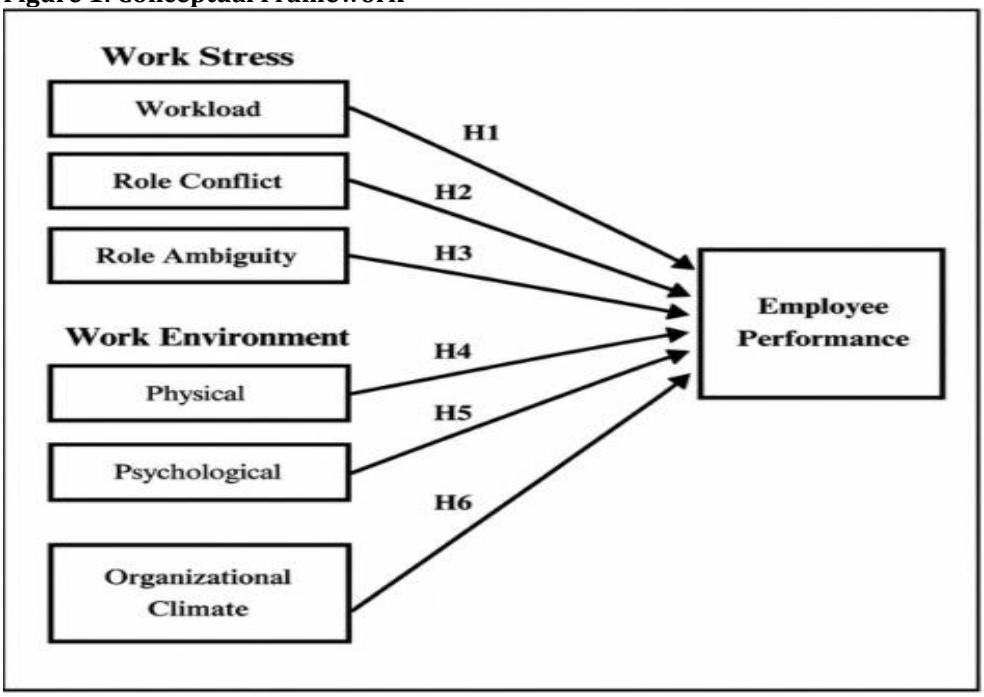
According to Bakker et al. (2023) and Schaufeli (2004), the JDR model states that employees' outcomes are determined by the balance between job demands and resources. For example, when an employee has too much work or has conflicting roles, these create demands that lead to lower performance due to reduced energy. On the other hand, there are many resources that can help increase motivation and decrease stress. These include supportive leaders, a good team dynamic, and a positive organizational culture.

The Transactional Model of Stress focuses on how individuals appraise their own level of stress at a particular time, which then determines what they will do to cope with it. Rizal et al. (2025) explain that the amount of stress in a workplace will determine how well employees perform. When combined, the JDR Model and the Transactional Model of Stress allow for a better understanding of how employee performance, the workplace environment, and the organizational climate interact.

**Conceptual Framework**

The conceptual framework for this study is grounded in the Job Demands-Resources (JD-R) model and the Transactional Model of Stress, supported by empirical evidence from recent organizational studies (Bakker et al., 2023; Chen et al., 2022; Park & Park, 2021; Galanakis et al., 2022). The framework posits that employee performance is not an isolated outcome but is driven by the dynamic interplay between job demands, workplace resources, and the broader organizational context. The model categorizes the independent variables into three main constructs that directly influence the dependent variable, employee performance, as shown in Conceptual Framework Figure 1.

**Figure 1: Conceptual Framework**



**Work Stress (Job Demands):** This construct captures the varying facets of job demands, specifically workload, role conflict, and role ambiguity. According to the JD-R model, high job demands drain an employee's physical and psychological resources, which can elevate strain and exhaustion, ultimately diminishing their ability to concentrate, stay motivated, and perform tasks effectively.

**Work Environment (Job Conditions):** This is divided into physical and psychological environments. The physical environment includes the design of workspaces, lighting, and equipment, which affect comfort and efficiency. The psychological environment encompasses emotional support, interpersonal relationships, and perceived fairness. When employees are psychologically supported and secure, they become more adaptable and capable of sustaining elevated performance levels.

**Organizational Climate (Macro Context Resources):** This encompasses the macro social and managerial environment, including the quality of leadership, communication structures, and levels of trust. A positive organizational climate acts as a critical job resource that reinforces employee belongingness and commitment, enabling them to manage work stress effectively. Conversely, a negative climate amplifies stress and demotivates employees, even within well-designed physical workspaces.

Rather than viewing these elements in isolation, the framework captures their interrelated effects, illustrating how organizational and environmental contexts either strengthen or cushion the impact of job demands on employees. Based on this framework, the following hypotheses were developed and tested:
**H1:** There is a significant relationship between workload and employee performance.
**H2:** There is a significant relationship between role conflict and employee performance.
**H3:** There is a significant relationship between role ambiguity and employee performance.
**H4:** There is a significant relationship between the physical work environment and employee performance.
**H5:** There is a significant relationship between the psychological work environment and employee performance.
**H6:** There is a significant relationship between organizational climate and employee performance.

## 3. Method

### *Research Design*

A cross-sectional design (quantitative) was employed to investigate how workplace conditions, organizational climate, and employee performance are related. Workload, role conflict, role ambiguity, physical work environment, psychological work environment, organizational climate, and employee performance were studied by completing a structured self-report questionnaire that employees completed in their workplaces in Sarawak. A convenience sampling procedure was used due to limited access. Of the 350 government organizational workers surveyed, 221 surveys provided usable information. Participants ranged in age from 18 to 60 and represented a variety of job roles in the organization, such as managerial, administrative, and operational. The number of participants was adequate for conducting multiple regression analyses.

### *Measures*

Demographics collected via the first part of the survey included gender, age, educational attainment, years of service, and management level. The second section of the survey consisted of measures developed to represent the constructs of interest in this study. Each construct was operationalized using a definition. Work-related stress was operationalized with reference to three aspects of work-related stress: workload, role conflict, and role ambiguity. Both the physical and psychological aspects of the work environment were also assessed. Organizational climate and employee performance were each assessed based upon perceptions about these constructs. For all constructs of interest in this study, responses were elicited using a 5-item Likert-type scale. Responses were elicited using the following anchors: 1 = Strongly Disagree; 5 = Strongly Agree. Instrument adapted from previous study which work Load (Paarima et al., 2024), role conflict (Homayed et al., 2025), role ambiguity (Hill et al., 2015), physical work environment (Anasi, 2020) and psychological work environment (Sari et al., 2021). Organizational climate (Pradoto et al., 2022) and employee performance (Sari et al., 2021).

### *Data Collection Process*

Data collection occurred when employees completed an electronic survey using Google Forms at their place of

employment within designated geographic areas. Employees who chose to complete the survey gave informed consent prior to beginning the survey. Throughout the data collection process, participant anonymity and confidentiality were ensured. The data collection process took six months to provide ample opportunity for participation by employees from a variety of backgrounds and organizations. The survey links and QR code were disseminated through multiple organizational sources.

***Data Analysis***

Following data collection, responses entered electronically into Google Forms were exported and stored in a .csv file for analysis using IBM SPSS. Demographic data were converted to numerical form to facilitate statistical analysis; however, the five-point Likert scales were preserved. Following exportation of the data into a spreadsheet program, the data were processed and cleaned to eliminate missing or inconsistent responses. Statistical analysis involved multiple procedures:

Descriptive Statistics: Used to summarize the demographic profiles of the respondents.
Reliability Analysis: Cronbach's Alpha was utilized to evaluate the internal consistency of the measurement items.
Normality Testing: Skewness and kurtosis values were examined to confirm that the data met the assumptions for parametric testing.
Pearson Correlation Analysis: Conducted to explore the strength and direction of the relationships between the independent variables and employee performance.
Multiple Regression Analysis: Employed to assess the predictive relationship and determine the relative contribution of each independent variable to employee performance.
All statistical analyses were conducted at a 0.05 significance level.

## 4. Findings and Discussion

***Reliability Analysis***

A reliability analysis was conducted to evaluate the internal consistency of the measurement instruments used in this study. In social science and organizational research, a Cronbach's alpha coefficient exceeding 0.60 is generally considered to indicate an acceptable and reliable level of internal consistency (Hair et al., 2022). The results demonstrated strong reliability across all constructs, confirming that the scales accurately measured the intended variables and were sufficiently robust for subsequent statistical analyses.

***Normality Test***

The first step taken before conducting correlation analysis and multiple regression was to perform a normality test to determine if there was adequate adherence to the assumptions necessary for using parametric statistics. Violations of these assumptions could cause issues in the interpretation of results produced by inferential statistical procedures such as correlation and multiple regression analysis.

A variety of tests exist that can be used to assess normality, including graphical and statistical tests. Graphical assessments included creating histograms, Normal Probability (P-P) Plots, and scatterplots using SPSS. Histograms are generally used to visually evaluate the shape of distributions. In this case, the histogram appeared fairly symmetrical. The Normal P-P Plots are used to graphically compare the standardized residuals against a perfect straight line. In this study, the residuals were very close to being on a perfectly straight line. Scatter plots are used to examine whether there is any pattern to residuals.

Since all residuals were randomly dispersed without any obvious patterns or clustering, it appears that homoscedasticity has been met. Statistically, skewness and kurtosis values were used to assess normality. All of the variables in the study had skewness and kurtosis values within an acceptable range of -2 to +2. Many researchers have determined that when skewness and/or kurtosis are less than or equal to +2/-2, there is sufficient support for the use of parametric statistical analyses (George & Mallery, 2020; Hair et al., 2022).

**Table 1: Reliability Test**

| *Variables* | *Cronbach's Alpha* | *No of Items* | *Strength* | *Result* |
|---|---|---|---|---|
| Employee Performance (EP) | 0.974 | 6 | Excellent | Reliable |
| Workload (WL) | 0.629 | 6 | Moderate | Reliable |
| Role Conflict (RC) | 0.757 | 6 | Good | Reliable |
| Role Ambiguity (RA) | 0.815 | 5 | Very Good | Reliable |
| Physical Work Environment (PHY) | 0.844 | 5 | Very Good | Reliable |
| Psychological Work Environment (PSY) | 0.806 | 5 | Very Good | Reliable |
| Organizational Climate (OC) | 0.844 | 5 | Very Good | Reliable |

***Demographic Profile of Respondents***

A total of 221 respondents participated in this study. The sample comprised 53.4% males and 46.6% females. Most respondents were young, with 38.0% aged 18 to 25 years and 22.2% aged 26 to 30 years. In terms of education, the majority held a Diploma/STPM qualification (42.5%), followed by SPM/SPV certificates (25.8%) and Bachelor's degrees (23.5%). Regarding work experience, 35.3% had less than one year of experience, while 23.5% had between one and two years. However, 24.9% had more than five years of work experience. In terms of organizational position, most respondents were in middle management (51.6%), followed by lower management (32.6%) and top management (15.8%). Overall, the sample represents employees from diverse educational backgrounds, experience levels, and management positions.

**Table 2: Demographic Profile of Respondents (N = 221)**

| | **N** | **Percentage (%)** |
|---|---|---|
| **1) Gender** | | |
| Male | 118 | 53.4% |
| Female | 103 | 46.6% |
| **2) Age** | | |
| 18 – 25 | 84 | 38% |
| 26 – 30 | 49 | 22.2% |
| 31 – 35 | 41 | 18.6 % |
| 36 – 40 | 16 | 7.2% |
| 40 - 44 | 9 | 4.1% |
| 45 & Above | 22 | 10% |
| **3) Highest Education Level** | | |
| PT3 / PMR or equivalent with it | 5 | 2.3% |
| SPM / SPV or equivalent with it | 57 | 25.8% |
| Diploma / STPM | 94 | 42.5% |
| Bachelor's Degree | 52 | 23.5% |
| Master or PHD | 13 | 5.9% |
| **4) Work Experience** | | |
| Less than 1 year | 78 | 35.3% |
| 1 – 2 years | 52 | 23.5% |
| 3 – 4 Years | 36 | 16.3% |
| More than 5 Years | 55 | 24.9% |
| **5) Management Level** | | |
| Low | 72 | 32.6% |
| Middle | 114 | 51.6% |
| Top | 35 | 15.8% |

***Correlation Analysis***

A Pearson correlation analysis was conducted to examine the strength and direction of the linear relationships among the study variables: Workload (WL), Role Conflict (RC), Role Ambiguity (RA), Physical Work Environment (PHY), Psychological Work Environment (PSY), Organizational Climate (OC) and the dependent variable, Employee Performance (EP).

**Table 3: Correlation Analysis**

| Variables | EP | WL | RC | RA | PHY | PSY | OC |
|---|---|---|---|---|---|---|---|
| Employee Performance (EP) | 1 | | | | | | |
| Workload (WL) | −0.082 | 1 | | | | | |
| Role Conflict (RC) | −0.064 | 0.412** | 1 | | | | |
| Role Ambiguity (RA) | −0.071 | 0.386** | 0.451** | 1 | | | |
| Physical Work Environment (PHY) | 0.093 | −0.115 | −0.102 | −0.088 | 1 | | |
| Psychological Work Environment (PSY) | 0.462** | −0.198* | −0.213* | −0.176* | 0.322** | 1 | |
| Organizational Climate (OC) | 0.531** | −0.224* | −0.247* | −0.201* | 0.341** | 0.568** | 1 |

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

The results reveal that only psychosocial and organizational factors possess a statistically significant relationship with employee performance. Specifically, Organizational Climate (OC) demonstrated the strongest positive correlation with Employee Performance ($r = 0.531$, $p < 0.01$), indicating that a supportive and transparent organizational culture is closely associated with higher employee performance levels. Similarly, the Psychological Work Environment (PSY) exhibited a strong and significant positive correlation with employee performance ($r = 0.462$, $p < 0.01$).

Conversely, the traditional job stressors examined in this study did not show any significant relationship with employee performance. Workload ($r = -0.082$), Role Conflict ($r = -0.064$), and Role Ambiguity ($r = -0.071$) all displayed weak, non-significant negative correlations. Furthermore, the Physical Work Environment (PHY) also showed a weak and non-significant positive relationship with performance ($r = 0.093$). These results suggest that basic physical infrastructure and isolated job stressors do not directly dictate performance outcomes, and that organizational and psychosocial factors affect employee performance far more than traditional stress factors and the physical work environment.

**Table 5: Summary of Hypothesis Results**

| Hypothesis | Statement | Result |
|---|---|---|
| H1 | There is a significant relationship between workload and employee performance. | Not Supported |
| H2 | There is a significant relationship between role conflict and employee performance. | Not Supported |
| H3 | There is a significant relationship between role ambiguity and employee performance. | Not Supported |
| H4 | There is a significant relationship between physical work environment and employee performance. | Not Supported |
| H5 | There is a significant relationship between psychological work environment and employee performance. | Supported |
| H6 | There is a significant relationship between organizational climate and employee performance. | Supported |

***Multiple Regression Analysis Results***

A multiple linear regression analysis was conducted to examine the extent to which workload, role conflict, role ambiguity, physical work environment, psychological work environment, and organizational climate predict employee performance. Prior to interpreting the results, a visual inspection of the standardized residuals histogram was performed. The histogram exhibited an approximately normal, bell-shaped distribution without

extreme outliers, confirming that the assumptions of normality for the regression analysis were satisfactorily met.

**Table 6: ANOVA Results**

| Model | Sum of Squares | df | Mean Square | F |
|---|---|---|---|---|
| Regression | 182.734 | 6 | 30.456 | 34.116 |
| Residual | 196.812 | 214 | 0.920 | |
| Total | 379.546 | 220 | | |

**Table7: Regression Coefficients**

| Predictor | B | Beta | t | Sig. |
|---|---|---|---|---|
| Workload | –0.041 | –0.052 | –0.812 | 0.418 |
| Role Conflict | –0.038 | –0.047 | –0.734 | 0.464 |
| Role Ambiguity | –0.046 | –0.058 | –0.901 | 0.369 |
| Physical Work Environment | 0.062 | 0.071 | 1.102 | 0.272 |
| Psychological Work Environment | 0.287 | 0.331 | 4.982 | 0.000 |
| Organizational Climate | 0.354 | 0.402 | 5.913 | 0.000 |

Model Summary:
R = 0.694
$R^2$ = 0.482
Adjusted $R^2$ = 0.468

The overall regression model was statistically significant ($F(6, 214) = 34.116$, $p < .001$), indicating that the combined independent variables reliably predict employee performance. The model summary revealed an $R^2$ of .482, meaning that the six predictors collectively explain 48.2% of the variance in employee performance (Adjusted $R^2$ = .468).

In evaluating the individual contributions of each predictor, the analysis revealed that only psychosocial factors significantly influenced performance. Organizational climate emerged as the strongest and most significant positive predictor of employee performance (β= .402, t = 5.913, p < .001). This was closely followed by the psychological work environment, which also demonstrated a significant positive effect (β = .331, t = 4.982, p < .001).

Conversely, traditional job stressors and physical workplace conditions failed to reach statistical significance in this model. Specifically, workload (β = -.052, p = .418), role conflict (β = -.047, p = .464), role ambiguity (β = -.058, p = .369), and the physical work environment (β = .071, p = .272) did not significantly predict employee performance.

In summary, the regression results indicate that when employees operate under favorable psychological and organizational conditions, traditional job stressors and the physical work environment become irrelevant as predictors of performance. The data strongly suggest that fostering a supportive, transparent organizational climate and a psychologically safe workspace are the most critical drivers of employee performance.

## 5. Contribution and Implications

This study offers significant theoretical and practical contributions to the understanding of employee performance, particularly within the Sarawak organizational context.

### *Theoretical Contributions*

The findings of this research are significant for both theory and practice regarding employee performance in the Sarawak organization. Theoretically, the data provide strong evidence that supports the JD-R model from an empirical perspective in a regionally specific setting. By demonstrating that the strength of the relationship between psychosocial/structural work environment resources and employee performance is significantly

greater than the strength of relationships with workload-related stress, or physical environmental aspects of the workplace, the research supports the underlying premise of the JD-R model (Demerouti et al., 2001; Bakker & Demerouti, 2017; Schaufeli, 2004). More specifically, by providing clear evidence that organizations can mitigate the potential psychological and operational damage resulting from employees experiencing high levels of job demands through organizational resource allocation such as active management support, open communication, and positive work environments, the research has direct implications for employee performance enhancement.

***Managerial and Practical Implications***

Given that organizational climate is the most important factor associated with performance, this study's results suggest that companies must take an integrated, resource-based approach to human resources to develop an appropriate climate within which employees can perform at their best. The development of a climate where employees feel psychologically safe and supported requires organizations to have good quality leadership, establish transparent and open lines of communication, and provide fair and equitable treatment to all employees (Schaufeli, 2004; Lukić Nikolić, 2024) while providing opportunities for recognition and validation of their efforts through employee contributions (Bakker & Demerouti, 2017). Organizations need to move away from using only quantitative performance measures to evaluate employee performance. Human Resources departments must incorporate metrics into their standard assessment process to measure both the organizational climate and overall employee well-being (Maslach, 2016). As part of this transition, organizations will need to establish formalized systems of feedback so managers have the diagnostic information required to continually improve the employees they supervise (Aguinis, 2009). Strategic investment in supporting the psychological working environment is essential for promoting employee wellness. It also promotes resilience and productivity among employees who are exposed to high levels of demands in their jobs (Gilbert & Karanika-Murray, 2023).

**Conclusion**

The study demonstrates how work stress and the work environment affect employee performance. The empirical data show that there is a statistically significant positive correlation between employee performance and the psychological work environment, as well as organizational climate. However, the data do not show a statistically significant relationship between physical aspects of the work environment (including workload, role conflict, and role ambiguity) and employee performance. In essence, while the quality of the physical space may have an indirect effect on employee performance due to its impact on the quality of the psychological work environment, the psychological factors are much more important than the physical ones.

Although this study offers insight into many aspects of workplace dynamics, numerous methodological and contextual limitations must be acknowledged. First and foremost, the sample size used for this study was limited to only certain geographical areas within Sarawak. Therefore, the generalizability of the findings from this study will likely be very low if compared to organizations operating in different areas or in completely different sectors. Second, since this study relied solely on self-reporting through surveys, it has the same problems of measurement error (i.e., common method variance) and social desirability bias as all self-report studies. Lastly, since this study was cross-sectional in nature, it does not allow for the analysis of causality in terms of how some variables relate to others.

Future studies can use longitudinal research designs to assess changes in employee performance over time and to establish causal connections between variables. It would be wise for subsequent studies to utilize larger samples from a variety of different industries located throughout multiple states or countries. Additionally, by extending their conceptual frameworks to include more independent variables such as leadership style, job satisfaction, employee engagement, and perceived organizational support, researchers will develop a better understanding of the various ways in which employee performance is influenced by factors outside of those related to job requirements.

**Acknowledgement:** The authors would like to express their sincere appreciation to the Faculty of Business and Management, Universiti Teknologi MARA (UiTM), for its continuous support and encouragement throughout this research.

**Conflict of Interest Statement:** The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Consumer Buying Behavior Towards Online Insurance Services: An Empirical Study in Bandar Baru Uda, Johor Bahru

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**Abstract:** Take a walk on any of the densely populated streets in Malaysia today, and you'll see a country rapidly embracing digitization, with cashless night markets, for example, as well as government services reached via a flick of the screen. But as the nation moves quickly toward full-fledged maturity, an unwelcome rub remains: trusting the average man or woman in the street is an ongoing process, even as the technology is in place. This psychological difference is most obvious in the financial industry, where conventional, face-to-face insurance handshakes are giving way to digital shops. This study examines the key factors influencing consumers' intention to purchase online insurance services in the metropolitan neighborhood of Bandar Baru Uda in Johor Bahru to identify what motivates or deters them from shifting to this medium. The thematic study focuses on the direct relationships between the most important underlying properties, such as satisfaction level, perceived internet quality, and motivating properties, which can affect customer purchasing decisions. The empirical findings indicate a statistically significant correlation between these consumer perceptions and their actions in purchasing. The results of these findings offer strategic guidance for insurance companies seeking to enhance their digital channels and empower customers to make informed decisions about the insurance sector in the digital era.

**Keywords**: *Consumer Buying Behavior, Satisfaction Level, Perceived Internet Quality, Motivational Factors.*

## 1. Introduction and Background

The insurance industry depends on the economics of preserving. It acts as a financial barrier, having risks that are collected together to protect individual assets and human futures from unanticipated weaknesses. Traditionally, the Malaysian insurance industry relied on extensive branch networks and in-person interactions to deliver this sense of security. The industry is going through unprecedented structural changes, however, as Bank Negara Malaysia (BNM) continues to actively drive the nation towards a fully digital financial landscape with the modern regulatory sandbox programs. The old-fashioned, touchy-feely handshake between agent and policyholder is soon to be replaced by direct-to-consumer applications over digital technology (Asian Insurance Review, 2025; Insurance Asia 2024; NielsenIQ Malaysia, 2024).

This digital revolution is not just about taking business online; it's about changing the perception of security. In the traditional theory of consumer behavior, the buying process has been described as a highly complex "black box" that is primarily triggered by external signals from the environment and marketing stimuli (Peter & Nord, 1982). These cues are all virtual these days. A customer visiting a digital platform is not simply looking at the economics of a life and/or general insurance policy. But they test their faith with a brilliant screen.

Smaller insurance companies like motor or travel have seamlessly integrated into web checkout, but the transition for larger insurance sets is a digital tussle. Interestingly, recent national data shows that although public awareness of digital insurance channels has risen by 20% over the past few years, over 40% of the market is still wary about it because of digital vulnerabilities, anxiety about technology, and a high degree of cultural dependence on human intermediaries (Insurance Asia 2024; NielsenIQ Malaysia, 2024). This friction reveals a big service gap for contemporary insurance companies. In today's increasingly competitive and congested environment, it's not just a matter of offering the lowest price, but it must also be a remarkable and smooth digital service experience. While it is well documented that certain cities have had successes with digital, in localized urban neighborhoods, it is a different picture. Bandar Baru Uda Johor Bahru is one of the locations where a considerable digital divide exists, as customers are still predominantly offline and use

traditional means to access the insurance marketplace. To overcome this gap, this study looks at the localized variables impacting consumer buying behavior towards online insurance services in Bandar Baru Uda. To help insurance companies get on the right track to successfully digitize Malaysia's changing consumer market, this study seeks to deliver empirical insights into particular areas: customers' previous level of satisfaction with the internet, localized internet challenges, and internal motivations.

**Problem Statement:** Imagine a town that never shuts down, and getting protected happens quicker than you can make a cup of coffee for your life, car, health, or next destination. In contemporary financial technology, Malaysia's government is actively pursuing its digital journey, while regulatory frameworks actively drive the development of fully automated digital insurers (PwC Malaysia, 2025). In today's world, complicated financial protection has become a one-tap commodity on our cellphone. But beyond this perfect digital veneer exists a huge psychological disconnect: millions of regular consumers still won't cross the digital line in the hopes of buying insurance. This is because sensitive health information or financial details are entered into a virtual cloud network, leading to a high level of user concern. This collective hesitancy is an intentional safeguarding measure in a world becoming more complex with advanced phishing techniques and fake websites using a proxy domain name (Cybersecurity Malaysia, 2025; Ye et al., 2021).

This huge customer distrust has become one of the most important front lines in the battle being waged by the modern insurance industry. Though this digital 'friction' is a widely researched phenomenon at a national scale, it is best understood at a localized urban scale. Bandar Baru Uda in the larger Johor Bahru district is a prominent example of this digital divide. While it is an established residential and business centre in South Malaysia, the digital insurance penetration is still relatively low. The question is simple: why, when they have the online tools in their hands, are the people of Bandar Baru Uda still not adopting online insurance services? This study directly tackles this gap by investigating the specific catalysts driving localized consumer buying behaviour. The research examines the topic via three key lenses. First, it studies customer satisfaction levels to evaluate whether existing digital insurance systems truly meet user expectations or leave them disappointed. Second, it addresses the infrastructure barrier by assessing perceived internet quality and availability issues, as well as mapping how concerns about connection stability and security interrupt the purchasing process. Finally, it investigates the internal motivators, such as possible cost savings or pure convenience, which may persuade a customer to switch from offline to online. Through localized empirical insights, this study aims to dismantle the barriers of digital anxiety, mapping the exact pathway to digital trust for the everyday Malaysian consumer.

## 2. Literature Review

**Consumer Buying Behavior Towards Online Insurance Services:** Today's corporate landscape is not about what they want to sell but about reading the consumer's complex and ever-evolving needs well. If there are a number of firms selling the same or very similar financial products in a tightly competitive arena, just dumping generic advertising into the stream of marketing is a recipe for failure. Firms need to know and comprehend the purchasing behavior of their target segment to prosper (Kotler et al., 2014). The objective of classic consumer behavior theory is to interpret the complex manner by which products and services are selected, purchased, used, and disposed of by individuals, groups, or organizations as a result of a combination of previous experiences, personal preference, pricing, and brand power(Kotler et al., 2014). Decoding this "human equation" has been a guessing game historically. In today's world, it has become a science; multinational corporations can now monitor what, when, and how often their customers are purchasing (Brink & Berndt, 2008). But the entire ecosystem has moved to the virtual world, which has changed the way that things are handled. With the advent of the internet in business, early digital models set that smooth online access to the system was the ultimate obstacle to good consumer contact(Liao & Cheung, 2002). Consumers were not just asking for digital platforms; they were also expecting to be able to access these services from remote geographic locations, as a basic infrastructural requirement that impacted their longer-term attitudes towards online systems (Joseph & Stone, 2003). This expectation has grown stronger in the modern period.

Empirical studies in recent years in emerging digital markets have shown that platform unavailability, unreliable digital infrastructure, and network latency are direct factors that lead to user attrition and have a significant impact on the technical accessibility of online service providers (Zhou & Wan, 2022). The new digital storefront is not only connected but it also attracts two very human desires – convenience and time efficiency

(Ranganathan & Ganapathy, 2002). The internet removes the friction from traditional business by changing the customer journey into a research sanctuary. Users can easily access important product information, can compare competing service providers side by side and can easily search for the exact information they need to satisfy their specific needs by clicking a button. As per the latest study on digital financial consumption, today's consumers are extremely motivated by "information symmetry", which is the ability to independently decide on complex financial products like insurance without feeling pressured by a salesman who is too pushy (Dinh et al., 2023). Understanding consumer behavior in this digital landscape then demands a focus on the interaction between the reliability of the infrastructure, the ease of access to the web and internal motivations, which can make a curious browser into a confident digital buyer.

**Satisfaction Level:** In the modern business environment, customer satisfaction is no longer regarded as a mere performance indicator; it is the very essence of the organization's operations and overall development, where the attitude towards customers is truly oriented and the effort is aimed at continuous improvement of the process. In the simplest definition, contentment is a continuous emotional review and a buyer's total assessment of the brand's performance against their expectations. If a company manages to connect both the expectation and the fulfillment of a consumer in a way that creates a great psychological impact, there is no other way to describe it. A satisfied customer translates to a loyal one, and thus equates to a customer who will actively advocate the product for future sales. However, feeling this satisfaction is much more precarious if a company removes the retail location and replaces it with an all-digital experience. Creating a strong online presence requires a vibrant online community where customers can feel included and secure.

While a modern insurance business can't simply depend on its own marketing voice, it must build a wide-reaching brand presence throughout digital channels where organic, eWOM (electronic word of mouth) communication can flourish. When regular consumers speak about their own experiences in their real lives, you see an authentic consumer response on the Internet which traditional advertising can't replicate. But being exposed isn't enough to make skeptical spectators into confident digital consumers. The transition to online banking systems requires proactive digital education for non-bankers. By providing users with clear information on the operation of automated platforms and demonstrating the platform's high security and encryption standards, companies can alleviate customer concerns and encourage greater participation (Afzal et al., 2025). Last but not least, it is important to establish a clear, causal link between the internal satisfaction an individual experiences and what they actually do in the real world to express their satisfaction, which requires a more complex and dynamic notion of feedback. Modern consumer behavior frameworks focus on the dynamic nature of satisfaction in digital retail finance in relation to various factors and timelines. Both the speed and the sense of security of an online network and the user interface play a role in a consumer's decision to complete an online transaction. Empirical studies of the digital insurance sector over the last few years have found that platform responsiveness, navigation and rapid real-time support are the key factors for digital retention (Jain et al., 2025; Wei et al., 2025). As a result, assessing consumer satisfaction in concentrated urban centers necessitates understanding how digital education, electronic peer influence, and seamless platform performance interact to build the modern purchase trip.
**H1:** There is a relationship between satisfaction level and consumer buying behavior towards online insurance services.

**Perceived Internet Quality:** Think about the frustration of a consumer who has decided to purchase an insurance policy online, has selected their coverage, entered the personal information, and then clicks on the final payment button and the page freezes, a hyperlink breaks, or the screen goes blank with no confirmation message. In the digital banking sector, an unresponsive or poor UI experience has a negative impact on the user and their trust in the brand. When a platform's tech design makes it hard to navigate, or when it breaks during a transaction, the buyer is in a stressed state, not knowing whether their funds have been stashed away in the cloud. One of the most common sources of revenue loss is technical issues and/or poor digital architecture. Studies have shown that the user's background – from the reluctant surfer to the person who has surfed for years, or the one who has been shopping online for years – has a significant impact on their judgment of a platform's structural reliability and data security measures. Once structural vulnerabilities arise, the perceived danger is an immediate obstacle that will stop the customer from going further on the digital journey. This technology barrier turns into a national reality, not a concern for businesses when one takes a broader view of the larger picture of developing countries. The paradox of Malaysia's digital development for many years has

been the government's attention to providing basic internet access to outlying areas, without prioritizing the overall speed of internet connections. This has effectively connected millions of residents to the internet, but the country was experiencing pockets of internet lag and congestion. The situation is completely different now.

To eliminate these digital dead zones, Malaysia has actively deployed advanced fiber optic networks and a comprehensive national 5G deployment, as outlined in the current digital economy plans(Digital Nasional Berhad [DNB], 2025; Malaysian Communications and Multimedia Commission [MCMC], 2024). The lifeblood of modern business activities has come to be known as high-speed fiber lines, which convert electrical impulses into light waves and transmit vast quantities of data at the speed of light. These are the big-scale changes happening nationally; however, there is a digital gap occurring at the grassroots level. The user experience on a day-to-day basis is not always indicative of high speeds in the national statistics in special-purpose suburban centres such as Bandar Baru Uda in Johor Bahru. In these areas, consumers are likely to experience micro-infrastructure challenges like unexpected signal drop-offs inside high-density residential buildings, network congestion or cellular dead zones within a specific area. Empirical studies recently conducted in Malaysia indicate that even minute fluctuations in network quality can disrupt more complex financial transactions like completing a multistep online insurance application. If the connection is not reliable, customers drop the digital channel altogether and switch to traditional, offline transactions (Shin, 2021). Therefore, exploring online buying behaviors in Johor Bahru requires a realistic evaluation of the effect of internet quality on digital customers' buying behaviors, which may either empower or repel them.
**H2:** There is a relationship between perceived internet quality and consumer buying behavior towards online insurance services.

**Motivational Factors:** For any business that wants to succeed in a very competitive business environment, the secret to getting a lot of sales and taking over the market area is a deep psychological understanding of consumer buying behaviors. Academic consensus categorizes these behavioral influences into four main groups: cultural, social, personal and psychological. The psychological pillar sub-components, such as individual perception, acquired habits, and personal motives, however, exert the greatest influence on the human mind when it comes to understanding why the client buys a product. Motivation is defined as an internal need condition that is highly engaged, which actively guides a person's behavior towards a goal. In traditional commerce, internal cues were slow-moving and highly intimate. Today, progressive digital marketers realize that if they can figure out the exact magic that causes this psychological momentum, they can design platform experiences that capture customers and keep them engaged with a brand's digital platform.

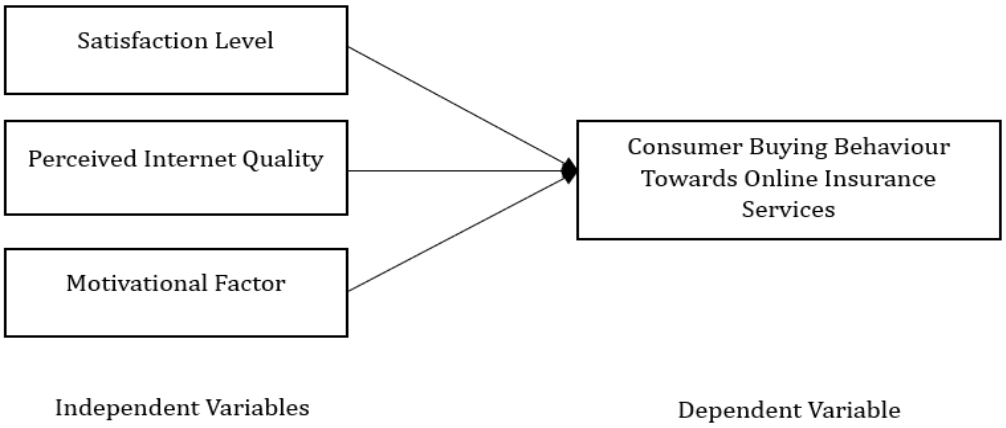
Virtual "shopping" is no longer just about getting a physical product; it's more of an exploration that's triggered by different kinds of digital stimuli. If consumers' behavior changes to include online shopping, their motivations should change with it as they are now evaluating and buying services completely online. Today, consumers aren't only interested in the product properties – they are much more inclined to be interested in the context, such as instant gratification, extreme convenience, or simple cost efficiency. The current macroeconomic data shows a huge behavioral transformation in emerging digital ecosystems where traditional financial behaviors are being replaced by independent, self-directed digital cashouts. Consumers want to engage with the brand digitally, and they have no intention of continuing with the tedious administrative hassles, wanting to take ownership of the entire purchasing process (Deloitte Insights, 2026).

Perhaps one of the best examples of this motivational change is the swift transformation of the digital retail finance sector in developing markets such as Malaysia. In the last national consumer survey, an overwhelming 88% of today's Malaysian insurance consumers are psychologically confident in conducting all financial transactions digitally on their own(Minime Insights Reports, 2026)The empirical evidence reveals a surprising truth: the main driver for this vast uptake is the desire for quick, seamless interactions – the ease of access around the clock, policy issuance in real time and the ability to create modular, flexible premiums that help alleviate personal cash flow constraints (FPT Global Finance, 2026; Minime Insights Reports, 2026). To gauge purchasing behaviors in a local suburban neighborhood, however, one must chart the influence of these compelling and contemporary internal drives in effectively negating the consumer fears and apprehension that would otherwise keep the average consumer on the sidelines.
**H3:** There is a relationship between motivational factors and consumer buying behavior towards online insurance services.

**Research Framework:** This study bases its framework on the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and the Technology Acceptance Model (TAM) to build a rigorous conceptual foundation (Davis, 1989). According to these well-established theoretical frameworks, people's assessments of system performance, structural preparedness, and inherent advantages are what motivate people to adopt new technologies. The three independent variables in this study, which are satisfaction level, perceived internet quality and motivational factor, were chosen with these theoretical features in mind and specifically adapted to the Bandar Baru Uda local environment.

Initially, an experience antecedent is satisfaction level. Evaluating past contentment particularly with legacy, agent-driven services is critical because strong happiness with conventional face-to-face contacts frequently serves as a psychological anchor, reinforcing status quo bias and causing resistance to automated self-service channels. Second, the concept of facilitating conditions or perceived ease of use is represented by perceived internet quality. Micro-level infrastructure issues (like localized network latency or signal dropouts in high-density residential buildings) cause friction during complicated transactions in high-stakes digital financial services like insurance, which directly affects a consumer's willingness to adopt digital channels. Lastly, motivational factors are mapped onto performance expectancy and perceived usefulness. Intrinsic incentives like 24-hour convenience, information symmetry, instant policy issuance, and possible cost savings are what motivate modern self-directed customers to switch from conventional channels to digital platforms. Integrating these three variables into a single model enables a thorough evaluation of how infrastructural, motivational, and experiential forces interact to influence consumer purchasing behavior in a suburban ecosystem.

**Figure 1: Research Framework**




This conceptual design opens up the "black box" of consumer behavior. It suggests that if a consumer has had good experiences in the digital world, their physical network infrastructure is adequate and secure enough not to raise transaction anxiety, and their internal motivations such as cost-efficiency and absolute convenience are strong enough to replace their traditional experiences, then they will complete an online insurance transaction. Recent financial consumer frameworks highlight that losing even one of these pillars results in instant platform abandonment (Adyen Financial Reports, 2026; NielsenIQ Malaysia, 2024). Therefore, the framework is the exact empirical basis which is used in testing and analyzing the data collected from residents of Bandar Baru Uda.

## 3. Research Methodology

To comprehensively investigate the link between the independent factors and consumer purchase decisions, this study used a quantitative, cross-sectional research methodology. The target market consisted of adult citizens aged 18 and above living in Bandar Baru Uda, Johor Bahru, who made financial or insurance purchases. Because a thorough sampling frame containing all residents of the localized sub-district was unavailable, a non-probability convenience sampling procedure with quota restrictions was used to get a demographically balanced sample across gender and age distributions. The total sample size of N = 120 surpasses the minimal threshold necessary for multiple linear regression analysis with three predictors ($\boldsymbol{N \geq 50 + 8m}$, where $\boldsymbol{m = 3}$ requiring at least 74 observations), meeting Green (1991) rule of thumb. This research also used G*Power

analysis as suggested by Faul et al. (2009), which suggested a minimum sample size of 74, with a power of 0.8. Data were gathered using a standardized, self-administered questionnaire split into five sections. Section A collected demographic information from respondents, whereas Sections B, C, D, and E used 5-point Likert scales to assess satisfaction level, perceived internet quality, motivational factors, and consumer purchasing behavior. To ensure robust construct coverage, all measurement items were adapted from validated instruments in the prior literature: Satisfaction Level items from Zainal and Hussin (2025), Perceived Internet Quality items from Ye and Jia (2005), Motivational Factors from Wijaya and Tan (2025), and Consumer Buying Behavior from Peter and Nord (1982). Academic specialists in digital marketing and financial services reviewed the content and face validity ahead of time. Data collection took place over four weeks, with self-administered digital forms distributed through localized community groups and physical survey distribution in Bandar Baru Uda's key commercial and residential hubs to ensure broad representation across different user segments.

## 4. Results

This chapter presents the results of our investigation. We employed a computer algorithm to make sense of the vast amount of data we collected from 120 residents in Bandar Baru Uda, Johor Bahru. We examined the data in great depth because we wanted to know how members of this community thought about various issues. We began by examining the characteristics of the individuals. With 61 men and 59 women, it turns out that the number of men and women is nearly equal. The majority of the population is Malay. Additionally, there are some members of the Bumiputera population of Sabah and Sarawak, as well as Chinese and Indian populations. The majority of the residents in this region are young, single, and between the ages of 18 and 25.

The majority of people have completed their education and hold an SPM certificate. A few of them have also attended college. own a diploma or a bachelor's degree. While many are employed in the industry, some are still in school. We discovered something intriguing when we examined these individuals' usage of technology. 63.3% of them have never utilized an insurance facility. This is concerning as it indicates that a large number of individuals do not use platforms for money management. This stark digital deficit perfectly mirrors contemporary macroeconomic trends in secondary Malaysian urban hubs, where despite universal smartphone ownership and young demographic concentrations, a distinct gap persists between everyday e-commerce consumption and high-involvement digital financial adoption due to structural friction and trust barriers (Yang & Shi, 2024). We will utilize the information we know about the people to determine why they do or do not use financial services. In addition, we want to know how satisfied people are with financial services how good the internet is and what motivates people to use digital financial services. This will help us understand why some people are not using financial services and what we can do to change this.

**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 of Respondents (n=120)**

| Variables | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 61 | 50.8 % |
| Female | 59 | 49.2 % |
| **Race** | | |
| Malay | 104 | 86.7 % |
| Chinese | 9 | 7.5 % |
| Indian | 5 | 4.2 % |
| Others | 2 | 1.7 % |
| **Age** | | |
| 18 – 25 years | 57 | 47.5 % |
| 26 – 35 years | 39 | 32.5 % |
| 36 – 45 years | 20 | 16.7 % |
| 46 – 55 years | 4 | 3.3 % |
| 56 years old and above | 0 | 0.0 % |
| **Marital Status** | | |

| | | |
|---|---|---|
| Single | 73 | 60.8 % |
| Married | 47 | 39.2 % |
| Divorce | 0 | 0.0 % |
| Others | 0 | 0.0 % |
| **Education level** | | |
| Secondary | 55 | 45.8 % |
| Diploma | 28 | 23.3 % |
| Degree | 32 | 26.7 % |
| Master and PhD | 0 | 0.0 % |
| Others | 5 | 4.2 % |
| **Work Sector** | | |
| Student | 32 | 26.7 % |
| Public Sector | 7 | 5.8 % |
| Private Sector | 73 | 60.8 % |
| Self Employed | 6 | 5.0 % |
| Unemployed | 2 | 1.7 % |
| **Online Insurance Services** | | |
| No | 76 | 63.3 % |
| Yes | 44 | 36.7 % |

**Reliability Analysis:** Reliability Analysis was used to determine the consistency of the variables, as shown in Table 2 below. Through a rigorous Cronbach's alpha internal consistency check, the data revealed that the survey scales are highly stable and ready for inferential analysis. The dependent variable, consumer buying behavior, achieved a solid alpha value of 0.736, confirming that the items measuring purchasing choices are well aligned and reliable. Mirroring this strength, the independent variable for customer satisfaction level yielded a remarkably similar and acceptable alpha value of 0.735. Interestingly, the instrument captured varying degrees of human perception across the remaining factors; while the scale for perceived internet quality registered a moderate yet acceptable alpha value of 0.617, reflecting the slightly varied infrastructure experiences of the residents, the internal motivational factors emerged as the strongest and most cohesive element of the entire instrument, commanding a powerful alpha value of 0.817. Among the variables, perceived Internet quality reported relatively low reliability, as the respondents were mainly composed of young adults, who are 18 to 25 years old, and used the Internet not as frequently as other age groups.

According to standard psychometric thresholds, alpha values above 0.70 indicate robust reliability, while values hovering around 0.60 remain perfectly acceptable for exploratory, localized environmental variables (Hair Jr., 2023). Ultimately, these balanced scores provide a green light for the study, assuring that the questionnaire is a trustworthy tool for mapping the digital insurance landscape in Bandar Baru Uda.

**Table 2: Reliability Analysis**

| Variables | No of Items | Cronbach Alpha |
|---|---|---|
| Buying Behavior | 6 | 0.736 |
| Satisfaction Level | 7 | 0.735 |
| Perceived Internet Quality | 6 | 0.617 |
| Motivational Factor | 5 | 0.817 |

**Correlation Analysis:** Hair et al. (2022) stated that correlation analysis examines the strength of the relationship between variables. As for this study, correlation analysis was conducted to examine the strength of the relationship between independent variables(satisfaction level, perceived internet quality and motivational factor) and independent variable(digital buying behavior. The statistical results in Table 3 below reveal a fascinating, multi-layered story of digital consumerism in Bandar Baru Uda, complete with an unexpected behavioral paradox. First, the relationship between customer satisfaction level and digital buying behavior was reported to be highly statistically significant ($p=0.000<0.05$). However, the correlation coefficient revealed a weak-to-moderate negative relationship ($r=-0.358$). This negative sign indicates that as consumers grow more comfortable and satisfied with legacy, agent-driven operations or baseline online services, their immediate urgency to adopt fully automated digital insurance systems actually drops. However, the structural

variable of internet quality challenges failed to achieve statistical significance (p=0.061>0.05, r=0.172). This suggests that while connection stability is a minor disruption, it does not prevent an online insurance transaction in this urban context. This is supported by an interesting finding showing that motivational factors emerged as a statistically significant, positive driver (p=0.019<0.05). Though the positive correlation coefficient is low (r=0.213), it confirms a definite, small relationship, proving that internal triggers such as payment flexibility and immediate promotional initiatives have urged the consumer to adopt digital insurance transactions. This complex dynamic aligns perfectly with modern digital financial frameworks in Malaysia, which highlight that modern tech adoption is no longer a matter of basic infrastructure access, but rather an emotional negotiation driven by immediate convenience incentives and underlying trust parameters (Ernst & Young Malaysia, 2026).

**Table 3: The relationship between consumer buying behavior towards online insurance services and satisfaction level, perceived internet quality and motivational factor**

| | | Buying Behavior | Satisfaction Level | Perceived Internet Quality | Motivational Factor |
|---|---|---|---|---|---|
| Buying Behavior | Pearson Correlation | 1 | -.358** | .172 | .213* |
| | Sig. (2-tailed) | | .000 | .061 | .019 |
| | N | 120 | 120 | 120 | 120 |
| Satisfaction Level | Pearson Correlation | -.358** | 1 | -.140 | .120 |
| | Sig. (2-tailed) | .000 | | .127 | .192 |
| | N | 120 | 120 | 120 | 120 |
| Perceived Internet Quality | Pearson Correlation | .172 | -.140 | 1 | .077 |
| | Sig. (2-tailed) | .061 | .127 | | .403 |
| | N | 120 | 120 | 120 | 120 |
| Motivational Factor | Pearson Correlation | .213* | .120 | .077 | 1 |
| | Sig. (2-tailed) | .019 | .192 | .403 | |
| | N | 120 | 120 | 120 | 120 |

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

**Analysis of Variance (ANOVA):** Table 4 below indicates that the analysis produced an F-statistic of 9.923 with a significance value of p=0.000, falling well below the critical 0.05 threshold. In the narrative of quantitative research, this p=0.000 indicates that the overall regression model is highly statistically significant. Instead, this robust result delivers an empirical guarantee that the combined framework of satisfaction levels, infrastructure barriers, and internal motivations can reliably explain and predict the consumer buying behavior toward online insurance services in Bandar Baru Uda.

**Table 4: Analysis of Variance (ANOVA)**

| MODEL | SUM OF SQUARES | df | MEAN SQUARE | F | Sig. |
|---|---|---|---|---|---|
| Regression | 6.213 | 3 | 2.071 | 9.923 | .000[b] |
| Residual | 24.209 | 116 | .209 | | |
| Total | 30.422 | 119 | | | |

Prior to the regression analysis, assumptions for multiple regression have been checked through SPSS software. First, regarding the normality of data, the skewness and kurtosis values provided a good indication. Second, for linearity, the observed p-plot showed a close fit to the diagonal line, hence indicating that linearity among the variables is achieved. As for homoscedasticity, the scatterplots for the model line are constant and fit the best line, denoting that the assumption of homoscedasticity has been met for further analysis. Lastly, the common method variance (CMV) test has been conducted for all variables to test for common method bias. All variables showed an acceptable value of the variance inflation factor(VIF), which is less than 3.3 as suggested by Hair et al. (2022). Overall, all of the assumptions have been verified and the procedures followed.

**Regression Analysis:** Drawing upon the principles established by Malhotra et al. (2020), regression analysis serves as a powerful tool to evaluate the relationship between independent and dependent variables. This analysis was conducted to determine the primary factors influencing online insurance purchasing behavior. The results demonstrate that the collective framework consisting of customer satisfaction level, internet availability challenges, and motivational factors accounts for exactly 20.4% of the variance in the respondents' buying behavior within the Bandar Baru Uda community. This finding aligns with contemporary digital finance trends in Malaysia, which emphasize that platform trust and seamless convenience remain the definitive catalysts driving consumers toward digital transactions (Khan et al., 2025).

**Table 5: Multiple Regression Model Summary**

| MODEL | R | R SQUARE | ADJUSTED R-SQUARE | STD. ERROR OF THE ESTIMATE |
|---|---|---|---|---|
| 1 | .452 [a] | .204 | .184 | .45683 |

To determine which predictors exert the strongest influence on digital insurance buying behaviour, the study evaluates the individual regression coefficients in Table 6 below, revealing compelling consumer decision-making in digital insurance transactions. The statistical output indicates that the satisfaction level is the most dominant predictor in the model (β=-0.374,t=-4.429,p=0.000), operating as a significant negative relationship. This implies that as consumers are satisfied with their current traditional insurance habits, their immediate urge to actively adopt automated insurance online alternatives significantly drops. It aligns Leong et al. (2020) findings, where high satisfaction with current methods acts as a psychological inhibitor for customers in adopting new technologies. It confirms that technical accessibility cannot overcome the satisfaction level with traditional services. Instead, when consumers feel fully satisfied with conventional channels, their status quo bias creates a far more resilient barrier to automated service adoption than any technical or connectivity issue. Conversely, motivational level emerges as a key, statistically significant positive relationship (β=0.250,t=2.987,p=0.003), indicating that internal incentives like instant convenience and rewards are pushing consumers to complete online insurance transactions. Interestingly, the physical infrastructure limitations and perceived internet quality reported insignificant statistical evidence (β=0.100,t=1.190,p=0.236), highlighting that connectivity no longer hinders digital insurance transactions in this urban context. This behavioural shift aligns with recent empirical studies on the Malaysian digital economy, which underscore that in modern suburban hubs, technical accessibility is largely secondary to emotional value drivers and the psychological subversion of status quo customer habits (Aziz, 2026).

**Table 6: Multiple Regression Coefficients**

| MODEL | UNSTANDARDISED COEFFICIENTS | | STANDARDISED COEFFICIENTS | T | Sig. |
|---|---|---|---|---|---|
| | B | STD. ERROR | BETA | | |
| (Constant) | 4.307 | .564 | | 7.640 | .000 |
| Satisfaction Level | -.533 | .120 | -.374 | -4.429 | .000 |
| Perceived Internet Quality | .101 | .085 | .100 | 1.190 | .236 |
| Motivational Level | .251 | .084 | .250 | 2.987 | .003 |

**Discussion**

In conclusion, the researchers carried out an extensive quantitative analysis based on the primary information collected from 120 respondents, consisting of adult residents within the urban ecosystem of Bandar Baru Uda, Johor Bahru. To obtain the definitive results of this study, we utilized a robust suite of analyses such as reliability testing, Pearson correlation, descriptive demographic mapping, and multiple linear regression coefficients. Researchers used correlation analysis as the first core technique to test the localized hypotheses that were built in the early stage of the study. Based on this technique, the researchers obtained mixed results showing that customer satisfaction level holds a significant negative relationship (p=0.000,r=-0.358), while internet availability problems failed to reach statistical significance (p=0.061). Consequently, for these specific variables, the null hypotheses were rejected for satisfaction but failed to be rejected for internet constraints.

Researchers then used multiple linear regression coefficients as the second comprehensive technique to test the structural framework built in the early stage of the study. The deep analysis of the study, which included reviewing current banking journals and fintech publications alongside collecting targeted questionnaires, revealed that customer satisfaction level and internal motivational factors function as the true, significant predictors of consumer buying behavior toward online insurance services. Ultimately, the resulting regression model shows that these collective variables successfully account for 20.4% of the total variance in consumer purchasing choices, meaning the critical alternative hypotheses regarding satisfaction (H_1) and motivation (H_3) are fully supported and statistically significant.

This finding aligns with modern empirical research in digital financial services and InsurTech. Recent studies establish that satisfaction with incumbent providers acts as a powerful "mooring factor" that suppresses a customer's intention to switch to online platforms, regardless of the attractiveness or convenience of those digital platforms (Wang et al., 2026; Wong et al., 2025). Similar patterns have been observed in InsurTech adoption studies, where satisfaction with offline interactions and human agents creates channel inertia, directly resisting digital migration (Leong et al., 2020) .

## 5. Managerial Implications and Recommendations

Findings from this study have given remarkable implications for policymakers, practitioners, and consumers. First, the data from this research reveal a deeply human narrative: consumers are not refraining due to internet disruptions (β=0.100), but because they are entangled in a mental struggle. They are rooted in a profound contentment with conventional, in-person insurance interactions (β=-0.374), anticipating a surge of intrinsic motivation (β=0.250) to boldly embrace the digital insurance platform. Policymakers must reallocate focus from physical digital infrastructure toward building regulatory trust and consumer protection frameworks. Practitioners, especially insurance operators, should design high-value digital experiences that actively break status quo habit inertia and trigger intrinsic customer motivation. Finally, consumers are encouraged to re-evaluate whether their reliance on conventional agents reflects actual superior service or merely dependence on status quo bias that limits their financial flexibility.

To overcome this inertia, insurance firms cannot merely create another static webpage; they must fundamentally change their story. Business executives and marketing groups need to move beyond vague commitments and adopt complete transparency. Envision a web-based platform where conversational AI tools serve not as impersonal checkout bots, but as virtual assistants that explicitly outline what a policy includes and, crucially, what it omits. This transparent honesty dismantles the perilous belief that a simple online policy shields against all unexpected crises, quickly fostering the one asset that money cannot purchase: genuine customer trust. Moreover, since basic tech accessibility is a certainty, the competition for the suburban consumer will be determined by emotional significance. Insurers need to initiate dynamic, short video campaigns on platforms such as YouTube and TikTok, translating complex legal language into relatable micro stories that highlight adaptable payment options and immediate claims processing. By integrating these digital financial tools into the community's everyday online behaviors, businesses can effortlessly connect the experience of browsing with that of purchasing (Bakar et al., 2025; Wang et al., 2026).

## Conclusion

This research endeavor was never just a task of analyzing statistics; it was an exploration to grasp the subtle, human uncertainty that occurs just before a consumer hits "purchase" on an online policy. The core of this study pulsed with a clear aim: to unravel the intricate, unseen forces that influence consumer purchasing decisions regarding online insurance services. We observed a consumer's ultimate decision arising not in isolation, but from a conflict between their ease with conventional insurance agents, the unseen resistance of digital systems, and an unexpected surge of personal drive. Theoretically, these pages reveal insights into the contemporary mind, mapping how these influences intersect to shape actual buying decisions in a time when finance is transitioning to the cloud. In practical terms, this evidence acts as a reminder for both insurers and fintech creators. The age of unchanging, text-laden webpages is now over. To engage the vast pool of unserved customers, suppliers must emerge prominently by developing fully transparent, effortless platforms and smooth mobile interfaces that alleviate consumer concerns and transform uncertainty into complete understanding.

When the final figures are counted, they reveal an unforgettable narrative: customer satisfaction rates, internet access issues, and internal drives contain the crucial elements of the Bandar Baru Uda consumer market. Every variable functions as a distinct personality in this story, with some firmly holding consumers to the security of traditional practices while others serve as the driving force pushing them toward the future. By uncovering these micro-level dynamics, this research provides industry leaders with the essential framework to create financial ecosystems that individuals genuinely wish to engage with. This change in behavior elegantly reflects the larger, modern digital transformation occurring in suburban Malaysia, where shifting a consumer from mere browsing to actual purchasing now hinges not on enhancing connectivity speed, but on gaining their trust through significant value transparency and instant, concrete benefits (Aziz, 2026). In summary, this document signifies a starting point, rather than a conclusion. As our world becomes more interconnected, the responsibility now shifts to the upcoming generation of researchers. They are encouraged to flip the page and delve further into this emerging narrative, examining the uncharted landscape of perceived risk factors, platform trust frameworks, and changing demographic trends, while giving meaning to the data through candid focus groups and personal interviews, ensuring the tale of the digital consumer remains vividly engaging.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# The Impact of Macroeconomic and Environmental Factors on Food Production in Malaysia: An ARDL Analysis

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**Abstract:** Production of food is essential in ensuring the food security of a nation, depending on the economic situation and changes in the environment. This paper seeks to establish the impact of macroeconomic factors as well as environmental factors on food production in Malaysia from 1988 to 2022. The main objectives of this paper include establishing the effect of food imports, inflation rate, temperature, and agricultural land on food production in Malaysia. The stationarity tests show that the variables have different orders of integration, while the Autoregressive Distributed Lag (ARDL) bounds test establishes a long-run cointegrating relation. The study finds out that food imports, temperature, and agricultural land significantly affect long-run food production. These findings illustrate the policy implications of macroeconomic factors, particularly food imports, as well as environmental factors, namely temperature and agricultural land, on food production in Malaysia.

**Keywords**: *Macroeconomic, Environmental, Food Production, Malaysia, ARDL*

## 1. Introduction and Background

Food production is the process of preparing and producing food by using raw materials such as crops and livestock for human consumption through conversion of the raw materials into food, either at the household level or in industrial production (Daszkiewicz, 2022). A study done by Abbasi et al. (2022) pointed out that there are also food production activities that are carried out using agricultural food production, whereby farming and livestock farming are the major sources of the raw materials used in the production of foods to satisfy the food requirements of the population. As noted by Suffian and Suffian (2021), Malaysia has attained impressive growth over the last few decades in agricultural production. According to Suffian and Suffian, the agricultural industry contributes the most to the country's economy, besides the development of industrial crops like palm oil, cocoa, and rubber, which also contribute to the economic growth of Malaysia. Therefore, the production of food is not only for the provision of food but also for trade (Xie et al., 2023).

**Figure 1: Worldwide Food Production Index from 2002 until 2022**

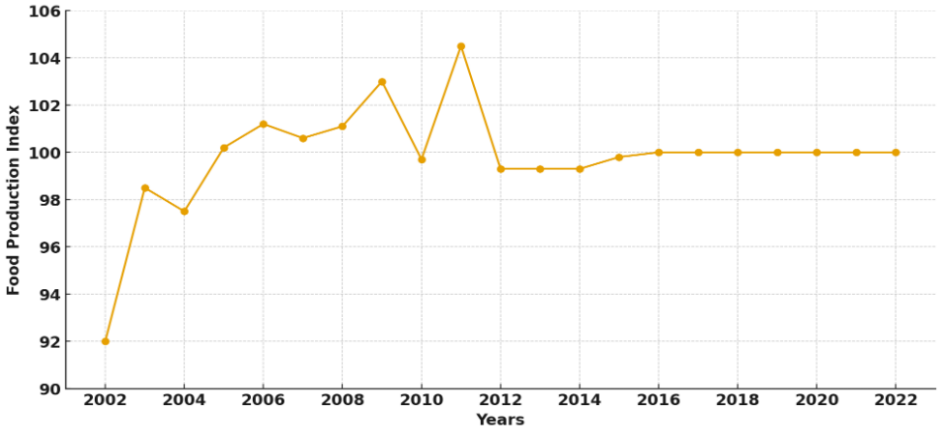



Figure 1 shows the line chart of the worldwide food production index from 2002 until 2022 that is retrieved

from the World Bank. The chart shows that global food production increased steadily from 2002 to 2011 where in 2011, when it reached its highest point at around an index of 105, showing that there was strong growth in food production. However, after 2011, the index dropped drastically and then remained almost the same from 2013 onwards, at around an index of 100. This shows that while food production grew quickly at first, it later became stable, showing that food production stayed about the same over the years. This situation may be caused by several different factors such as changes in the economy and agricultural and environmental conditions that affected food production around the world.

Food production in Malaysia faces several interconnected challenges that stem from both economic and environmental factors. The country's growing population continues to increase the demand for food, putting pressure on limited resources. At the same time, Malaysia's heavy reliance on imported food makes it vulnerable to global price fluctuations and supply disruptions. Rising inflation has also made it more expensive for farmers to buy essential inputs like fertilizers and fuel, reducing their profits and discouraging production. On the environmental side, rising temperatures and unpredictable weather conditions are affecting crop yields and quality, especially for key staples such as rice. The loss of agricultural land due to urbanization and industrial activities adds to the problem, leaving less space for cultivation (Solaymani, 2018).

Hence, several factors could influence the food production (FPRD) issue in Malaysia, whether the issue comes from a macroeconomic perspective or from an environmental perspective. According to Abang Ali (2024), five independent variables that can impact food production in Malaysia are inflation, food imports, land under cereal production, precipitation, and temperature. However, the present study focuses on four key determinants: agricultural land, temperature, food imports, and inflation. Precipitation is excluded from the model because the environmental dimension is represented by the temperature variable.

Moreover, inflation can affect the costs of production and consumer purchasing power. Increased inflation leads to high costs of inputs like fertilizers, machinery, and fuel which in turn lowers the profit margins of the farmers and discourages agricultural practices (Weremczuk & Malitka, 2022). Moreover, inflation increases food prices and hence it can minimize consumer demand for some products, and this creates imbalances in the market which may further limit the growth of production. Besides macroeconomic factors, environmental factors such as temperature are also closely related to food production. Based on Hatfield and Prueger (2015)'s study, temperature is a primary factor that affects the rate of plant development. Temperature changes have profound effects on crop growth, development, yield and quality which is particularly important for an essential crop like rice (Liu et al., 2025). Therefore, the consistency of the temperature will support efficient crop cycles and higher yields; otherwise, it will affect food production.

Other than that, agricultural land is also amongst the factors that affect food production in Malaysia as it dictates the potential and sustainability of agricultural output in the country. Mohd Azman et al. (2023) noted that increasing agricultural land can be effective in improving domestic food production, decreasing reliance on imported goods and services, and promoting national food security. However, Malaysia is experiencing problems like urbanization, industrialization and land conversion, which are decreasing the size of arable land for farming (Marzuki & Jais, 2020).

Further study about the determinants of food production at a national level is important and should be done earlier to identify which factors contribute the most to food production. This is to avoid disasters, including famine and malnutrition, in a country that are caused by limited food resources faced by the population. It also helps government agencies and policymakers make decisions to improve food production conditions, thus ensuring food security in Malaysia.

Accordingly, the study focuses on examining the determinants of food production in Malaysia. The dependent variable is food production (FPRD), while the independent variables are inflation rate (INFR), food imports (FIMP), agricultural land (AGRL) and temperature (TEMP). The study utilizes secondary data collected from the World Bank, the International Monetary Fund (IMF), and the Food and Agriculture Organization of the United Nations (FAO) using time series analysis from 1988 to 2022. Therefore, the objective of this study is to determine the impact of macroeconomic variables, temperature and agricultural land on food production.

This study examines macroeconomic and environmental conditions that affect food production in Malaysia between 1988 and 2022. It seeks to gain a deeper understanding of the economic and environmental determinants of food production in Malaysia. In addition, it can enrich the literature with current data specific to Malaysia in addressing food-related challenges, thus ensuring improvements in food productivity and food security domestically. With these results, it will help the government agency mainly the Ministry of Agriculture and Food Security (MAFS), to determine the strategic direction and development trajectory of food production in Malaysia.

The remainder of this study proceeds as follows. Section 2 reviews past studies on the relationship between food production and the variables introduced, which shows the gap between this study and past studies. Section 3 outlines the data and method used to complete the study. Section 4 presents and interprets the results. Section 5 concludes and supports some recommendations for future researchers to explore topics related to food production

## 2. Literature Review

**Theoretical Findings:** This study adopts two theoretical perspectives to gain a deeper understanding of factors influencing food production. Firstly, the Keynesian economic model of aggregate demand (AD) and aggregate supply (AS) explains food production from a macroeconomic perspective that emphasize on overall demand and supply conditions influence output levels. Secondly, Environmental Determinism, also known as Climate-Production Theory, will explain food production from an environmental perspective, suggesting the influence of natural factors, including temperature and land, on food productivity.

The Keynesian aggregate demand (AD) and aggregate supply (AS) theory is a theory about the responsiveness of food production to changes in expenditure, income and economic capacity. Increases in income and government spending trigger consumption and investment when the economy is not running at full capacity, and this promotes greater agricultural production. Empirical studies indicate that an increase in agricultural expenditure can increase productivity by a large percentage with 1% growth (Ngobeni & Muchopa, 2022), and that infrastructure development and export promotion can enhance productivity and minimize losses after the harvest period (Awokuse, 2005). On the other hand, insufficient aggregate demand may cause oversupply, a decline in price and slow food production growth.

Similarly, Aggregate Supply (AS) is the sum of the goods and services that producers are willing to offer at various prices. When the agricultural sector works within a horizontal range, unutilized resources like land, labor force, and machinery can enable production to be increased without affecting prices. But when capacity factors such as insufficient farmland or inputs come into play, increased demand primarily increases prices but does not affect production (Zeng et al., 2021), which shows low supply responsiveness. Poor technology, poor storage, and unavailability of credit also hinder farmers from maximizing output (Adekunle et al., 2023). As a result, supply is slow in responding to increased demand, leading to food inflation or scarcity. Technological advancement and investment have the potential to push the AS curve to the right over time, which makes production more sustainable.

According to the Keynesian AD-AS model, balanced intervention policy is necessary to maintain food production. The government must boost its aggregate demand via expenditure, rural income subsidy, and promotion of trade whilst at the same time mitigating supply-side limitations by means of investing in infrastructure, technologies, and education (Zeng et al., 2021). This implication is supported by Ghanaian and Indian evidence that public investment and input subsidies only promote agricultural growth in combination with access to credit and technological infrastructure (Yeboah et al., 2025; Zafar et al., 2023). Therefore, the Keynesian policy implication is that demand management and capacity building are essential in attaining sustainable food production and long-term food security.

The Environmental Determinism or Climate-Production Theory explains that environmental conditions, particularly temperature and land availability, play a fundamental role in determining agricultural productivity. This theory assumes that natural factors set the limits for human activities such as farming. This means favorable temperature and sufficient agricultural land contribute to higher food production, while extreme temperature or land scarcity can reduce output. Temperature is a key contributor to climate change

and serves as a fundamental basis for human survival and the development of agricultural production (Yuan et al., 2024). This means that any temperature change, whether small or large, can have a significant impact on agricultural productivity and food production (Choo, 2021). On the other hand, agricultural land may not directly determine food production but can act as an influencing factor that interacts with other variables, such as temperature, to improve agricultural productivity. According to Maruschke et al. (2024), land availability for agricultural activities has increasingly become a concern because of extreme climate change.

**Empirical Findings:** Food production is often used as a key indicator of a country's agricultural performance by utilizing inputs including land, labor, capital and material are used, where an increase in the production growth rate compared to the input use rate indicates improved efficiency in transforming inputs into food output (Sarma et al., 2024). In this research, food production is taken as the dependent variable, as it is influenced by various factors such as population growth, imports, inflation, employment, temperature and agricultural land.

A study by Abdullah et al. (2025) examined how climate change, especially rainfall and temperature variability affects paddy productivity in Malaysia in eight granary areas from 1994 to 2023. The results show that excessive rainfall significantly reduces yield across all regions while temperature variability has mixed effects. In 2024, the World Bank suggested that the government overcome this problem by utilizing public investment in digital agricultural technologies (DATs) to enhance Malaysia's agrifood productivity and resilience. Thus, showing that increased spending up to an optimal amount positively influences output before diminishing returns set in (Zhi & Wong, 2020).

In addition, a study on China's water-land-food (WLF) system found that food import competition can positively influence domestic food production by improving the coordination of land and water use, which allowed agricultural resources to be utilized more efficiently (Li et al., 2025). In contrast, a study by Barel-Shaked and Buda (2025) on OECD countries reported that greater reliance on food imports is often associated with lower domestic food self-sufficiency. Similarly, Mahase-Forgenie and Forgenie (2025) conducted a study on Caribbean Small Island Developing States (SIDS) that showed that although imports contribute to food availability, the overall impact on domestic food production remains insignificant.

Inflation has been found to influence food production in some ways especially in terms of farmers' income and price differences that encourage or discourage food production. A study by Rozi et al. (2025) found that inflation in the soybean market in Indonesia boosted farmers' income. However, Ahmed et al. (2025) examined the impact of inflation on rice and wheat prices in Bangladesh, where it showed that inflation increased the production costs and reduced food production.

Temperature can be considered one of the most critical environmental factors influencing agricultural productivity in the context of food production. Xu et al. (2024) demonstrated that rising temperature in Northeast China significantly reduces yields. Tan et al. (2021) showed that the minimum temperature has a positive correlation with rice yield in Malaysia, while maximum temperature has a negative correlation particularly during the off-season. Sethuraman et al. (2025) discovered that the optimum temperature for crop yield, including paddy, in Malaysia is 35°C. On the other hand, Kyaw et al. (2023) found that rice particularly does not affected by temperature, while Sjulgård et al. (2023) discovered that certain crops possess the ability to tolerate extreme temperatures.

Agricultural land serves as the foundational resource for food production. A study by Laghari et al. (2025) showed a significant positive relationship between the availability of agricultural land and the output of food production. Similarly, Dong et al. (2023) found that soil properties, farmland water conservation, and soil nutrients significantly impact agricultural land conditions and crop yields. Halperin et al. (2023) found that the lack of agricultural land due to urbanization will lead to a lack of food provision and livestock and crop production. Therefore, protecting high-quality agricultural land is essential not just for maximizing food output, but also for maintaining a balanced supply of ecosystem services (Aleminew, 2023). However, Li et al. (2024) found a negative relationship between land and food production, showing that land resource mismatch ultimately reduces food production. Similar findings were reported by Ahmed et al. (2025) and Azizan and Hussin (2015).

**Literature Gap:** Although many studies have been conducted on food production, there are still some gaps that need to be filled further, especially in Malaysia. Most past studies only focused on either macroeconomic factors or environmental factors, but not both together. As for the current study, the objective is to examine how important both factors, macroeconomic factors such as food imports and inflation rate, along with environmental factors such as temperature and agricultural land, may influence food production in Malaysia. Thus, it shows that there is still a need to study how these factors together influence food production in Malaysia. Secondly, many studies were done in different countries, such as China, India, and South Africa where the situations of these countries are not the same as Malaysia that has a tropical climate, smaller agricultural land and depends a lot on imports specifically. Therefore, this study will fill the gap by examining how both macroeconomic and environmental factors influence food production in Malaysia

## 3. Research Methodology

**Model Specification:** The model is theoretically founded on Keynesian aggregate demand-aggregate supply (AD-AS) and climate-production theory, which jointly elucidate the impact of the economic and environmental factors on food production. Through a combination of these frameworks, the model incorporates economic motivations and environmental limitations in influencing food production in Malaysia and adopts the model from Abang Ali (2024) as follows:

$$LFP_t = \alpha + \beta_1 LFI_t + \beta_2 LINF_t + \beta_3 LTEMP_t + \beta_4 LAGRL_t + \varepsilon_t \quad (1)$$

where LFP denotes the log of food production in Malaysia; LFI is the log of food imports; LINF is the log of the inflation rate; LTEMP is the log of temperature; and LAGRL is the log of agricultural land. $\beta_0$ denotes a constant value, $\beta_1$ to $\beta_4$ denotes the parameters to be estimated, and ε denotes the error term that captures idiosyncratic shocks.

Natural logarithms of all the variables serve many functions in economic estimation in order to provide accurate estimations and elasticity values. Variables which have been used in equation (1) have been justified in terms of theory by means of recent research.

**Data Description:** The analysis utilizes annual time-series data covering the period from 1988 to 2022 for Malaysia giving 35 observations. The World Bank and the Food and Agriculture Organization (FAO) provide information on agricultural land and food production. The data on food imports and inflation rates are obtained from the World Bank, and the International Monetary Fund (IMF); the temperature data are compiled in international climate databases. All variables are considered on an annual basis and adjusted to make them time-consistent. Data consistency and reliability were achieved through cross-verification of various sources. Multiple sources can be used to minimize bias in measurement by making comparisons between sets of data, keeping variables defined and measured similarly. Table 1 is a summary of variable types, variables, measurement, and sources.

**Table 1: List of Variables and Measurement**

| Type of Variable | Descriptive Statistics Variable | Source of Data | Measurement |
|---|---|---|---|
| Dependent Variable | Food Production (FP) | World Bank Open Data | Index (2014-2016 = 100) |
| | Food Imports (FI) | World Bank Open Data | Percentage (%) |
| Independent Variable | Inflation Rate (INF) | IMF | Percentage (%) |
| | Temperature (TEMP) | FAO | Celsius (°c) |
| | Agricultural Land (AGRL) | World Bank Open Data | Hectare (ha) |

**Unit Root Test:** This study applies a unit root test to prevent spurious regression and results from being distorted (Granger & Newbold, 1974; Ridwan, 2025). According to Islam et al. (2024) and Nielsen (2005), the stationarity of regression variables needs to be tested through differencing and stationary techniques for estimation. Augmented Dickey-Fuller test (Dickey & Fuller, 1979) and the Phillips-Perron test (Phillips &

Perron, 1988) were applied to test for unit roots. These analyses were conducted to determine the order of integration of the variables, specifically whether they are integrated of order zero, I (0), or order one, I (1).

**Auto-Regressive Distributed Lag (ARDL):** The Auto-Regressive Distributed Lag (ARDL) method has been utilized to achieve the objectives. Valid reasons support the selection of this approach. First, the ARDL technique offers more flexibility and eliminates the restriction that all time-series variables must have the same order of integration (Kuri et al., 2025). The technique is used regardless of whether the regressors are integrated of order I(0) or I(1) (Pesaran et al., 2001). This is because ARDL estimation does not depend on pre-testing the order of integration among the variables. Subsequently, it reduces the problem of uncertainty associated with the pre-testing of the variables (Narayan & Narayan, 2005).

Second, the ARDL approach is suitable for small sample sizes and produces more reliable estimates of the true parameters compared to the cointegration technique developed by Pesaran and Shin (1999). ARDL estimators generally produce more efficient and consistent coefficient estimates. Likewise, Laurenceson and Chai (2003) argued that the ARDL framework effectively represents the data-generating process through a general-to-specific modelling approach by employing a sufficient number of lags. Further, an unrestricted error correction model (UECM) of an ARDL model procedure is specified in equation (2).

$$\begin{aligned}\Delta LFP_t = \quad & \alpha + \sum_{i=1}^{p-1} \phi_i \, \Delta LFP_{t-i} + \sum_{i=0}^{q_1-1} \theta_{1i} \, \Delta LFI_{t-i} + \sum_{i=0}^{q_2-1} \theta_{2i} \, \Delta LINF_{t-i} \\ & + \sum_{i=0}^{q_3-1} \theta_{3i} \, \Delta LTEMP_{t-i} + \sum_{i=0}^{q_4-1} \theta_{4i} \, \Delta LAGRL_{t-i} \\ & + \lambda_1 LFP_{t-1} + \lambda_2 LFI_{t-1} + \lambda_3 LINF_{t-1} + \lambda_4 LTEMP_{t-1} + \lambda_5 LAGRL_{t-1} + \varepsilon_t. \end{aligned} \tag{2}$$

where

- $\Delta$ denotes the first-difference operator.
- $\sum \phi_i \Delta LFP_{t-i}$ captures the short-run dynamics of the dependent variable.
- $\sum \theta_{ji} \Delta X_{t-i}$ represent the short-run effects of the explanatory variables.
- The lagged level variables ($LFP_{t-1}, LFI_{t-1}, LINF_{t-1}, LTEMP_{t-1}, LAGRL_{t-1}$)capture the long-run relationships and are jointly tested using the Bounds Test for cointegration
- $\varepsilon_t$ is the white-noise error term.

The F-statistics obtained from the calculation need to be compared to the higher and lower critical values. If the value obtained from the test exceeds the upper critical bound, the hypothesis of non-cointegration should be rejected (Pesaran et al., 2001).

**Diagnostic Tests:** The ARDL model needs important diagnostics to confirm that the estimated model is well-specified. Many statistical models require normally distributed error terms to ensure valid statistical inference; it is important to examine the normality of the residuals using the Jarque–Bera test and to assess the presence of serial correlation to confirm that the residuals are independent over time. To detect heteroscedasticity and non-constant variance in the residuals, the Breusch-Pagan-Godfrey test is used. The Ramsey RESET test is employed to validate whether the model is correctly specified.

## 4. Results

This section clarifies the empirical results on the relationship between macroeconomic and environmental factors and food production in Malaysia. The analysis consists of a unit root test, a bound test for long-run co-integration, and diagnostic tests.

**Unit Root Test:** Table 2 displays the results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests for the variables LFP, LFI, LINF, LTEMP, and LAGRL. The purpose of these tests is to determine

the stationarity properties of the variables and find their order of integration. A variable is considered stationary when the null hypothesis of a unit root is rejected at the significance levels (Dickey & Fuller, 1979; Phillips & Perron, 1988).

Generally, the findings show a combination of stationary and non-stationary variables. Specifically, LFP is integrated of order one [I(1)], whereas LFI, LINF, LTEMP, and LAGRL are integrated of order zero [I(0)]. The absence of variables integrated of order two [I(2)] satisfies the main condition for the application of the Autoregressive Distributed Lag (ARDL) bounds testing approach, which can be employed when variables are a mixture of I(0) and I(1) but not I(2) (Pesaran, Shin, & Smith, 2001).

**Table 2: Unit root test results**

| | | ADF | | PP | | Order of Integration |
|---|---|---|---|---|---|---|
| **Variables** | | **Level** | **First-order difference** | **Level** | **First-order difference** | |
| LFP | Intercept | -0.894 | -3.280** | -1.354 | -3.196** | I(1) |
| | Intercept with Trend | -2.284 | -3.233* | -2.199 | -3.151* | |
| LFI | Intercept | -2.058 | -4.732*** | -2.183 | -4.674*** | I(1) |
| | Intercept with Trend | -3.718** | -4.846*** | -3.994** | -4.763*** | |
| LINF | Intercept | -4.905*** | -4.941*** | -4.905*** | -19.699*** | I(0) |
| | Intercept with Trend | -5.624*** | -4.689*** | -6.149*** | -18.602*** | |
| LTEMP | Intercept | -4.057*** | -2.604* | -3.999*** | -15.082*** | I(0) |
| | Intercept with Trend | -10.122*** | -2.324 | -6.922*** | -15.933*** | |
| LAGRL | Intercept | -3.790*** | -7.977*** | -3.790*** | -11.638*** | I(0) |
| | Intercept with Trend | -4.641*** | -7.897*** | -4.456*** | -11.625*** | |

Note: ***,**, * denote the rejection of the null hypothesis at the 1%, 5%, and 10% levels, respectively. The optimal lag length was chosen automatically using the Schwarz Information Criterion (SIC) for the ADF test, and the bandwidth was chosen using Newey-West for the PP unit root test.

**Bound Test and Long-run Co-integration:** Table 3 exhibits the results from the bound test. The food production model computed F-statistic in the bound test is 7.34. The calculated value exceeded the upper bound critical values at the 10%, 5%, and 1% significance levels, which were 3.52, 4.01, and 5.06, respectively. Therefore, the initial hypothesis that posits the absence of cointegration among the variables was rejected. The rejection of the hypothesis means that there is evidence of a long-run relationship existing between LFP, LFI, LINF, LTEMP, and LAGRL in Malaysia from 1988 – 2022.

**Table 3: Bound test result**

| Test statistic | Value | k |
|---|---|---|
| F-statistic | 7.34*** | 4 |
| Significance | Lower 1(0) | Upper 1(1) |
| 10% | 2.45 | 3.52 |
| 5% | 2.86 | 4.01 |
| 1% | 3.74 | 5.06 |

Note: 1. The critical values are based on Pesaran et al. (2001), Case III: unrestricted intercept and no trend. 2. k is an independent variable, and it is equivalent to 4. ***, **, * denote the rejection of the null hypothesis at the 1%, 5%, and 10% levels, respectively.

These results provide a theoretical basis for examining both long-run and short-run dynamics and justify the application of an error correction model (ECM) to analyze the speed at which short-run disequilibria adjust towards the long-run equilibrium. Thus, given the significant result of the Bound test in Table 3, further

evaluation was extended to long run cointegration is exhibited in Table 4.

**Table 4: ARDL Long-run and Short-run**

| Variables | Long-run | Short-run |
|---|---|---|
| LFI | 0.679*** (0.079) | |
| LINF | -0.038 (0.034) | |
| LTEMP | 0.073* (0.0417) | |
| LAGRL | -5.271*** (1.612) | |
| DLFI | | -0.127** (0.054) |
| DLINF | | -2.707** (0.006) |
| DTEMP | | 0.0240* (0.012) |
| DLAGRL | | -0.441** (0.164) |
| ECT (Speed Adjustment) | | -0.369***(0.090) |
| Constant | 73.939 | 27.349 |
| R-squared | 0.801 | |

Note: *, p < 0.1, **, p< 0.05, and ***, p < 0.01. Standard errors are presented in parentheses.

Table 4 reveals the ARDL estimations for both the long-run and short-run relationships. The estimation results indicate that LFI (food imports) is positively associated with LFP (food production) at the 1% significance level in the long run, but negatively associated with LFP at the 5% significance level in the short run. The positive long-run relationship is consistent with Li et al. (2024), who found that food imports positively influence domestic food production by improving the coordination of land and water use in agricultural resources. This finding is also supported by Subramaniam (2024), who found that food imports significantly improve food availability by supplementing domestic production. However, the negative short-run effect indicates that greater reliance on food imports is associated with lower domestic food self-sufficiency (Barel-Shaked & Buda, 2025).

Table 4 also shows that LINF (inflation) has no significant effect on LFP in the long run but has a significant negative effect in the short run. The short-run findings are consistent with Ahmed et al. (2025), who found that inflation increases production costs and indirectly reduces food production. Meanwhile, LTEMP reveals a weak positive association with LFP at the 10% significance level in both the long and short run. In contrast, LAGRL (agricultural land) has a negative and statistically significant effect on food production in both the long run and the short run. This finding is consistent with previous studies showing that agricultural land-use transformation, land degradation, and the conversion of productive farmland reduce agricultural productivity and food production (Li et al., 2024; Ahmed et al., 2025).

The estimated ECT coefficient indicates that approximately 36.9% of short-run disequilibrium is corrected each year, implying a relatively moderate speed of adjustment toward the long-run equilibrium following short-run shocks.

The error correction model (ECT) coefficient is negative (-0.369) at the 1% significance level, confirming the presence of a stable long-run equilibrium relationship among LFP (food production), LFI (food imports), LTEMP (temperature), and LAGRL (agricultural land). The findings are consistent with Boutfssi et al. (2026), Mala et al. (2025), Engle and Granger (1987) and Pesaran et al. (2001). The estimated ECT coefficient indicates that approximately 36.9% of short-run disequilibrium is corrected within a year, showing a relatively moderate speed of adjustment toward the long-run equilibrium due to short-run shocks.

**Diagnostic Tests:** Table 5 presents the necessary diagnostic tests for the reliability and accuracy of the dynamic ARDL method's estimated equation. The diagnostic test results display a normal distribution of residuals and the functional form is linear, proving the absence of serial correlation and heteroskedasticity issues.

**Table 5: Diagnostic test results**

| Diagnose tests | Null hypothesis | Chi-Square |
|---|---|---|
| Jarque-Bera test | $H_0$: The residuals have a normal distribution | 0.4871 |
| Lagrange Multiplier test | $H_0$: There is no autocorrelation | 0.1047 |
| Breusch-Pagan-Godfrey | $H_0$: There is no heteroskedasticity | 0.3895 |
| Ramsey RESET test | $H_0$: Functional form is linear | 0.2280 |

## 5. Conclusion

This paper examines the macroeconomic and environmental factors of food production in Malaysia using annual data covering the period from 1988 to 2022. By analyzing both macroeconomic and environmental factors within a single empirical framework, this study provides a clearer picture of the key drivers influencing food production performance in Malaysia.

The empirical results indicate that food imports, temperature, and agricultural land have significant long-run effects on food production. These findings highlight the importance of both macroeconomic factors, specifically food imports, and environmental factors, namely temperature and agricultural land, in influencing food production in Malaysia.

From a policy implication, the positive relationship between food imports and food production suggests that the Malaysian government should maintain a balanced import strategy that secures essential food commodities and agricultural inputs without undermining domestic production. The positive effect of temperature on food production suggests that current climatic conditions may still support agricultural productivity. Nevertheless, adaptive farming technologies are necessary to reduce the potential adverse impacts of future climate change. Meanwhile, the negative effect on agricultural land indicates the need to improve land-use efficiency by protecting productive farmland from conversion and enhancing agricultural productivity through modern technologies rather than depending solely on land expansion.

This research study has several limitations despite its contributions. The analysis is based on a few macroeconomic and environmental variables and fails to include aspects of rainfall, advancements in technology, government spending on agricultural activities, or government intervention.

More climatic indicators could be included in this work; comparisons across nations could be possible for investigation. This extension would provide better insight into the interaction between economic conditions, environmental change, and food production as tricky. Overall, this paper can be added to the current list of the literature on food security as it proves the utmost importance of the macroeconomic and environmental factors in shaping agricultural performance in Malaysia.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Purchase Intention in Social Networking Services (SNS): Impact of the openness to new experiences personality trait and the socialization process

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**Abstract:** Framed by the Big Five Factor Model, this study investigated how much one's personality traits and socialisation process influence purchasing intention in social networking services (SNS). This study adopted a snowball sampling method, focusing on SNS users as respondents throughout Malaysia. The data collected were then tested via structural equation modelling (CB-SEM) using AMOS. The study revealed that openness to new experiences, group norms, and social identity significantly impact SNS users' purchase intention. This study's discovery gives SNS developers insights into the pattern of SNS users' purchasing intentions and strengthens the socialisation process as a driver that encourages purchases among users. Recognizing the importance of the SSN, businesses should plan strategically based on the comprehension of users' personalities. It is crucial to incorporate a basic understanding of a person's personality and his or her reasoning for each intention and behaviour to precisely predict and interpret actions, which would enable businesses to sustainably grow towards building a competitive advantage. By understanding more about the types of personality of SNS users, practitioners, as well as society, will benefit from better decision-making capabilities.

**Keywords:** *Personality traits; socialization; SNS; purchase intention; sustainability*

## 1. Introduction

Businesses are attaining positive benefits from the spread of social networking services (SNS) throughout the world. The nature of SNS that facilitates individuals to connect and build virtual connections ultimately offers an unprecedented venue for businesses to grow and promote themselves above and beyond previous efforts towards progressing global sustainability. The operational systems of SNS technology provide social interactions and information facilities and have become the compulsory centre for online purchases globally. (Al Kurdi & Alshurideh, 2025; Attar et al., 2021). The anticipated outcome of virtual conversations and social contacts in cyberspace for consumers is also pronounced through the possible access to multiple sources of information and details that assist consumers to contemplate before purchases. Inclusively, SNS are advantageous for both businesses and consumers as a package in terms of growing transactions, supporting consumers socially, easing word-of-mouth (WOM) messages and circulating info in a commercial setting (Awad & Alharthi, 2025; Chen et al., 2020; Tun, 2021).

Dale Dougherty and Tim O'Reilly invented a new term, "Web 2.0," which was subsequently changed to "social networks" and is now known as "social media" in 2004. According to Gvili et al. (2020), the supposition of a commerce model in the form of social media is a collection of theories. In social media itself, there are variations of platforms such as SNS, video-sharing sites, and photo-sharing sites. SNS is a robust subset of social media that is used daily from different perspectives in human lives. Today, SNS has grown into a dominant social stage where communication is mediated by machines (Albayrak & Ceylan, 2021). SNS is classified by a new structure of links handled by machines and applications as a common tool to create groups with various degrees of influence among users (Bilal et al., 2022). It is estimated that around 5.79 billion people are users of SNS, which is a 248 % surge from 2.33 billion users in 2017, with continuous upward trends expected (Statista, 2026). Examples of SNS include WhatsApp, YouTube, LinkedIn, Facebook, Instagram, and Threads. A global survey conducted on marketers found that most marketers are keen on the value of SNS, such as connectedness, brand awareness, and the engagement opportunities SNS provides via dialogues with consumers (Awad & Alharthi, 2025; Basuki & Husni, 2022). It has been noted in several studies that SNS is considered a part of businesses' instruments, specifically as a marketing strategy (Luqman et al., 2020; Pujadas-Hostench et al., 2019; Zhang & Ha, 2018). SNS offers businesses multiple levels of value, which include segmentation, customer service, WOM support, an economical alternative for advertising, speed of information, and a venue for customers' voices

(Awad & Alharthi, 2025; Balathandayutham & Anandanatarajan, 2020; Curras-Perez et al., 2014).

Despite the abundance of research done on consumer purchase intention, more can be uncovered to address the issues because businesses could enormously benefit from concrete information in understanding purchase intention in SNS specifically. Presently, businesses are misinterpreting consumer decision-making process, not understanding brand loyalty, missing vast opportunities to data mine consumers (Nogueira et al., 2021; Ramnarain & Govender, 2013), missing chances to connect and engage with customers through branding (Hutter et al., 2013), not gaining revenue on possibilities of advertisements (Savulescu & Mihalcea, 2013), lacking understanding on users motivation and attitudes in knowledge management aspects and missing opportunities to reach customers faster and more efficiently (Tan et al., 2013). Additional forgone benefits of social networks include crowdsourcing and listening to conversations among SNS users, which contain hints and feedback on services and products of competitors.

Some determinants of purchase intention studies include attitudinal beliefs, social influence, risk, and the brand's social media (Park & Chun, 2025; Vahdat et al., 2021). However, little emphasis has been made on the combination of an individual's internal cognitive and social influences on a user's experience as factors that facilitate purchase intention through SSN. Yet, the existing research has not examined the combination of these aspects comprehensively, even though it is considered a cornerstone of individual intention decision-making. Not only has SNS reached a stage as a vital medium for individual purchase intention, but it also enables people of common interest to connect, disclose, and exchange information, ideas, feelings, experiences, interests, or desires (Al Kurdi & Alshurideh, 2025; Hsu et al., 2013; Shi et al., 2018). SNS has also seized users' decision-making without anyone realizing it. To effectively maximize the potential of social networking services in driving user purchases, research should span a broad spectrum of individual characteristics (Anindito & Handarkho, 2022; Bashir et al., 2023). However, businesses in Malaysia lack an understanding of the nuances in this field, given the limited research conducted locally (Ali, 2021). Hence, this study aims to investigate the effects of different personality traits and socialisation processes in SNS on users' purchasing intention, using the Big Five Model (BFM) as the underpinning theoretical premise. BFM is one of the most extensive models used as a predictor of purchase behaviour in the field of psychology (De Raad & Mlačić, 2015; Copeland & Zhao, 2020; Supieza et al., 2025). BFM states that a person's personality traits are important in determining many life outcomes (De Raad & Mlačić, 2015), which in turn influence purchase intention in SNS users daily.

This study is motivated to determine:

- Which personality traits are viable for purchase intention through SNS
- To examine the dimensions of the impact of the socialisation process in SNS.

For these reasons, this paper is organized into various sections.

## 2. Literature Review

### Big Five Factor Model as the underpinning theory

This conceptual framework investigates how personality traits within the Big Five Factor Model influence consumer decision-making processes and subsequent purchase intentions. These fundamental dimensions of human disposition serve as key predictors for behavioral variations in retail settings, as they transcend cultural and demographic boundaries to shape how individuals engage with market offerings (Liu & Chen, 2025).

By analysing these stable personality dimensions, marketers can design personalized solutions that align with specific consumer values and motivations, thereby facilitating more effective consumer-brand interactions. For instance, personality traits such as openness and conscientiousness influence consumer interactions with AI interfaces, affecting chatbot adoption and information processing (Liu & Chen, 2025). Such strategic alignment transforms broad marketing initiatives into individualized experiences that resonate more deeply, ultimately strengthening the causal link between dispositional traits and final decision outcomes in diverse retail environments.

### Purchase intention

One of the main steps prior to any action in a person's decision involves intention. Before acting, individuals

are faced with plenty of choices during decision-making, such as what to eat, where to live, what to buy, and all sorts of decision-making situations, which most commonly start with having an intention (Attar et al., 2021). To perform an act of purchase is another circumstance that individuals face almost daily, and as a matter of fact, this condition deals with intention. For businesses, uncovering purchase intention is crucial to product and service development. It is important to ensure business sustainability. When the perfect condition meets with the perfect product, consumers are greatly motivated to have the intention to purchase (Kurdi et al., 2025; Hoe & Mansori, 2018), which is frequently related to the perceptions, attitudes, behaviour of consumers, and information quality.

Businesses have long been interested in understanding what motivates consumers to purchase by dissecting various reasons to offer the best fit between businesses and consumers. The curiosity to understand what motivates consumers to purchase has evolved into questioning how consumers consume (Shabankareh et al., 2025; Bilal et al., 2022). Eventually, the study of market segmentation emerged to find out similar consumers' needs and desires within a group (Al Kurdi et al., 2025; Ruangkanjanases et al., 2020). Market segmentation includes psychographic (lifestyle, personality), behavioural (benefit desire, brand loyalty), demographic (gender, age, social class), and geographic (country distinctions, regional) factors. Correspondingly, Shi et al. (2018) noted that consumers' motives and desires could reasonably be impacted by physical and social environments as well. Past research has proved that consumers who benefit from being an informed buyer would result in and induce a satisfied purchase aftermath (Chen et al., 2025; Attar et al., 2021; Tran et al., 2021). Another important insight from previous studies is that consumers are found to rely more on their unofficial informants, who are friends, family, and acquaintances, rather than information obtained from companies (Yang et al., 2026; Lantos, 2021). Other than that, it is also evident that news travels fast in the virtual world (Tan & Sia, 2021).

**Personality traits**

Personality traits are essential contributors to the behaviour-personality relationship through an individual's internal elements (Elangovan et al., 2025; Grace et al., 2015). Precisely, the field of psychology assimilates discrete and distinctive individual behaviour as part of the personality traits dimension. Personality, according to Yang et al. (2015), is a dynamic arrangement of psychophysical systems within an individual that generates a person's specific patterns of behaviour, feelings, and thoughts. On the other hand, personality classifies as a different clusters including behaviouristic, psychoanalytic, humanistic, and trait paradigms (Nostro et al., 2017). Personality traits work to portray personality in an individual subject consistently and permanently.

Personality categorisation is called the five-factor model, known as the "Big Five". The five trait dimensions are openness to new experiences, conscientiousness, extraversion, agreeableness, and neuroticism. The consistency of these factors is tested in dissimilar assessments, dialects, and nations, exhibiting the operational sturdiness of the model (De Raad et al., 2015; Grace et al., 2015). Due to its wide usage, the Big Five model is now considered a common explanation of personality. The Big Five is defined in two opposite poles, designed to imply a range where most people occupy a central position. Moreover, the Big Five does not include every description of personality because of its purpose as a guide in the general classification. Though specific constructions might focus on a specific personality feature projected onto the Big Five dimensions, the Big Five could not fully describe all aspects of personality (Arpaci et al., 2022; Elangovan et al., 2025). Correspondingly, other studies suggest that there are more opportunities to investigate personality traits' influence on purchase intention in SNS extensively, as personality is an integral part of a consumer. Users' personality differences cause various online behaviours and have an immense impact on businesses (Gera & Agarwal, 2023; Rajendran et al., 2018; Zhao et al., 2025).

To assess SNS users' personality traits, the Big Five Inventory (BFI), adapted from Chen et al. (2021), is used based on the six facets of personality traits. It is intended to measure SNS users' personality traits along with five sides of personality which are openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. It is an important dimension to understand the SNS socialisation processes that impact users' purchase intention based on personality traits. Moreover, there is equally great anticipation to expand knowledge on consumer purchase intention research specifically through the socialisation process in SNS (Hafeez et al., 2017; Riaz et al., 2021).

Next, the outcome of this study could increase business owners' devotion to SNS, as SNS is considered an important marketing channel in businesses and practitioners may plan strategically based on the understanding of users' personalities. Additionally, this study's findings that focus on the personality traits in SNS would enlighten individual decision-making in the virtual world (Sosanuy et al., 2021; Zeqiri et al., 2025). Although messages and interaction occur through machine-mediated channels, at each end of the SNS exchange stands an individual for the final decision-making. Therefore, it is crucial to incorporate a basic understanding of a person's personality and his or her reasoning for each intention and behaviour to precisely predict and interpret actions, which would enable businesses to plan accordingly towards business sustainability (Osei et al., 2022; Yang et al., 2026).

To date, numerous studies have attempted to determine the relationship between personality traits and the use of SNS (Balathandayutham & Anandanatarajan, 2020; Osei et al., 2022; Shabankareh et al., 2025). However, mixed results appeared despite stable personality trait measurement being applied. That leaves a huge potential for studies to further delve into the ways personality traits and SNS could be intertwined with a focus on the predictive capability of personality traits of SNS users and purchase intention. Hence, the following hypotheses are proposed based on these justifications:
H1: Personality traits influence consumer purchase intention in SNS
H1a. Openness positively influences consumer purchase intention in SNS
H1b. Conscientiousness positively influences consumer purchase intention in SNS
H1c. Extraversion positively influences consumer purchase intention in SNS
H1d. Agreeableness positively influences consumer purchase intention in SNS
H1e. Neuroticism positively influences consumer purchase intention in SNS

**Socialisation**
Scholars and practitioners are fascinated with the evolution of technology and its effect on consumer behaviour. Various theories and models have been experimented with and brought forward for scrutiny and discussion. The main interest of the practitioners lies in the question of what drives decision-making and consumers' purchase intention (Bui et al., 2025; Ismail et al., 2018; Shi et al., 2018). A major argument towards acceptance of technology certainly is an individual's attitude, his or her cognition, and the effect linked to technology. Equally important is the suggestion to incorporate social influence from one's social network to increase prediction since an individual's attitude and behaviours are a result of the socialisation process (Ismael et al., 2025; Ruangkanjanases et al., 2020). Since individuals are naturally social creatures, social integration may unite diversity and independence (Yang et al., 2026; Yang et al., 2015). This translates into the idea that one's own attitude or decision-making towards a product or service is not only caused by one's own attitude but also by the socialisation effect based on the desire to align one's behaviour with referent group norms (D'Arco et al., 2023).

Similarly, previous studies found that brands or products from social media significantly influence consumer buying habits (Raman & Hu, 2024; Wang & Wang, 2020). However, not many studies have scrutinised high-tech innovations' interaction with social influence specifically on consumer decisions (Argo, 2020). Moreover, previous empirical evidence supporting social influence has been somewhat mixed. Binyamin et al. (2018) found that the use of new information systems is not affected by subjective norms. Furthermore, the opposite impact was found in several organizational studies, signifying that social influence does affect attitudes toward social media and employees' behavioural intentions (Chen et al., 2020; Bilal et al., 2022). Hence, empirical studies are needed to comprehend such relationships to further elucidate decision-making.

Group norm effects happen when several individuals agree on beliefs and shared goals. Most importantly, distinct rules and resolutions are crucial factors for any community in the virtual world (Paftalika & Hananto, 2018; Ruangkanjanases et al., 2020). For this reason, online communities represent group norms most closely when group-related information is being shared and regulate members' actions; community values, goals, and conventions are passed to each member of online communities. Perceived community norms occur after repeated and long-term interaction with the group. Additionally, it is said that group norms influence behavioural intention and persuade members to have a feeling of togetherness and solidarity (Akram et al., 2022; Paftalika & Hananto, 2018).

Equally important is that social influence's impact on purchase intention is manifested through previous work researching reasons for SNS use (Copeland & Zhao, 2020; Doan, 2020). Vahdat et al. found that influencers on attitude come from various sources such as relatives, neighbours, friends, and family members, as well as inspiring personalities in the media such as movie stars or sports champions (2021). Dummanonda and Nuangjamnong (2021) acknowledged that there are significant effects on users' social media behaviour from both group norms and social identity. In the form of a shared vision, group norms have an impact on online community users' knowledge sharing and behaviour as well, which causes individuals with common interests, desires, and backgrounds to start to evolve (Binyamin et al., 2018). Additionally, due to social influence, members of the same community will also start to act likewise (Curras-Perez et al., 2014; Hsu et al., 2013; Pornsakulvanich, 2017). Finding out the underlying reasons that cause these users to be part of the same actions and the cause to spur users to contribute, initiate, as well as purchase is worthy to be investigated (Yeo, 2012).

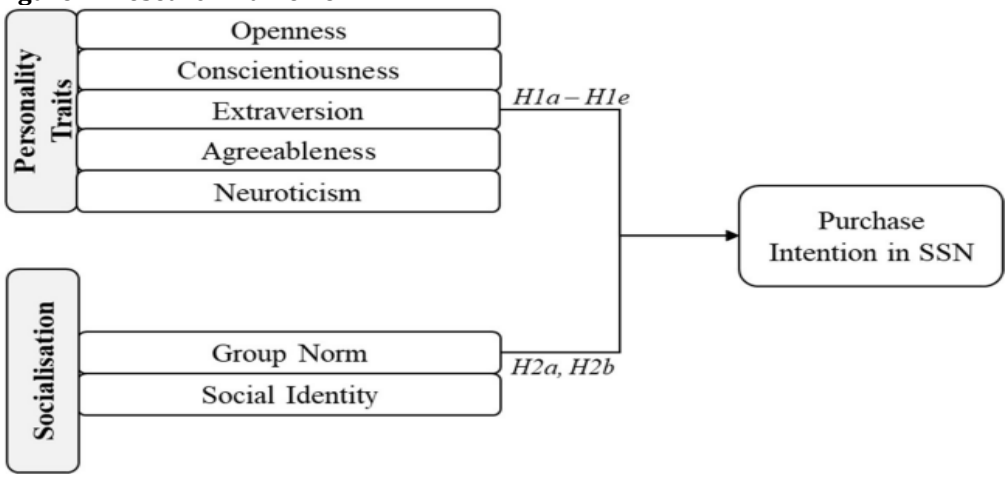
Social identity is not based on a single theory, as it covers affective, cognitive, and evaluative aspects. The formation process of social identity comes from influences of family members, friends, and neighbours, as well as various personalities such as sports champions, politicians, or movie stars. Jokisch et al. (2020) posited that these influences are powerful on consumer purchasing behaviour, especially if users voluntarily adopt a technology, and are even more pronounced than those from networks in the workplace or education. One explanation offered by Sanyal et al. (2021) was that an individual's intent is sometimes exaggerated by enhanced community status or self-perception in the eyes of people surrounding the purchasers, which encourages the act of adopting new inventions. This is further supported by Farivar and Wang (2022) where social identity is positively correlated with purchaser decisions. Based on the above discussion, this study hypothesises that.

H2a. Group norms positively influence consumer purchase intention in SSN

H2a. Social identity positively influences consumer purchase intention in SSN

For this reason, this study intends to further understand personality traits and the effects of interaction between consumers in the SNS socialisation process on purchase intention. Figure 1 exhibits a research framework for this study.

**Figure 1: Research framework**




Thus, the goal of this study is to link personality traits and socialisation impact on consumer purchase intention for SNS users.

## 3. Research Methodology

### Sampling and data collection procedure

A self-administered questionnaire was collected from the 138 respondents through emails, Google Forms and WhatsApp. A total of 134 surveys were completed and usable, which were included in the analysis process. Self-administered questionnaires are handy for both participants and researchers since questions may be

answered quickly and researchers can code the questions in a short amount of time. They are also efficient in terms of time and money (Dalati & Marx Gómez, 2018). This sample size exceeds the G*Power software's minimal required sample size of 97 (Faul et al., 2009). Cohen's (1988) power of 0.80, error of 0.05 and medium effect size of 0.15 were used to get this sample size. The unit of analysis in this study is individual SNS users in Malaysia, and the sampling frame comprises all SNS users in Malaysia who have made prior online purchases, are 18 years and above and are able to speak and write in English.

**Measurement**

Five-point scales that were adapted from previous literature were used for all measurements. This study specifically adapts the "personality traits" from the Chen et al. (2021) BFI with eight items for agreeableness, eight items for conscientiousness, nine items for extraversion, and eight items for neuroticism. As for "socialization", five items for social identity and seven items for social influence were adapted from Grace et al. (2015) and Cheek and Briggs (2013) respectively. Three components in the purchasing intention construct were adapted from Haslinda et al. (2015). Due to its robust capabilities to perform regression during confirmatory factor analysis (CFA) as well as to test the measurement and structural model simultaneously, AMOS version 24.0 was used to analyse the data (Hair et al., 2017).

## 4. Findings and Results

**Reliability assessment**

To check on the internal reliability of the multiple measures and different constructs, Cronbach's alpha values are applied. The ideal Cronbach's alpha, according to Hair et al., 2017) is 0.70. A value of 0.90 is considered to be excellent reliability, a value of 0.7-0.9 is considered to be high reliability, a value of 0.50-0.70 is considered to be moderate reliability, and a value of less than 0.5 is considered to be low reliability. All eight research variables are listed in Table 1 which displays the consistency of scales employed in this study.

**Table 1: Reliability assessment**

| Subscale | Items | Cronbach's alpha score | Level of reliability |
|---|---|---|---|
| Openness | 2 | 0.665 | Moderate Reliability |
| Conscientiousness | 3 | 0.762 | High Reliability |
| Extraversion | 3 | 0.562 | Moderate Reliability |
| Agreeableness | 3 | 0.644 | Moderate Reliability |
| Neuroticism | 3 | 0.704 | High Reliability |
| Group Norm | 7 | 0.854 | High Reliability |
| Social Identity | 3 | 0.560 | Moderate Reliability |
| Purchase Intention | 3 | 0.876 | High Reliability |

Source: Data collected

After inspecting the correlation matrix in the previous phase, where most of the item coefficients were 0.3 or above, component analysis was carried out. According to the findings of the factor analysis, the two questions that loaded on Factor 1 were classified as indicators of openness to new experiences. Conscientiousness was named as Factor 2 (3 items), extraversion was named as Factor 3 (3 items), agreeableness was named as Factor 4 (3 items), neuroticism was named as Factor 5 (3 items), group norm was named as Factor 6 (3 items), social identity was named as Factor 7 (3 items), and purchase intention was named as Factor 8 (3 items).

**KMO and Bartlett's test**

The KMO and Bartlett test comes before CFA and is crucial since it shows if the data is suitable for CFA or not. Bartlett's test of sphericity and KMO are intended to determine whether factor analysis is appropriate for use in research (Hair et al., 2017). The KMO test yields scores ranging from 0 to 1, with numbers closer to 1 being preferable. Conversely, according to Hadi et al. 2016), results are further divided into two parts, where values between 0.5 and 1.0 indicate that the data are eligible for factor analysis, whereas values below 0.5 are not. Any data that meet both requirements are accepted to move forward with factor analysis since Bartlett's test of sphericity requires that the p-value be less than 0.05 to demonstrate its significance (Hair et al., 2017). Table 2 demonstrates the results of this research. As shown, this research satisfies KMO and Bartlett's test of sphericity.

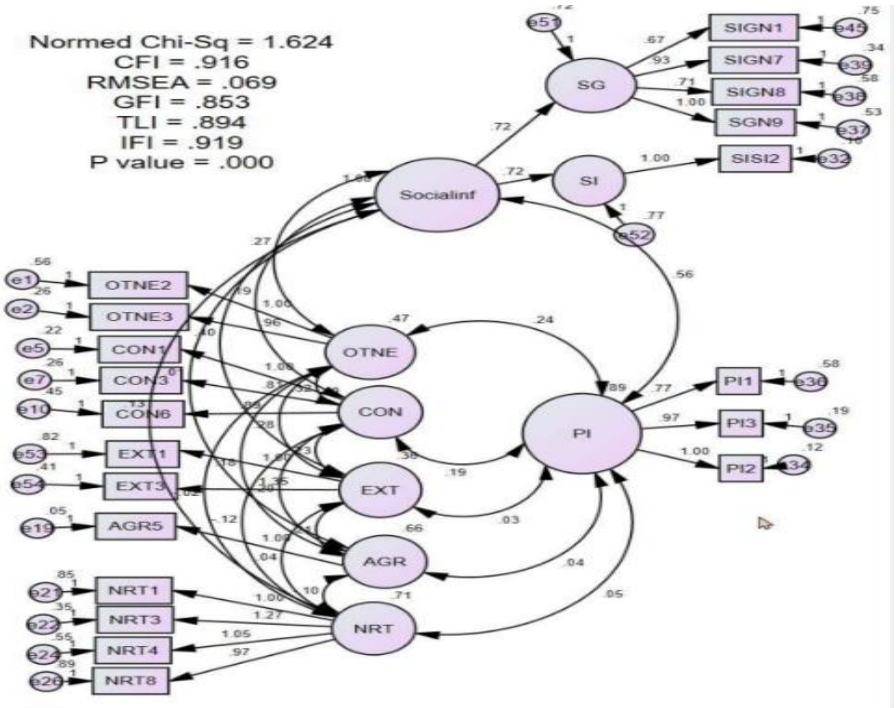
**Table 2: KMO and Bartlett's test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | | 0.748 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1740.879 |
| Df. | | 378 |
| Sig. | | .000 |

**Confirmatory factor analysis (CFA)**

Hair et al. (2017) and Zainudin (2015) both proposed that CFA should be tested via two phases which are construct validity assessment and goodness-of-fit assessment. Hence, this research performs both stages for CFA. Figure 2 is the CFA model before adjusting the measures. Included in this stage are five personality traits, two socialisation processes, and purchase intention in SSN constructs. Concerning the CFA, eight variables and 56 measures were employed. Openness to new experience (OTNE), conscientiousness (CON), extraversion (EXT), agreeableness (AGR), neuroticism (NRT), group norm (SIGN), social identity (SISI), and purchase intention (PI) were the variables selected. Each of these variables is loaded with its own measures and assessed by CFA. Kline (2015) contends that at least four tests of model fit should be used to evaluate CFA and structural models. Seven goodness-of-fit indices, including the chi-square (X2) to the degrees of freedom (Df), goodness-of-fit index (GFI), incremental fit index (IFI), Tucker-Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and p-value, have been selected for this study.

**Figure 2: CFA**




The following Table 3 displays goodness-of-fit indices for CFA, along with the recommended criteria for these indices (Hair et al., 2017). The findings indicate that the CFA's goodness-of-fit indices are inconsistent. GFI and TLI readings are below the recommended criteria. Therefore, by eliminating some items, connecting them to new variables, and adding linked measurement errors, our study has improved the model (Anderson & Gerbing, 1988). After some measures were deleted, some modification indices were changed, and the model fit was improved (Hair et al., 2017).

**Table 3: Goodness-of-fit indices for preliminary CFA**

| Model fit indices | Recommended criteria | Default model | |
|---|---|---|---|
| X /Df | | | 2 |
| GFI | | 0.853 | |
| IFI | ≥ 0.9 | 0.919 | |
| TLI | ≥ 0.9 | 0.894 | |
| CFI | ≥ 0.9 | 0.916 | |
| RMSEA | < 0.08 | 0.069 | |
| | 1:3 1.661 | | |
| P value | 0.05 | 0.000 | ≥ 0.9 |

**Construct validity**

Hair et al. (2017) emphasized the imperative of verifying the results of CFA through construct validity. After the deletion of a few items in the preliminary CFA test, there are 27 items left in the model. In the next process, two tests are conducted in this research to investigate construct validity, namely convergent and discriminant validity. These tests show how measures are related to each other and also prove whether measures belong on the same scale or not. Factor loadings, composite reliability (CR), and average variance extracted (AVE) are used to evaluate convergent validity.

Table 4 demonstrates that all loadings, CR, and AVE meet the specifications. The majority of the loadings are more than 0.70 as suggested by Hair et al. (2017). Since other items from the same constructs have high loading scores to complement AVE and CR, the six items below that threshold (loading values from. 656 to. 686) are regarded as satisfactory out of the 27 items that were retained (Byrne, 2013). Every CR and AVE exceeds 0.70 and 0.5, respectively.

**Table 4: Factor loading, CR and AVE**

| Construct | Loadings | CR | AVE |
|---|---|---|---|
| Openness | | 0.842 | 0.730 |
| I am interested in exploring many new things | 0.946 | | |
| I try to open myself to new opportunities | 0.752 | | |
| Conscientiousness | | 0.856 | 0.667 |
| I often complete tasks successfully | 0.916 | | |
| I excel in something that I'm interested in | 0.832 | | |
| I work hard to achieve what I intend to achieve | 0.686 | | |
| Extraversion | | 0.759 | 0.513 |
| I can talk to others about new things that attract me | 0.707 | | |
| I am assertive in taking charge of the assigned task | 0.676 | | |
| I enjoy being part of a group in completing the task | 0.763 | | |
| Agreeableness | | 0.804 | 0.577 |
| I trust others | 0.794 | | |
| I value cooperation over competition | 0.711 | | |
| I am concerned about others | 0.773 | | |
| Neuroticism | | 0.823 | 0.612 |
| I am not easily bothered by things | 0.728 | | |
| I stay calm even in tense situations | 0.686 | | |
| I'm able to control myself | 0.914 | | |
| Group Norm | | 0.885 | 0.523 |
| I achieve a sense of belonging by purchasing the same products and brands that others purchase | 0.656 | | |
| I like to know what brands and products make good impressions on others | 0.737 | | |

| | | | |
|---|---|---|---|
| I often consult other people to help them choose the best alternative available from a product class. | 0.683 | | |
| I often identify with other people by purchasing the same products and brands that they purchase. | 0.793 | | |
| If other people can see me using a product, I often purchase the brand they expect me to buy | 0.718 | | |
| It is expected that people similar to me use the same products or brands | 0.728 | | |
| When buying products, I generally purchase those brands that I think others will buy | 0.742 | | |
| Social Identity | | 0.773 | 0.533 |
| My feeling of belonging is always belonging to my community | 0.793 | | |
| My popularity lies with other people | 0.721 | | |
| My act is the way in which other people react to me | 0.673 | | |
| Purchase Intention | | 0.924 | 0.803 |
| There is a possibility that I will use information from social media to decide to buy a product or service in the future | 0.830 | | |
| I intend to use information from SNS to decide to buy a product or service in the future. | 0.928 | | |
| I will repeatedly use information from SNS to decide to purchase products or services in the future | 0.926 | | |

Table 5 shows that the square root of the AVE of each construct exceeds the correlation of that construct with other constructs, and each item loading is substantially greater on its assigned construct than on the other constructs. All of the values meet the discriminant validity requirement, which states that r values should be smaller than 0.9 (Gold et al., 2001). Therefore, the statistical data give sufficient support for discriminant validity.

**Table 5: Discriminant validity**

| | **AGR** | **CON** | **EXT** | **SIGN** | **NRT** | **OTNE** | **PI** | **SISI** |
|---|---|---|---|---|---|---|---|---|
| AGR | (0.760) | | | | | | | |
| CON | 0.279 | (0.817) | | | | | | |
| EXT | 0.455 | 0.519 | (0.716) | | | | | |
| SIGN | 0.153 | 0.133 | 0.330 | (0.723) | | | | |
| NRT | 0.167 | 0.461 | 0.416 | 0.117 | (0.782) | | | |
| OTNE | 0.327 | 0.516 | 0.383 | 0.198 | 0.423 | (0.855) | | |
| PI | 0.307 | 0.268 | 0.346 | 0.422 | 0.159 | 0.362 | (0.896) | |
| SISI | 0.327 | 0.282 | 0.427 | 0.509 | 0.331 | 0.320 | 0.543 | (0.730) |

Structural model

This study performed a goodness-of-fit analysis to validate the structural model, which is composed of the following variables: $X^2$/Df, GFI, IFI, TLI, CFI, and RMSEA. The structural model's goodness-of-fit indices are included in Table 6, along with the test's recommended criteria (Hair et al., 2017). The findings demonstrate that not all goodness-of-fit indices on the tests for the structural model were met. The values for $X^2$/Df (1.661), GFI (0.849), IFI (0.922), TLI (0.901), CFI (0.920), and RMSEA (0.071) vary between those that are above and below the suggested threshold.

**Table 6: Goodness-of-fit for structural model**

| Model fit indices | Recommended criteria | Default model |
|---|---|---|
| X | | |
| GFI | ≥ 0.9 | 0.849 |
| IFI | ≥ 0.9 | 0.922 |
| TLI | ≥ 0.9 | 0.901 |
| CFI | ≥ 0.9 | 0.920 |
| **Df** | **1:3** | **1.661** |
| **RMSEA** | **< 0.08** | **0.071** |
| **P value** | **0.05** | |

The value of the coefficient of determination is 0.58 which indicates that the contribution of exogenous constructs, which are social influence and personality traits in estimating endogenous construct Y, is 58%. Purchase intention predictors are estimated to account for 58% of its variance. In other words, the variance in the purchase intention inaccuracy is about 42.0% of the variance in the purchase intention. Figure 3 displays the standardized path coefficients for every path in the model and the regression path coefficients for every path in the model, with tables for standardized regression weights (factor loading) and regression path coefficients and their significance based on p-value < 0.05.

**Figure 3: Regression path coefficients for every path in the model**

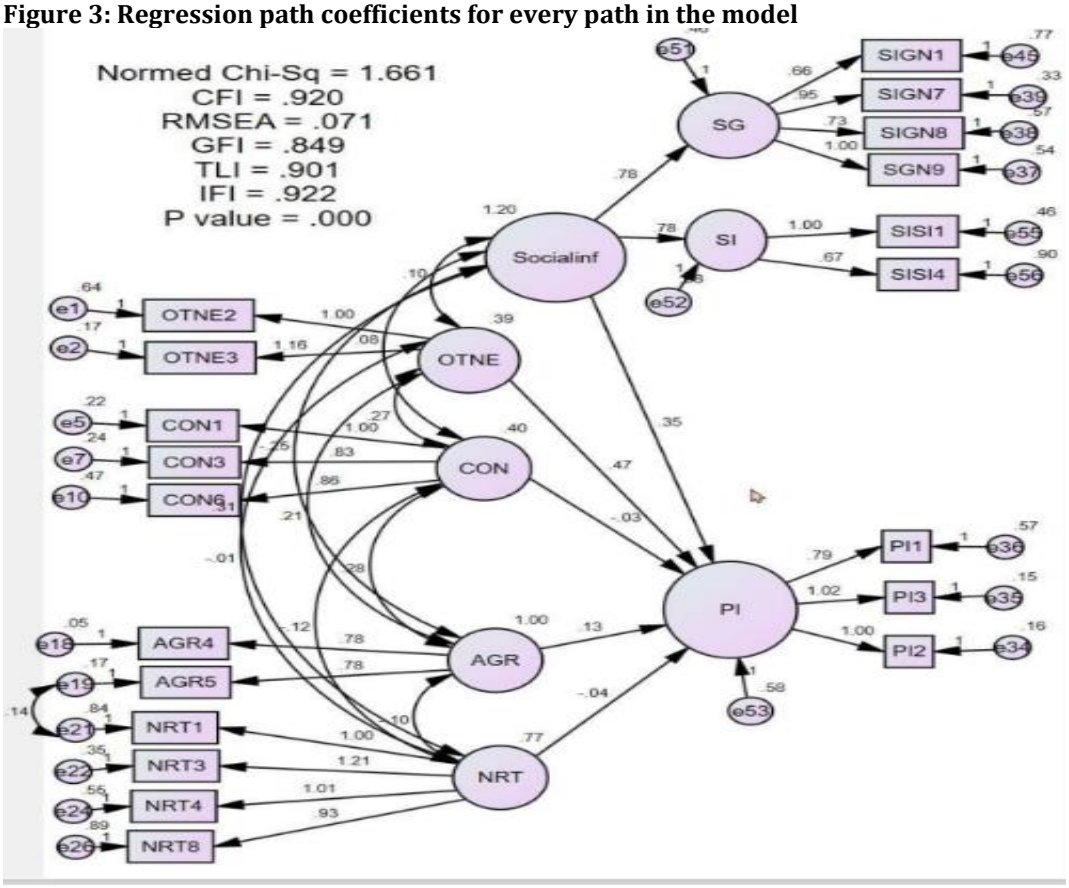



Table 7 summarises the results of the hypothesis testing. Specifically, openness to new experiences (β=0.189, p<0.05), group norm (β=0.175, p <0.05) and social identity (β=0.374, p<0.05) were found to influence purchase intention in SSN. Thus, only H1a, H2a and H2b are supported. The resulting path values for the remaining interaction effects involving conscientiousness (β=0.053, p>0.05), extraversion (β=0.040, p>0.05), agreeableness (β=0.084, p>0.05), and neuroticism (β=-0.121, p>0.05), are all insignificant. Hence, the H1b, H1c, H1d and H1e are rejected. The role of the effect size is then evaluated. The effect size ($f^2$) measures the

proportional influence of an endogenous construct and a predictive construct (Cohen, 2016). With an effect size ($f^2$) of 0.36, social identity was identified as the dimension that significantly contributed to explaining purchasing intention in SSN.

**Table 7: Hypothesis testing**

| Hypo. | Relationship | β | SE | t-value | p-value | $f^2$ | Decision |
|---|---|---|---|---|---|---|---|
| H1a | OTNE Purchase Intention | 0.189 | 0.084 | 2.250 | 0.025 | 0.170 | Supported |
| H1b | CON Purchase Intention | 0.053 | 0.090 | 0.589 | 0.556 | 0.049 | Not Supported |
| H1c | EXT Purchase Intention | 0.040 | 0.095 | 0.425 | 0.671 | 0.048 | Not Supported |
| H1d | AGR Purchase Intention | 0.084 | 0.086 | 0.971 | 0.332 | 0.091 | Not Supported |
| H1e | NRT Purchase Intention | -0.121 | 0.083 | 1.455 | 0.146 | -0.086 | Not Supported |
| H2a | SIGN Purchase Intention | 0.175 | 0.089 | 1.978 | 0.049 | 0.194 | Supported |
| H2b | SISI Purchase Intention | 0.374 | 0.093 | 4.006 | 0.000 | 0.360 | Supported |

Notes: $p<0.05$

**Discussion**

The empirical finding confirms that openness to new experiences has a direct and advantageous impact on SNS users' intentions to make a purchase. This result supports Gvili et al. (2020) and Iqbal et al. (2021) findings on positive openness to new experience relations as well. SNS users with this trait are not very concerned with the perceived value of information or connectedness in the SNS unlike other personality traits; hence, it is easier for this type of personality trait to be enticed with offers or items found online.

Similarly, the findings of this study support the influence of social identity and group norms on SNS users' purchasing intentions. This finding demonstrates that users are more likely to have strong, positive purchase intentions after connecting with others via SNS without the assistance of other mediating factors. This result is supported by Belgiawan et al. (2017) and Sambe et al. (2021). Users are found to be influenced by the feeling of togetherness with group members and also have the same goals and values as others. The findings verify that SNS users listen to other users in terms of purchasing information and react to it. This research can conclude that for the average SNS user, the impact of the socialisation process exists after interacting with other members. Interaction could be in the form of text, visuals, video streams, emoticons, symbols, and audio. Hence, general users are found to be affected by what they receive and seem to induce purchase intention within them.

## 5. Conclusion and Recommendations

**Theoretical implications**

The major contribution of this investigation is to add to the cumulative knowledge of the BFM model in the area of purchase intention. In this study, a theoretical framework examines the personality traits and socialisation process on purchase intention from SNS users' psychology aspect. This research provides marketers with guidelines to understand the effects of the socialisation process in SNS towards purchase intention among users.

**Practical implications**

The findings suggest that through the existence of SNS, companies are exposing themselves to SNS users and helping increase purchases through repeated publicity. This could occur subconsciously and organically; hence marketers are advised to design marketing strategies that include activities to integrate SNS in the marketing plan (Andon & Annuar, 2023). Similarly, this study's findings offer valuable insights to marketers.

**Limitations and future research**

Despite the theoretical and practical contributions offered by this research, there are other boundaries to overcome. The results are not easily generalizable to the population, and this becomes a limitation of this research. Another limitation of this research is that the personality traits tested did not show stability results despite having high reliability and stability performance in other studies. There are adjustments needed for fine-tuning in terms of adaptation and sample choice in future studies.

Next, the snowball sampling method could be used, but with another subsequent method such as offline follow-up and establishing links with other institutions or organizations that could connect this research to the sample population. Despite the growing popularity of the snowball sampling method, this research was not able to collect a bigger data sample through the dissemination of the surveys. The inability of the snowball sampling method to gain momentum contributed to the small sample collected. The sample size projected was 400, however, only 133 respondents were analysed and contributed to the less-than-optimum model fit for this study. Woodley and Lockard (2016) attested to the failure of the snowball sampling method in their research as well when their research failed to gather enough respondents. There are various alternatives to fix the uptake rates such as reaching out to offline participants via original online participants. Another way to overcome the barriers is also to ask for assistance from local organizations or institutions to which potential respondents are connected (Parker et al., 2019).

AMOS was used to validate this research framework, and the findings highlighted the socialisation process as a major component that influences users' purchasing intentions in SNS. However, most of the personality trait dimensions are deemed to be insignificant factors in purchase intention for SNS users. Hence, future research should further investigate how personality traits may influence users' purchase intention in SNS.

**Acknowledgement:** Funding for the project was received from the Faculty of Business and Management, UiTM, Puncak Alam Campus, Selangor, Malaysia, grant number 600-RMC/GPM LPHD 5/3 (085/2022).

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Designing a Gamified Tool: An ADDIE Approach to Capital Market Flashcard Development

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**Abstract:** Traditional, lecture-based finance courses frequently overwhelm undergraduate students with dense theoretical content, leading to poor knowledge retention, lower overall engagement, and a heavy reliance on last-minute cramming before major assessments. To address these persistent educational challenges, this study details the design, development, and implementation of a mobile-friendly digital flashcard game specifically tailored for an undergraduate Financial Markets and Institutions (FIN) course using the systematic ADDIE instructional design framework. By integrating active recall strategies, custom visual aids, and an algorithm-driven Spaced Repetition System (SRS), the platform transforms passive studying into a dynamic learning process that prompts students to systematically review challenging concepts based on their individual mastery levels. Subject-matter experts rigorously vetted the curriculum content for accuracy and practical relevance prior to deployment, while formative evaluations directly measured student usability, overall engagement, and conceptual comprehension during active coursework. Formative findings, including high expert ratings for content validity and evidence of adaptive scheduling from system logs, suggest that the tool has strong potential to support active recall. However, its effectiveness in improving long-term knowledge retention and reducing academic anxiety will be examined in a subsequent summative evaluation. Ultimately, by documenting the comprehensive analysis, design, and development phases, this study provides instructional designers and finance educators with a practical, replicable blueprint for implementing gamified, technology-enhanced active learning tools across complex capital markets curricula.

**Keywords**: *Capital market; flashcard game; ADDIE model; digital learning; spaced repetition system (SRS)*

## 1. Introduction and Background

Traditional lecture-centered teaching tends to leave learners in a passive state and results in limited knowledge retention (Kooloos et al., 2020). Even though effective for content coverage, these methods may not fully support sustained student engagement or deep cognitive processing (Dzaiy & Abdullah, 2024). Studies of higher education pedagogy have shown that lecture-centered environments limit active participation by positioning students as passive recipients rather than active contributors to their learning (Bhardwaj et al., 2025; Mladenovici et al., 2022). This may contribute to reduced attention span, lower engagement, and difficulties in long-term knowledge retention. A large-scale meta-analysis across STEM disciplines found that traditional lecturing is linked to higher failure rates and poorer exam outcomes compared to active learning methods (Freeman et al., 2014). Although the Freeman study focuses on STEM subjects, its findings are relevant to finance education, which also involves dense, technical material well-suited to active learning approaches. Furthermore, academic boredom is frequently reported among university students, especially in subjects with heavy content and minimal instructional variation or interactivity (Pekrun et al., 2010). Such conditions often undermine motivation, leading students to adopt superficial learning strategies that hinder deep understanding and long-term retention (Hemmings et al., 2019; Sharp et al., 2018).

In response to these challenges, researchers have increasingly advocated for the integration of active learning methods and digital educational innovations within higher education settings. Active learning shifts the focus from passive content consumption to active student participation, resulting in improved engagement, motivation, and learning outcomes (Freeman et al., 2014). Among the various approaches available, gamified

learning has attracted significant scholarly interest due to its potential to transform routine academic tasks into more stimulating learning experiences. Studies have shown that gamification may help alleviate feelings of academic boredom while encouraging greater involvement in coursework (Gyedu et al., 2026; García-López et al., 2023; Ruiz et al., 2024). Furthermore, cognitive learning strategies, particularly spaced repetition and retrieval practice, have consistently demonstrated their value in strengthening long-term memory retention through the systematic reinforcement of previously learned material (Vagha et al., 2025).

Building on recent developments in digital learning, this study developed a customized mobile-compatible flashcard application tailored to the FIN syllabus. The application integrates a Spaced Repetition System (SRS) to support active recall and maintain student engagement throughout the semester. Development was guided by the ADDIE framework (Analysis, Design, Development, Implementation, and Evaluation), which is widely used in instructional design to transform learning objectives into practical educational solutions (Basri et al., 2025). This paper concentrates on the first three phases of the model, namely analysis, design, and development. It explains how capital market topics were organized into a gamified learning structure, evaluated by subject matter experts, and subsequently refined based on preliminary user feedback.

Three key gaps can be identified from the existing literature. First, research on spaced repetition and digital flashcards has largely been conducted in language learning (Yu & Trainin, 2022) and health-related disciplines (Maye et al., 2026, Barrison et al., 2025). Although one study in a finance-related field explored the relationship between the voluntary use of a self-testing application and examination performance (Wuyts et al., 2026), it did not examine how such a tool might be designed and developed to support a specific curriculum. Second, studies of gamified learning in business education tend to emphasize learning outcomes while providing limited detail on the underlying design and development process. As a result, educators may find it difficult to replicate or adapt these interventions in their own teaching contexts. Third, commercially available flashcard decks are generally not tailored to specific course syllabi or the Malaysian higher education environment. Differences in financial instruments, regulatory structures, and market practices mean that materials developed primarily for North American contexts may not fully address local learning needs.

This study contributes to the literature in three ways. First, it provides a transparent description of the process used to convert a content-heavy finance syllabus into retrieval-practice items, thereby supporting replication in comparable disciplines. Second, it reports expert validation at the item level and details the modifications made in response to reviewer feedback, offering greater insight into the development process. Third, it documents both the configuration and observed performance of a spaced repetition scheduling system within a finance education setting, a dimension that has rarely been examined in prior research.

## 2. Literature Review

### *Retention Challenges in Finance Education*

Undergraduate finance curricula demand that students engage with a complex network of technical concepts, regulatory frameworks, and macroeconomic instruments. In introductory courses, learners must distinguish closely related ideas such as primary and secondary markets while simultaneously building foundational knowledge. From a cognitive perspective, this rapid introduction of highly interrelated concepts places a substantial burden on working memory, which has a strictly limited capacity (Sweller, 1988). When instructional materials are dense and presented without sufficient scaffolding or active reinforcement, this limited capacity is easily overwhelmed, preventing effective transfer of knowledge into long-term memory (Hawthorne et al., 2019; Sweller, 2010). Concepts in business and economics cannot be learned in isolation; instead, high element interactivity means that learners must process multiple interacting elements concurrently, increasing cognitive load exponentially and necessitating deliberate practice for schema construction.

Traditional study strategies frequently used by undergraduates, such as passive highlighting and repeated reading, offer limited benefits for long-term retention. While these techniques may create a sense of familiarity, they do not strengthen memory retrieval or promote deep conceptual integration. Consequently, students often face difficulties recalling key concepts during assessments or applying their knowledge within complex problem-solving contexts. A comprehensive review by Dunlosky et al. (2013) classified these popular strategies as "low utility," noting they do not reliably enhance exam performance or knowledge transfer.

Such passive strategies contribute to what cognitive psychologists term the illusion of competence, where repeated exposure leads students to confuse familiarity with true understanding (Roediger & Karpicke, 2006b; Hazlett et al., 2025). Recognition during study does not guarantee successful recall or application of knowledge in high-stakes situations.

In contrast, decades of cognitive science research demonstrate that actively retrieving information significantly strengthens memory traces beyond what passive restudying achieves. Roediger and Karpicke (2006a) showed that while restudying may support short-term cramming, active retrieval practice yields substantial gains in long-term retention and higher-order learning. When students engage in effortful practice, such as short-answer self-testing, they reinforce connections between concepts and build robust mental schemas (Greving & Richter, 2022; Kooloos et al., 2020). This process moves learning beyond superficial recognition, laying the cognitive foundation necessary for tackling complex financial problems.

***Spaced Repetition and Active Recall***

Given the limitations of standard passive study habits, cognitive psychology research highlights retrieval-based strategies, specifically spaced repetition and active recall, as effective methods to improve long-term retention. Spaced repetition operates by progressively widening the intervals between review sessions, forcing students to recall an idea when it begins to fade from memory. This timed reinforcement helps strengthen memory over time and increases study efficiency. For instance, landmark research by Roediger and Karpicke (2006) reveals that students who took repeated practice tests retained significantly more information one week later compared to those who merely reread the same material, despite the re-readers initially feeling more confident.

Digital flashcards provide an ideal tool to blend these active recall mechanics with performance-based scheduling algorithms. Across broader educational contexts, digital flashcards and audio-visual inputs have been highly effective in helping English as a Foreign Language (EFL) students master complex vocabulary (Yowaboot & Sukying, 2022; Peters, 2019; Peters & Webb, 2018). Extensive literature demonstrates that intentional vocabulary learning, which relies on focused repetition and retention, noticeably lifts students' baseline knowledge (Hirschel & Fritz, 2013; Honarzad & Soyoof, 2023). Historically, structural study aids like word lists, flashcards, and vocabulary notebooks have served as foundational tools to aid purposeful, structured vocabulary development (Elgort & Nation, 2010).

When these structural mechanics are translated into digital finance and accounting education, the pedagogical benefits hold equally true. Unlike static paper flashcards, modern Spaced Repetition Systems (SRS) dynamically tune the review cadence of individual items based on real-time learner performance. Cards that students find difficult reappear more frequently, while well-mastered content is reviewed less often. In finance-specific settings, undergraduates who voluntarily used a gamified self-testing app earned significantly higher final exam scores than non-users. Crucially, the intensity and accuracy of their active practice, not simply access to the app, predicted these gains (Wuyts et al., 2026). Pulling information from memory without assistive cues reinforces memory pathways far more effectively than passive observation. Together, active recall and algorithmically spaced reviews form a durable engine for long-term learning (Vagha et al., 2025)

However, the benefits of these cognitive strategies are not entirely unconditional. When study material is exceptionally long or conceptually complex, the advantage of active retrieval over restudying can diminish, especially for students already experiencing high cognitive load (Redifer et al., 2026). This underscores the importance of designing learning tools that break down content into manageable units, preventing overload and maximizing the efficacy of retrieval-based practice.

Empirical studies highlight the effectiveness of retrieval strategies, particularly spaced repetition complemented by active recall, as powerful means to enhance retention (Roediger & Karpicke, 2006). By introducing intervals that prompt review just before forgetting, spaced repetition maximizes both efficiency and retention. Digital flashcards serve as a practical application of these strategies, promoting active engagement and adaptability in the learning process. Studies indicate that students utilizing gamified self-testing applications perform significantly better academically than their peers who do not engage with these tools (Wuyts et al., 2026).

***ADDIE and ARCS: Structure and Motivation in Instructional Design***

While effective cognitive strategies are essential, the design of a learning tool is equally critical to its success. The ADDIE model, comprising Analysis, Design, Development, Implementation, and Evaluation, offers a systematic, phased framework that guides the development of educational interventions. This approach ensures alignment between learner needs, course objectives, and evaluation criteria throughout the development process (Basri et al., 2025).

Motivation complements instructional design as a vital element for student engagement. Keller's ARCS model identifies four essential factors influencing learners' motivation: Attention (capturing interest through novelty or compelling questions), Relevance (linking content to learners' goals and experiences), Confidence (building belief in success), and Satisfaction (reinforcing effort through visible progress and rewards) (Keller, 1987, 2010). Digital learning tools can naturally incorporate these factors via features such as interactivity, immediate feedback, and personalized pacing. For instance, gamified flashcards can effectively capture attention, adaptive content enhances relevance, prompt feedback builds confidence, and progress tracking fosters satisfaction.

Supporting this, meta-analytic evidence in higher education reveals that gamified learning formats generally enhance motivation and engagement more consistently than non-gamified methods. Crucially, the impact is strongest when gamification elements are thoughtfully integrated into, rather than merely added onto, instructional goals (Gyedu et al., 2026).

By combining the structured rigor of the ADDIE model with the motivational focus of ARCS, designers can create comprehensive learning tools that not only deliver content effectively but also encourage consistent student use and engagement.

## 3. Research Methodology

***Research Design***

This study employs Design and Development Research (DDR), which focuses on the systematic creation, refinement, and examination of instructional products and processes, as well as the factors that support their effective replication in other educational settings (Richey & Klein, 2014). The ADDIE framework was used to guide the development process. Although the study encompasses all five ADDIE phases, particular emphasis is placed on the Analysis, Design, and Development stages, as these phases generated the primary evidence reported in this paper. Implementation is discussed mainly in terms of the deployment environment, while Evaluation is limited to formative validation conducted before full implementation. An assessment of learning outcomes through summative evaluation falls beyond the scope of the present study and is addressed in a separate investigation.

**Table 1: Schematic layout of the ADDIE instructional lifecycle applied in this study**

| The ADDIE Cyclical Flowchart | | |
|---|---|---|
| 1 | Analysis | Identification of curriculum challenges and learning bottlenecks within the FIN course. |
| 2 | Design | Categorizing five macro financial market sub-decks. |
| 3 | Development | Creating active recall cards & setting SRS parameters. |
| 4 | Implementation | Classroom integration & student mobile application usage. |
| 5 | Evaluation | Expert content validation and system-log verification of scheduler behaviour. |

Following the issues identified during the analysis phase, a digital flashcard application was developed to encourage active learning and continuous review of course content. Rather than relying solely on traditional lecture-based instruction, the tool employs a Spaced Repetition System (SRS) to support retrieval practice and reinforce knowledge retention over time. Table 2 compares the conventional instructional approach used in the FIN course with the features incorporated into the developed flashcard application across four key learning dimensions.

**Table 2: Comparison of the traditional FIN approach and the developed SRS flashcard tool.**

| Dimension | Traditional FIN Approach | Developed SRS Flashcard Tool | Supporting Theory |
|---|---|---|---|
| Learning engagement | Passive listening to lectures and static slides | Active retrieval through a question-and-answer interface | Retrieval Practice Theory (Roediger & Karpicke, 2006) |
| Study scheduling | Massed cramming before exams | Spaced repetition with SM-2 algorithm adjusts intervals. | Forgetting-curve model (Ebbinghaus, 1885/1913) |
| Multimedia use | Text-heavy definitions | Text integrated with charts, graphs, and diagrams. | Dual-coding theory (Paivio, 1986) |
| Feedback | Delayed, exam-based feedback | Immediate formative feedback during learning activities. | Formative assessment framework: Formative Assessment Theory (Black & Wiliam, 1998) |

Note: Learning engagement was informed by Retrieval Practice Theory (Roediger & Karpicke, 2006), study scheduling by Ebbinghaus's Forgetting Curve (Ebbinghaus, 1885/1913), multimedia use by Dual Coding Theory (Paivio, 1986), and feedback design by Formative Assessment Theory (Black & Wiliam, 1998).

To evaluate the initial deployment of the application, a formative mixed-method assessment was undertaken. The evaluation drew on two complementary sources of evidence. The first consisted of system-generated logs that captured student usage patterns and monitored the operation of the spaced repetition algorithm. The second source comprised preliminary user feedback that provided insights into students' perceptions of engagement, usability, and overall learning experience.

***Research Context and Participants***

The study was carried out in the undergraduate Financial Market and Institutions (FIN) course offered by the Faculty of Business and Management at a Malaysian public university. As a core subject for finance majors, the course covers topics including financial systems, capital market operations, regulatory institutions such as Bank Negara Malaysia, and a range of financial instruments.

Three groups of participants were involved in different phases of the study. For the needs analysis, 64 students who had completed the course in the previous semester, together with two instructors who had taught the course for at least two semesters, were purposively selected. Their input helped identify areas of difficulty and common misconceptions among students.

Formative findings, including high expert ratings for content validity and evidence of adaptive scheduling from system logs, suggest that the tool has strong potential to support active recall. However, its effectiveness in improving long-term knowledge retention and reducing academic anxiety will be examined in a subsequent summative evaluation.

During the implementation phase, 95 undergraduate finance students enrolled in two parallel seminar groups participated in the study setting. Purposive sampling was adopted, with the sampling frame consisting of all students registered in these groups. Eligibility was limited to students who were currently enrolled in the course and had access to a compatible mobile device or laptop. Students who chose not to provide consent for log-data collection were excluded from the dataset but continued to have unrestricted access to the application. Of the 95 enrolled students, 90 consented to the collection of usage data, representing a participation rate of 94.7%.

## ADDIE Framework Application

### Analysis Phase

The analysis phase examined learning challenges encountered by students in the FIN course. Information gathered through discussions with students and instructors, together with a review of course materials, revealed several recurring issues. Students frequently experienced difficulty recalling technical terminology, distinguishing between closely related financial concepts, and maintaining engagement during lecture-centred sessions. Study practices were also largely passive, with many students relying on rereading notes rather than actively testing their understanding.

These observations suggested a need for a learning tool that would promote active recall, encourage regular review, and provide opportunities for independent learning outside scheduled class hours. In response, a digital flashcard application incorporating a Spaced Repetition System (SRS) was proposed to support continuous reinforcement of key concepts.

### Design Phase

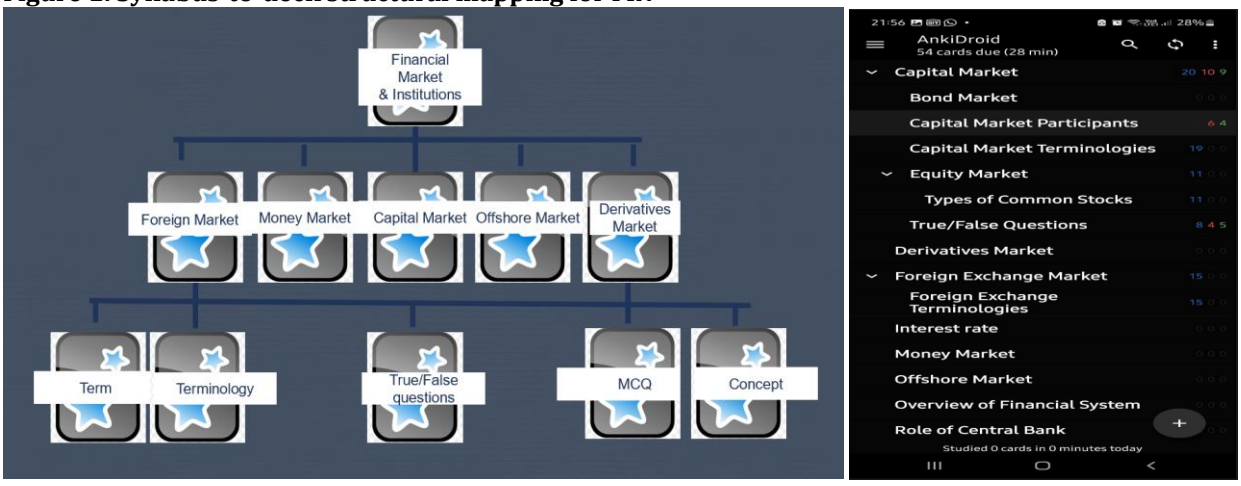
The design phase focused on defining the pedagogical structure and functional features of the flashcard application. The design was informed by established principles of retrieval practice and spaced learning, while learner engagement was guided by Keller's ARCS motivational model.

Several key design decisions were made. Flashcards were organized according to major course topics, including capital market instruments, trading mechanisms, and regulatory institutions. Each card adopted a question-and-answer format to encourage active retrieval rather than passive review. To support long-term retention, an SRS mechanism was integrated to adjust review intervals according to individual learner performance. Gamified features, including progress tracking and immediate feedback, were also incorporated to encourage continued participation.

The ARCS model informed the motivational aspects of the application design. Attention was supported through short and interactive learning activities, while relevance was enhanced by aligning content with course assessments and practical financial market scenarios. Confidence was fostered through graduated levels of difficulty and ongoing performance feedback. Satisfaction was reinforced through visual indicators of progress and achievement.

To facilitate systematic content organisation, the FIN syllabus was divided into five topic-based learning decks: Money Markets, Foreign Exchange Markets, Equity Markets, Bond Markets, and Derivatives. The resulting structure is presented in Figure 1. For the initial implementation phase, the application was introduced to 95 undergraduate finance students enrolled in two parallel seminar groups. Participants were selected through purposive sampling, as all students were registered in the course where the intervention was implemented.

**Figure 1: Syllabus-to-deck structural mapping for FIN**



**Development Phase**

The flashcard application was developed using the open-source Anki platform, chosen for its ability to operate across multiple devices and operating systems, including Windows, iOS, and Android (AnkiDroid). Question-bank content was derived directly from the FIN syllabus and organized into interactive flashcard decks. Three card formats were used: definition-based cards to strengthen knowledge of key terminology, multiple-choice items to assess conceptual understanding, and true/false questions aimed at addressing common misconceptions. For example, several cards were designed to reinforce the distinction between bondholders as creditors and shareholders as equity owners.

Card reviews were managed through a four-level response system that allowed learners to indicate the difficulty of each item. Selecting Again returned the card for review within a few minutes, while Hard scheduled an earlier repeat review than usual. Cards marked Good were presented again after a longer interval, whereas Easy extended the review period further. Scheduling was controlled by a modified SM-2 algorithm configured with a starting ease factor of 250%, an interval modifier of 100%, and a maximum review interval of 30 days. These settings were intended to ensure that previously learned material remained in circulation throughout the semester while preventing excessively frequent repetition.

**Figure 2: Screenshot of Anki using web and Apps**

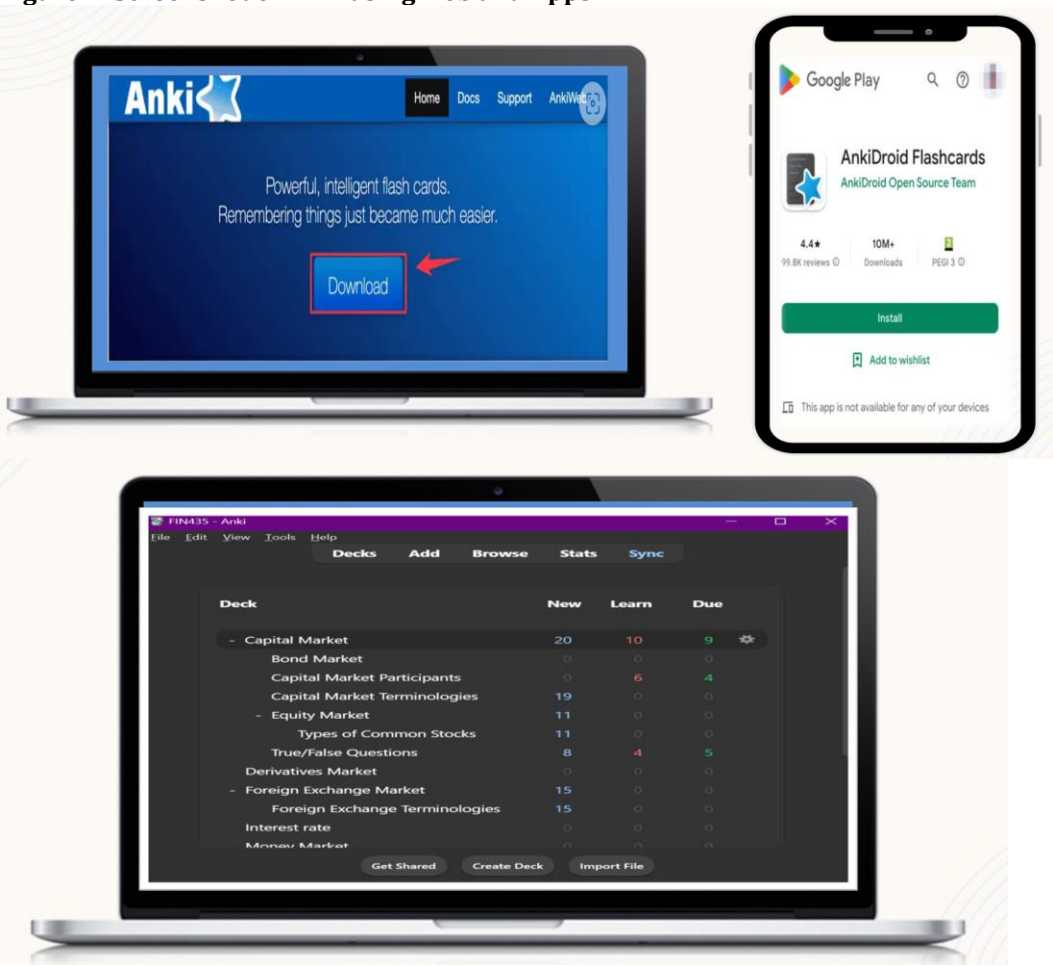


**Figure 3: Screenshot of contents**

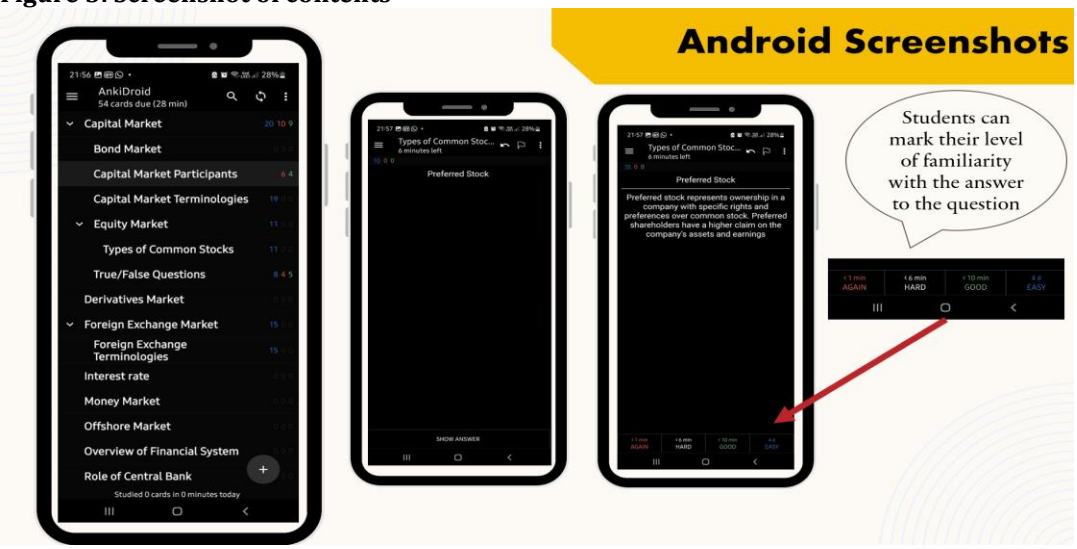



**Figure 4: Flashcard front-and-back interface with SRS response buttons.**




**Implementation Phase**

The application was incorporated directly into classroom teaching rather than being assigned solely as an independent learning activity. Upon completion of each topic, the instructor shared the relevant flashcard deck with students for immediate use. Students then participated in short retrieval-practice sessions during class, enabling instructors to monitor understanding, identify misconceptions, and provide clarification where necessary before introducing subsequent topics.

**Evaluation Phase**

As the primary focus of this study was the development of the application, the evaluation phase concentrated on formative validation to determine whether the content and system functions were suitable for wider use. Two forms of evaluation were undertaken. First, a panel of experienced finance academics reviewed the flashcards for consistency with the course syllabus and relevant regulatory requirements. Second, alpha testing was conducted on both Android and iOS devices to assess key system functions, including scheduling performance, card synchronization, and multiple-choice functionality.

The expert review panel consisted of three senior finance academics, each with more than ten years of teaching experience. The flashcards were evaluated using a four-point Likert scale covering relevance, accuracy, and clarity. Analysis of the ratings produced a Content Validity Index (CVI) of 0.92, exceeding the commonly accepted benchmark of 0.80. This result indicates a high level of agreement among the experts regarding the suitability of the flashcard content for the core learning outcomes of the FIN course.

## 4. Results

### System Architecture and Final Instructional Artifact

The primary outcome of this design and development study is a functional, multi-platform digital flashcard tool explicitly aligned with the FIN syllabus. Built upon the Anki engine, the master deck is structured to progress logically from broad capital market categories to detailed concept-level cards. In total, the deck comprises 95 flashcards, distributed across five core capital market modules as summarized in Table 3.

**Table 3: Structure and card distribution of the FIN master deck.**

| Target Sub-Deck Domain | Card Count (n) | Primary Pedagogical Focus |
|---|---|---|
| Money Market Terminologies | 15 | Intermediation processes and BNM macro-liquidity instruments |
| Bond Market Mechanics | 20 | Debt pricing, yield-to-maturity, and common structural misconceptions |
| Equity Market Operations | 19 | Common stock rights, equity issuance rules, and trading mechanics |
| Derivatives Market Dynamics | 13 | Hedging strategies, forward contracts, options terminology |
| Foreign Exchange Infrastructure | 28 | Exchange rate quotation, currency pairs, and regulatory compliance |

Each flashcard follows a front-and-back format tailored to address specific learning objectives. True/false prompts are strategically used to correct common misconceptions; for example, clarifying that bondholders possess a credit claim rather than an equity stake in the issuing company. Multiple-choice questions extend beyond mere recall by challenging students to analyze and compute real-world financial scenarios rather than simply recognizing definitions.

### Expert Validation and Formative Refinement

Prior to classroom deployment, the flashcard content and visual components underwent rigorous expert validation. Three subject-matter experts evaluated the materials using a standardized 4-point Likert scale questionnaire assessing relevance, structural accuracy, and conceptual clarity. The overall Content Validity Index (CVI) was 0.92, substantially exceeding the conventional academic threshold of 0.80, indicating strong alignment with the core FIN syllabus. Table 4 provides a detailed breakdown of validation scores by dimension.

**Table 4: Expert validation scores by dimension.**

| Expert Validation Dimension | Evaluative Focus | Score |
|---|---|---|
| Curricular Relevance | Alignment with FIN course learning outcomes | 0.96 |
| Structural Accuracy | Precision of terminology, formulas, and regulatory data | 0.91 |
| Conceptual Clarity | Readability of front-and-back layout and explanations | 0.89 |

Although the quantitative scores were high, qualitative feedback from the expert panel led to meaningful improvements. Reviewers noted that several money-market cards contained excessive text, potentially

increasing cognitive load. These cards were subsequently divided into smaller, more manageable units and supplemented with visual aids such as comparative equity charts leveraging dual-coding theory to support learning. Additionally, experts recommended that complex financial calculations include detailed, step-by-step solutions on the reverse side of each card, transforming them into self-contained diagnostic exercises rather than simple answer keys.

**System Log Metrics and Algorithmic Functionality**

Following the expert-driven content revisions, backend system logs were analyzed to verify that the Spaced Repetition System (SRS) scheduler operated as designed. The average card ease factor remained stable at approximately 250%, indicating that the flashcards were calibrated to an appropriate and balanced level of difficulty, avoiding extremes of being too easy or overly challenging.

The spacing of review intervals aligned with expectations: mastered terms gradually extended their review intervals toward the 30-day maximum, while cards identified as difficult were promptly re-queued within minutes. This behavior demonstrates that the scheduler effectively allocated study time, prioritizing material where students showed weaker recall and minimizing redundant reviews of already mastered content.

Overall, these log data patterns confirm that the tool functioned as intended, serving as a personalized review system that dynamically adapts to each student's recall performance, rather than enforcing a uniform study schedule for all learners.

**Discussion**

The design, development, and expert validation of the FIN flashcard tool demonstrate that employing a structured instructional framework like ADDIE can effectively transform dense, theory-heavy financial course material into a practical, student-centered learning resource. The high Content Validity Index (CVI) of 0.92 underscores that a deliberate, systematic design process rather than an ad hoc selection of content produces a tool closely aligned with formal course requirements. This finding reinforces prior research highlighting ADDIE's value in maintaining instructional accuracy when converting complex, information-rich subjects into digital learning environments (Basri et al., 2025).

The integration of a structured deck layout with diverse visual formats corroborates recent findings in gamified higher education design, which consistently show that combining game-like structural elements with visual, student-focused materials promotes active recall and mitigates the academic boredom prevalent in content-heavy courses (Gyedu et al., 2026). Notably, this effect is not limited to general educational contexts: in a directly comparable financial discipline, students who voluntarily engaged with a gamified self-testing app outperformed non-users on final exams, with gains tracking closely to the intensity and accuracy of their practice rather than mere tool access (Wuyts et al., 2026). This pattern emphasizes that the anticipated benefits of the FIN flashcard tool depend largely on consistent student engagement rather than novelty alone.

Supporting this, backend system logs provide technical evidence that automated SRS scheduling effectively addresses a major limitation of traditional study habits, which often rely on passive review and lack mechanisms to support durable retention. This aligns with foundational cognitive research demonstrating that repeated retrieval practice significantly enhances long-term recall compared to repeated rereading, even though rereading might feel subjectively more productive during study sessions (Roediger & Karpicke, 2006). Similar spaced repetition interventions in other rigorous technical subjects report comparable improvements, with learners using spaced review outperforming peers who exclusively engaged in massed, pre-exam cramming (Vagha et al., 2025). Collectively, these findings indicate that targeted, algorithm-driven review sharpens learner focus and reduces the cognitive overload that typically leads to disengagement.

At the same time, the effectiveness of retrieval-based strategies is not universal. Research on cognitively demanding material demonstrates that the benefits of testing over restudying can diminish or vanish when content is too dense to be cleanly segmented into manageable learning units (Redifer et al., 2026). This observation resonates with the expert panel feedback discussed in Section 4.2, where money-market cards identified as overly dense were subdivided into smaller, more digestible units, a revision that parallels recommendations from cognitive load theory literature.

Overall, this study confirms that the FIN flashcard tool is a structurally sound and content-valid instructional artifact. Its design decisions are well-grounded in established theories of retrieval practice, cognitive load management, and gamified motivation. These findings naturally lead to the next research phase, which will empirically investigate the tool's impact on student exam performance and motivation during a full-semester, live classroom implementation.

## 5. Conclusion, Limitations and Future Directions

### Conclusion

This study has documented the systematic design, development, and expert validation of a mobile-compatible digital flashcard tool tailored for the FIN course, using the ADDIE instructional design model. It illustrates an effective approach to translating dense, theory-intensive capital market content into an interactive, student-centered learning resource built on the open-source Anki platform. The primary contribution lies in offering a replicable process that integrates financial pedagogy with cognitive science principles, specifically organizing course material into targeted sub-decks augmented by an automated Spaced Repetition System (SRS). With a Content Validity Index (CVI) of 0.92 and stable backend system metrics, this tool demonstrates both conceptual soundness and technical reliability adequate to support active retrieval practice in a challenging academic context.

### Limitations

Several limitations should be acknowledged. First, the flashcard set is specifically scoped to introductory-to-intermediate FIN content and would require substantial adaptation to support more advanced or quantitatively intensive corporate finance courses. Second, the tool's effectiveness depends on learners having personal access to compatible mobile devices or laptops, making its utility contingent on hardware availability and basic digital literacy. Third, as a design-and-development study, this research focuses on expert content validation and technical functionality testing but does not yet provide empirical evidence on impacts to exam performance or long-term retention across an entire semester.

### Future Directions and Recommendations

Future research will involve a comprehensive empirical evaluation employing pre-test and post-test assessments to measure learning gains, alongside application of Keller's ARCS model to evaluate motivational changes during semester-long classroom use. Practically, subsequent versions could transition away from dependence on the Anki engine by developing a dedicated standalone native application. Finally, the ADDIE-guided design framework proven effective here could be expanded to other content-dense business subjects such as taxation, corporate governance, or auditing to establish an integrated, active-learning toolkit applicable across the broader curriculum.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Determinants of Capital Structure Decisions Among International Takaful Operators In Malaysia: Evidence From Panel Data Analysis

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**Abstract:** The capital structure decision remains an important issue in Shariah-compliant corporate finance, particularly for financial institutions whose regulatory requirements and risk-sharing structures differ from those of conventional corporations. Despite the development of Islamic finance, empirical evidence on the firm-specific determinants of leverage among foreign-owned international Takaful operators in Malaysia remains limited. This study examines the effects of firm age, firm size, liquidity, profitability, and company growth on capital structure using panel data from four foreign-owned international Takaful operators in Malaysia. Capital structure is proxied by the total-liabilities-to-total-assets ratio, which represents overall balance-sheet leverage rather than conventional interest-bearing debt alone. Audited annual financial statements were analysed using panel data regression with cluster-robust standard errors. The findings indicate that firm age, firm size, and liquidity are positively and statistically associated with leverage, whereas profitability and company growth show negative but statistically insignificant relationships. The results suggest that organizational maturity, scale, and liquidity are relevant to the liability structure of international Takaful operators, although the findings should be interpreted within the distinctive regulatory and Shariah-compliant characteristics of the industry. Overall, the evidence provides partial support for the Trade-off Theory and limited support for the Pecking Order Theory when these frameworks are adapted to the Takaful setting. The study contributes to the limited literature on capital structure in Islamic insurance and offers implications for the management of leverage, liquidity, and solvency within international Takaful operators.

**Keywords**: *Capital Structure, International Takaful, Islamic Finance, Leverage, Panel Data, Risk-Based Capital*

## 1. Introduction and Background

Capital structure has long occupied a central position in corporate finance because financing decisions directly influence a firm's cost of capital, financial flexibility, risk exposure, and long-term value creation. Since the seminal work of Modigliani and Miller (1958, 1963), researchers have extensively investigated how firms determine the optimal combination of debt and equity financing. Although subsequent theories, including the Trade-off Theory and Pecking Order Theory, provide alternative explanations for financing behavior, empirical findings remain inconsistent across industries, countries, and institutional environments. Such inconsistencies suggest that capital structure decisions are highly context-specific and shaped by both firm-level characteristics and the broader regulatory landscape. Capital structure also demonstrates how a company funds its overall operations and structural expansion, where debt can be a cost-effective financing mechanism that does not dilute ownership shares but increases the risk of financial distress (Neves et al., 2020; Amarasiri, 2019). The balance between these forces governs organizational survival and competitiveness (Malaysian Rating Corporation Berhad, 2010; Hussain et al., 2020).

For financial institutions, capital structure decisions are distinct from non-financial firms because they operate under strict regulatory capital adequacy and solvency requirements (DeAngelo and Stulz, 2015). Insurance and Takaful operators are highly leveraged by nature, relying heavily on technical reserves, policyholder liabilities, and solvency buffers to meet future claims. In Shariah-compliant finance, Takaful serves as an alternative to conventional insurance, grounded in cooperation (ta'awun) and shared responsibility. In this model,

participants contribute to a mutual fund to assist one another in times of financial distress. Unlike conventional insurers, Takaful operators must strictly adhere to Islamic principles that prohibit interest (riba), excessive uncertainty (gharar), and gambling (maysir). These guidelines restrict investment options to Shariah-compliant assets and forbid the use of conventional interest-bearing debt, fundamentally shaping how Takaful operators manage capital, leverage, and solvency buffers.

Malaysia has established itself as a leading global hub for Islamic finance through consistent regulatory reforms and comprehensive policy initiatives led by Bank Negara Malaysia (BNM). The development of the Malaysian Takaful sector has progressed through three strategic phases: Phase 1 (1984–1992) focused on establishing the regulatory foundations under the Takaful Act 1984 and forming the first Takaful operator; Phase 2 (1993–2000) fostered regional cooperation and retakaful (reinsurance) networks across ASEAN; and Phase 3 (2001–2010) enhanced operational capacities through the Financial Sector Masterplan (FSMP) and the establishment of the Malaysian Takaful Association (MTA) in 2002. Today, the industry operates under the rigorous guidelines of the Islamic Financial Services Act (IFSA) 2013 and BNM's Risk-Based Capital (RBC) Framework for Takaful Operators, which mandate strict capital adequacy ratios (CAR) to match risk-bearing exposures (Ibrahim et al., 2015; Zul Kepli, 2015).

To accelerate market penetration and encourage technology transfer, BNM approved the entry of foreign-owned international Takaful operators, including AIA PUBLIC Takaful Bhd, Great Eastern Takaful Berhad, Zurich General Takaful Malaysia Berhad, and Zurich Takaful Malaysia Berhad. These international Takaful operators operate under a dual institutional influence, balancing Malaysian regulatory expectations (like IFSA 2013 and RBC solvency requirements) with the corporate financial strategies and capital allocation policies of their foreign parent companies. Consequently, their financing decisions and capital structure adjustments may differ from those of domestic firms, offering a compelling subject for empirical investigation.

Despite the strategic importance of the Takaful sector, empirical studies on capital structure determinants within Islamic insurance remain scarce. Most existing studies focus on conventional insurance, listed industrial firms, manufacturing corporations, or commercial banks (Abdul Jamal et al., 2013; Najjar and Petrov, 2011). Comparative work on Shariah-compliant insurance in developing markets is particularly limited (Ismail, 2013). This study addresses this research gap by investigating the internal determinants of capital structure among all four foreign-owned international Takaful operators in Malaysia from 2016 to 2025. Specifically, we evaluate the effects of firm age, firm size, liquidity, profitability, and company growth on leverage. This research offers three primary contributions: first, it provides one of the earliest empirical studies focusing exclusively on international Takaful operators; second, it tests the validity of conventional finance theories (Trade-off, Pecking Order, and Agency Cost) within a highly regulated Shariah-compliant financial environment; and third, it provides practical insights for corporate managers, investors, and regulatory bodies in structuring sustainable capital frameworks.

## 2. Literature Review

Theoretical foundations of capital structure have been heavily explored across multiple sectors, but their applicability in Shariah-compliant financial institutions remains a subject of ongoing discussion. In finance literature, three dominant theories attempt to explain why firms select specific financing mixes: the Trade-off Theory and the Pecking Order Theory.

The Static Trade-off Theory, originating from Modigliani and Miller (1963) suggests that firms select an optimal capital structure by balancing the tax advantages of debt (interest tax shields) against the expected costs of financial distress and bankruptcy. In a financial institution context, larger and more diversified operators generally face lower default risks, enabling them to maintain higher leverage (DeAngelo and Stulz, 2015). For Takaful operators, although conventional interest-bearing debt is strictly prohibited, structural leverage exists in the form of policyholder technical reserves and Shariah-compliant financing instruments (such as Qard-ul-Hasan or Islamic subordinated debt) that function as regulatory capital buffers. Maintaining adequate capital is essential not only to maximize firm value but also to ensure solvency and operational resilience (Bouhedda and Soualhi, 2025; Lestari and Meldona, 2025).

The Pecking Order Theory, introduced by Myers and Majluf (1984), presents an alternative view based on information asymmetry between corporate insiders and external investors. According to this model, firms do not target a specific optimal debt ratio but follow a financing hierarchy: preferring internal funds (retained earnings) first, followed by external debt, and issuing equity only as a last resort. Highly profitable and highly liquid Takaful operators should consequently maintain lower leverage ratios because their internal cash-generation capabilities satisfy their operational and underwriting requirements, eliminating the need for external credit.

Although the Trade-off Theory and Pecking Order Theory were originally developed primarily in the context of conventional corporate financing, their application in the present study should be interpreted within the institutional characteristics of Takaful operators. In Takaful institutions, leverage does not arise predominantly from conventional interest-bearing borrowing because Shariah principles prohibit riba. Instead, a substantial proportion of liabilities comprises technical reserves, participants' funds, outstanding claims obligations, and other Shariah-compliant liabilities. Accordingly, this study does not interpret the total-liabilities-to-total-assets ratio as conventional debt in the strict sense. Rather, it is employed as a broad measure of balance-sheet leverage and the extent to which assets are supported by liabilities relative to shareholders' capital.

Within this setting, the Trade-off Theory remains relevant insofar as Takaful operators must balance the benefits of maintaining a larger liability-supported operational base against solvency, liquidity, and financial-distress risks. Similarly, the Pecking Order Theory provides a useful framework for examining whether firms with stronger internal financial resources, particularly greater profitability and liquidity, rely less on external or liability-based sources of financing. Therefore, these theories are applied as adapted analytical frameworks rather than as direct representations of conventional debt-financing behaviour. This Takaful-specific interpretation allows the study to examine whether established capital-structure relationships remain observable within a Shariah-compliant and highly regulated institutional environment.

**Firm Age and Capital Structure**

Firm age represents a common measure of reputation, organizational maturity, and institutional credibility. Mature firms generally benefit from established credit histories, long-standing banking relationships, and stable cash flows, which mitigate information asymmetry and allow easier access to debt-based financing. Accordingly, the Trade-off Theory suggests that mature firms can maintain higher leverage ratios because external creditors perceive them as lower risk. While some insurance-sector studies report a positive association between firm age and leverage (Bala and Abatcha, 2020), others document negative relationships, suggesting that mature insurance firms accumulate sufficient retained earnings over time, thereby reducing their reliance on external financing (Hassan, 2011; Rafiu et al., 2018; Naveed et al., 2010). Given these dynamics, we formulate our first hypothesis:

**H1:** Firm age has a positive and significant relationship with the capital structure of international Takaful operators.

**Firm Size and Capital Structure**

Firm size is widely recognized as a primary determinant of corporate capital structure. Larger financial institutions benefit from economies of scale, diversified investment portfolios, and robust asset bases, which reduce overall earnings volatility and default probabilities. Consequently, larger firms enjoy superior credit ratings and easier access to capital markets on highly favorable terms (Kumah-Ababio and Mensah, 2018; Nivorozhkin, 2004). This is consistent with the Trade-off Theory, which predicts that larger firms maintain higher debt levels. Empirical studies on insurance institutions consistently demonstrate a positive relationship between firm size and leverage (Çekrezi, 2015; Rafiu et al., 2018; Naveed et al., 2010). Based on these arguments, we establish our second hypothesis:

**H2:** Firm size has a positive and significant relationship with the capital structure of international Takaful operators.

**Liquidity and Capital Structure**

Liquidity measures a firm's capacity to settle short-term obligations using liquid assets. According to the Pecking Order Theory, highly liquid firms prefer utilizing internal cash reserves to support operational and underwriting requirements, suggesting a negative association between liquidity and leverage. Conversely,

highly liquid firms can access debt-based liabilities more easily because creditors perceive them as financially healthy and capable of meeting contractual payments (Myers and Rajan, 1998). Empirical insurance literature has reported mixed results, with some authors finding an inverse relationship (Najjar and Petrov, 2011; Abdul Jamal et al., 2013), and others documenting a positive relationship (Çekrezi, 2015). To test these theoretical perspectives, we propose:
**H3:** Liquidity has a negative relationship with the capital structure of international Takaful operators.

**Profitability and Capital Structure**
The association between profitability and capital structure remains a central debate in corporate finance. The Static Trade-off Theory suggests that highly profitable firms use more debt to exploit interest-induced tax shields. Conversely, the Pecking Order Theory predicts that profitable firms rely primarily on internally generated profits (retained earnings) to finance operations, resulting in lower leverage ratios. Most empirical insurance studies support the Pecking Order Theory, confirming that profitable operators rely less on external credit (Naveed et al., 2010; Aremu et al., 2013; Abdul Jamal et al., 2013). Thus, we hypothesize:
**H4:** Profitability has a negative relationship with the capital structure of international Takaful operators.

**Company Growth and Capital Structure**
Rapidly growing firms require significant financial resources to support business expansion and underwriting activities. When internal cash generation is insufficient to cover these capital needs, growing firms are forced to seek external liability financing, leading to higher leverage (Hassan, 2011; Bala and Abatcha, 2020). However, Trade-Off Theory suggests that growing firms may face higher financing costs because creditors worry that managers might pursue high-risk, speculative expansion projects, leading to higher interest rates and lower leverage (Rafiu et al., 2018; Aremu et al., 2013). Given these competing theories, we formulate our fifth hypothesis:
**H5:** Company growth has a positive relationship with the capital structure of international Takaful operators.

## 3. Research Methodology

This study investigates the internal determinants of capital structure among international Takaful operators operating in Malaysia. To test the empirical validity of capital structure theories, we construct a rigorous econometric framework mapping the relationships between firm characteristics and structural leverage.

**Theoretical Framework and Variable Selection**
The dependent variable is capital structure, proxied by the leverage ratio (LEV), measured as Total Liabilities divided by Total Assets. In the context of Takaful operators, total liabilities include technical reserves, participants' and policyholder-related liabilities, claims obligations, and other Shariah-compliant liabilities. Therefore, LEV represents overall balance-sheet leverage rather than conventional interest-bearing debt alone. The independent variables include: Firm Age (AGE), measured as the actual years since incorporation; Firm Size (SIZE), represented by Total Assets in Ringgit Malaysia (RM); Liquidity (LIQ), measured by the Current Ratio (Current Assets over Current Liabilities); Profitability (PROF), measured as Return on Assets (ROA, Net Income over Average Total Assets); and Company Growth (GROW), calculated as the percentage change in net total assets from the previous year. Table 1 summarizes the variable definitions and measurements.

**Table 1: Summary of Variable Measurement and Definitions**

| Variable | Unit of Measurement | Measurement / Proxy |
|---|---|---|
| Capital Structure (DR) [DV] | Percentage (%) | Total Liabilities / Total Assets |
| Firm Age (AGE) [IV] | Years | Actual Number of Years since Incorporation |
| Firm Size (SIZE) [IV] | RM (Currency) | Total Assets |
| Liquidity (LIQ) [IV] | Times (Ratio) | Current Ratio = Current Assets / Current Liabilities |
| Profitability (PROF) [IV] | Percentage (%) | Return on Assets = Net Income / Average Total Assets |
| Company Growth (GROW) [IV] | Percentage (%) | % Increase in Net Total Assets = (Total Assets_t - Total Assets_t-1) / Total Assets_t-1 |

Table 2 outlines the formulated hypotheses, including the expected signs of the coefficients and their supporting capital structure theories.

**Table 2: Theoretical Expectations and Direction of Variables**

| Independent Variable | Expected Direction | Supporting Theory |
|---|---|---|
| Firm Age (AGE) | Positive (+) | Trade-off Theory / Reputation Framework |
| Firm Size (SIZE) | Positive (+) | Trade-off Theory / Scale Diversification |
| Liquidity (LIQ) | Negative (-) | Pecking Order Theory / Cash Sufficiency |
| Profitability (PROF) | Negative (-) | Pecking Order Theory / Internal Financing |
| Company Growth (GROW) | Positive (+) | Pecking Order Theory / Reinvestment Pressures |

**Sample Selection and Data Source**

The target population comprises all foreign-owned international Takaful operators licensed by Bank Negara Malaysia (BNM). These include AIA PUBLIC Takaful Bhd, Great Eastern Takaful Berhad, Zurich General Takaful Malaysia Berhad, and Zurich Takaful Malaysia Berhad. Secondary financial data were hand-collected from the audited annual reports and financial statements of each company spanning the ten years from 2016 to 2025. The final sample consists of N = 40 firm-year observations. Although the sample is relatively small due to the limited number of international Takaful operators in Malaysia, it represents the complete population of foreign-owned international Takaful operators licensed by Bank Negara Malaysia during the study period.

**Model Specification**

To analyze the impact of firm-level characteristics on the capital structure of international Takaful operators, we formulate the following panel regression equation:

$$DR_it = \beta_0 + \beta_1(AGE)_it + \beta_2(SIZE)_it + \beta_3(LIQ)_it + \beta_4(PROF)_it + \beta_5(GROW)_it + e_it$$

where DR_it represents the Debt Ratio of company i at time t; AGE_it is the log of company years since incorporation; SIZE_it represents firm size; LIQ_it is liquidity; PROF_it is profitability; GROW_it is company growth; β_0 is the constant intercept; β_1 through β_5 represent regression coefficients; and e_it is the classical error term.

**Estimation Strategy and Model Selection**

We evaluate three fundamental panel data techniques: Pooled Ordinary Least Squares (POLS), the Fixed Effects Model (FEM), and the Random Effects Model (REM). Model selection is governed by formal diagnostic tests: the F-Chow test determines if individual-specific effects are present (POLS vs. FEM), and the Breusch-Pagan Lagrange Multiplier (BPLM) test checks for random individual effects (POLS vs. REM). If both tests favor alternative models over POLS, the Hausman specification test is conducted to choose between FEM and REM.
Additionally, we conduct post-estimation diagnostic tests on the panel structure to check for classical linear regression violations. Groupwise heteroskedasticity is assessed using the Modified Wald test, and first-order autocorrelation is evaluated using the Wooldridge test. Standard panel models may yield biased and inefficient standard errors in the presence of these violations. To resolve these econometric biases, we implement panel-level OLS with cluster-robust standard errors adjusted at the company level, ensuring that hypothesis tests are valid and coefficients are statistically robust.

## 4. Results

This section presents the empirical findings derived from the panel data analysis. We begin with descriptive characterizations, examine correlation patterns and diagnostic specifications, and close with the formal panel regression estimates.

**Descriptive Statistics**

Descriptive statistics for the dependent and independent variables are compiled in Table 3. The average leverage (DR) of international Takaful operators in Malaysia is 79.73% (median of 85.20%), which indicates a substantial reliance on leverage (underwriting technical reserves and policyholder funds), with equity capital representing the remaining 20.27%. The average company age (AGE) is 5.83 years since incorporation, reflecting a relatively young and rapidly growing industry. The average asset size (SIZE) is RM764,097.76, and average liquidity (LIQ) is 1.60 times, showing comfortable coverage margins. Profitability (PROF) records a mean value of 0.036 and a median of -0.0120, indicating relatively low profitability among the sampled Takaful operators, particularly during their early years of operation. Finally, growth (GROW) has an average annual rate of 27.31%, reflecting rapid structural expansion.

**Table 3: Summary of Descriptive Statistics (N = 40)**

| Variables | N | Min | Mean | Max | Median | Std. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| DR (%) | 40 | 0.3300 | 0.7973 | 0.9620 | 0.8520 | 0.1442 | -1.6286 | 5.2985 |
| AGE (Yr) | 40 | 1.0000 | 5.8276 | 13.000 | 6.0000 | 3.3495 | 0.3324 | 2.3004 |
| SIZE (RM) | 40 | 120,990 | 764,098 | 1,788,074 | 703,160 | 434,039 | 0.5025 | 2.7043 |
| LIQ (times) | 40 | 0.1260 | 1.6030 | 3.4300 | 2.0260 | 1.0886 | 0.0313 | 1.5629 |
| PROF (%) | 40 | -0.3130 | 0.0036 | 0.6670 | -0.0120 | 0.1419 | 3.2904 | 18.585 |
| GROW (%) | 40 | -0.7100 | 0.2731 | 1.0000 | 0.2200 | 0.3238 | 0.1966 | 6.0189 |

**Correlation Analysis**

Table 4 provides the Pearson correlation matrix. There is a strong, positive, statistically significant linear correlation between leverage (DR) and firm age (66.61%, $p < 0.01$), as well as between DR and firm size (62.58%, $p < 0.01$). Liquidity exhibits a modest positive correlation with leverage (19.70%), whereas profitability (-0.31%) and company growth (-38.81%, $p < 0.05$) are negatively correlated with leverage. Preliminary evidence suggests that leverage is associated with firm age and firm size, while the relationships with liquidity, profitability, and growth require confirmation through multivariate regression analysis.

**Table 4: Summary of Pearson Correlation Coefficients**

| Variables | DR | AGE | SIZE | LIQ | PROF | GROW |
|---|---|---|---|---|---|---|
| DR | 1.0000 | | | | | |
| AGE | 0.6661*** | 1.0000 | | | | |
| SIZE | 0.6258*** | 0.6302*** | 1.0000 | | | |
| LIQ | 0.1970 | -0.2874 | -0.0924 | 1.0000 | | |
| PROF | -0.0031 | -0.1265 | -0.0549 | 0.2625 | 1.0000 | |
| GROW | -0.3881** | -0.5982*** | -0.1786 | 0.1401 | -0.1018 | 1.0000 |

*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

**Econometric Diagnostics and Model Selection**

To rule out severe multicollinearity, the Variance Inflation Factor (VIF) is evaluated (Table 5). The individual VIF values range from 1.14 to 3.13, with a mean VIF of 1.84. Since these are well below the conservative threshold of 5.0, multicollinearity does not pose a problem for the regression model.

**Table 5: Variance Inflation Factor (VIF) Analysis (Mean VIF = 1.84)**

| Variables | VIF | 1/VIF (Tolerance) |
|---|---|---|
| Firm Age (AGE) | 3.13 | 0.3193 |
| Firm Size (SIZE) | 1.90 | 0.5273 |
| Company Growth (GROW) | 1.85 | 0.5414 |
| Liquidity (LIQ) | 1.17 | 0.8533 |
| Profitability (PROF) | 1.14 | 0.8774 |

To identify the optimal panel estimator, we run the F-Chow and Breusch-Pagan LM tests. The F-Chow test result ($F(3, 20) = 2.16$, $p = 0.1246$) fails to reject the null hypothesis of equal intercepts, indicating that Pooled OLS is preferred over the Fixed Effects Model. Similarly, the BPLM test for random effects yields a chi-bar-square statistic of 0.00 ($p = 1.0000$), supporting Pooled OLS over the Random Effects Model. Consequently, the Pooled OLS model was selected as the appropriate baseline estimator for subsequent analysis. Post-estimation diagnostics are summarized in Table 6. The Modified Wald test rejects the homoskedasticity null hypothesis ($p < 0.001$), and the Wooldridge test rejects the no-autocorrelation null ($p < 0.001$). To resolve these groupwise heteroskedasticity and first-order autocorrelation issues, we run Pooled OLS with cluster-robust standard errors adjusted at the company level (4 clusters).

**Table 6: Summary of Model Specification and Diagnostic Tests**

| Diagnostic Test | Null Hypothesis (H0) | Statistic | p-value / Decision |
|---|---|---|---|
| F-Chow Test | POLS is superior to Fixed Effects | F(3, 20) = 2.16 | 0.1246 / Prefer POLS |
| Breusch-Pagan LM | POLS is superior to Random Effects | chi2(1) = 0.00 | 1.0000 / Prefer POLS |
| Modified Wald Test | Homoskedastic residuals | chi2(4) = 2.1e+30 | 0.0000 / Heteroskedasticity present |
| Wooldridge Test | No first-order autocorrelation | F(1, 2) = 2007.33 | 0.0005 / Autocorrelation present |

**Panel Regression Estimates**

Table 7 presents the regression estimates for both the standard Pooled OLS model and the final model using cluster-robust standard errors. The R-squared value of 0.6586 indicates that the selected firm-specific variables explain approximately 65.86% of the variation in capital structure among international Takaful operators.

**Table 7: Pooled OLS Regression with Cluster-Robust Standard Errors**

| Variables | OLS Coef. | Robust Std. Err. | t-statistic | p-value | Conclusion |
|---|---|---|---|---|---|
| Firm Age (AGE) | 0.0234 | 0.0046 | 5.11 | 0.015** | Significant positive |
| Firm Size (SIZE) | 1.02e-07 | 3.51e-08 | 2.90 | 0.063* | Significant positive |
| Liquidity (LIQ) | 0.0528 | 0.0148 | 3.56 | 0.038** | Significant positive |
| Profitability (PROF) | -0.0294 | 0.2057 | -0.14 | 0.896 | Insignificant negative |
| Company Growth (GROW) | -0.0297 | 0.0780 | -0.38 | 0.729 | Insignificant negative |
| Constant (_cons) | 0.5066 | 0.0282 | 17.95 | 0.000*** | Significant positive |

*Note: R-squared = 0.6586, Adj R-squared = 0.5844. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.1*

## Discussion

The econometric results provide valuable insights into the applicability of corporate finance theories within Malaysia's international Takaful sector. Out of the five independent variables examined, firm age, firm size, and liquidity are positive and statistically significant determinants of capital structure, whereas profitability and growth exhibit negative and statistically insignificant relationships.

### Theoretical Alignment of Firm Age: The Reputation Shield

The regression analysis reveals a positive and statistically significant relationship between firm age (AGE) and the debt ratio (beta = 0.0234, p = 0.015). This finding indicates that as international Takaful operators mature, their leverage ratios increase. This finding is consistent with the predictions of the Static Trade-off Theory's reputation framework. Over years of operation, mature Takaful firms establish a strong brand name, stable underwriting portfolios, and creditworthiness. Lenders and underwriting participants are more willing to provide capital and participate in funds managed by mature operators because they possess a proven track record of timely commitments and claims settlement. This reputation shield reduces information asymmetry and financing costs, allowing mature operators to safely maintain higher leverage ratios. This positive effect is consistent with the empirical findings of Bala and Abatcha (2020) and Naveed et al. (2010), but contradicts the negative relationships reported by Hassan (2011) and Rafiu et al. (2018) for conventional insurance in other emerging markets.

### The Role of Firm Size: Economies of Scale and Solvency Comfort

Firm size (SIZE) is positively related to the debt ratio (beta = 1.02e-07, p = 0.063), and is statistically significant at the 10% level. Larger international Takaful operators rely more on debt-based liabilities (policyholder technical reserves and Shariah-compliant funds) than smaller operators. In corporate finance, larger assets reflect economies of scale, stronger risk diversification across multiple product lines (such as family and general Takaful), and lower overall cash flow volatility. Larger operators are generally perceived as financially stronger by market participants and regulators, enabling them to sustain higher leverage ratios. This market optimism allows larger operators to secure credit easily on competitive terms, enabling them to expand technical reserves without triggering solvency warnings. Conversely, smaller Takaful operators tend to maintain lower leverage ratios to protect themselves against bankruptcy or sudden liquidation under Malaysia's Risk-Based Capital framework. This result supports the predictions of the Static Trade-off Theory and matches the empirical findings of Kumah-Ababio and Mensah (2018), Bala and Abatcha (2020), Çekrezi (2015), Rafiu et al. (2018), and Naveed et al. (2010).

### Deciphering the Positive Effect of Liquidity: A Credibility Perspective

Liquidity (LIQ) exhibits a positive and statistically significant relationship with the debt ratio (beta = 0.0528, p = 0.038). This finding does not support Hypothesis 3, which was developed based on the Pecking Order Theory. The positive coefficient suggests that liquidity serves as a signal of financial strength and enhances creditors' confidence, allowing international Takaful operators to maintain higher leverage. Instead, in the context of Malaysian international Takaful operators, high liquidity acts as a signal of financial strength and solvency credibility. Operators with robust current assets find it easier to attract participants' risk funds and secure external financing because creditors and underwriting participants know the firm has sufficient operating cash flow to cover liabilities, claim payouts, and structural costs. This positive relationship is consistent with the empirical work of Çekrezi (2015) in Albania but rejects the negative patterns reported by Najjar and Petrov (2011) in Bahrain and Abdul Jamal et al. (2013) in Malaysia's non-financial sector.

### The Insignificance of Profitability and Growth: Inelastic Demand for Technical Reserves

Profitability (PROF) has a negative but statistically insignificant relationship with the debt ratio (beta = -0.0294, p = 0.896). Although the coefficient is negative, the effect is statistically insignificant. Hence, profitability does not appear to influence leverage decisions among international Takaful operators. The statistical insignificance suggests that Takaful leverage, which consists primarily of technical reserves and policyholder funds, is influenced more by market demand, regulatory solvency margins, and parental financial strategies than by immediate corporate profitability. This matches the findings of Naveed et al. (2010), Aremu et al. (2013), and Abdul Jamal et al. (2013), but differs from the positive relationships documented by Hassan (2011) and Najjar and Petrov (2011).

Similarly, company growth (GROW) exhibits a negative and statistically insignificant relationship with the debt ratio (beta = -0.0297, p = 0.729). Although the estimated coefficient is negative, the relationship is statistically insignificant. Therefore, Hypothesis 5 is not supported, and no conclusive evidence can be drawn regarding the influence of company growth on capital structure. Nevertheless, the negative coefficient may suggest that expanding international Takaful operators rely more on capital injections from parent companies or retained earnings than on additional liabilities. This interpretation is consistent with the findings of Aremu et al. (2013) and Najjar and Petrov (2011), although the lack of statistical significance indicates that this relationship should be interpreted cautiously.

## 5. Managerial Implications and Recommendations

### Managerial Implications and Recommendations

The findings provide several implications for managers and regulators of international Takaful operators, although these implications should be interpreted in light of the study's small sample and the distinctive liability structure of Takaful institutions. In particular, the results should not be interpreted as prescribing an optimal level of leverage but rather as identifying firm characteristics that are associated with differences in balance-sheet leverage.

### Firm Maturity and Size

The positive and statistically significant relationships between firm age, firm size, and leverage suggest that more established and larger international Takaful operators tend to maintain higher levels of liabilities relative to their assets. This may reflect greater operational maturity, broader underwriting activities, stronger market presence, and the capacity of larger institutions to support larger technical reserves and participant-related liabilities. Managers should therefore consider capital and solvency planning in relation to the operator's stage of development and scale of operations rather than applying a uniform leverage policy across Takaful institutions.

### Liquidity and Leverage

Liquidity is also positively and significantly associated with leverage. This finding suggests that operators with stronger short-term financial capacity are able to support higher levels of liability-based operations. From a managerial perspective, liquidity should therefore be considered together with leverage and solvency rather than viewed solely as a substitute for external financing. Maintaining appropriate liquid-asset buffers remains important for meeting claims and other short-term obligations, particularly where higher leverage reflects greater technical and participant-related liabilities.

### Regulatory Implications

For regulators, the findings reinforce the importance of assessing leverage within the specific institutional structure of Takaful. Because a substantial component of total liabilities represents technical reserves, claims obligations, and participant-related funds rather than conventional borrowing, leverage ratios should be interpreted together with liquidity, solvency, and capital-adequacy indicators. The results therefore support continued integrated monitoring of these dimensions under Malaysia's prudential framework rather than the use of leverage measures in isolation.

### Conclusion

This study examined the firm-specific determinants of capital structure among foreign-owned international Takaful operators in Malaysia. Capital structure was proxied by the total-liabilities-to-total-assets ratio and therefore represents broad balance-sheet leverage, including technical reserves and participant-related liabilities, rather than conventional interest-bearing debt alone. The empirical analysis indicates positive and statistically significant associations between leverage and firm age, firm size, and liquidity, while profitability and company growth are negatively but statistically insignificant associated with leverage.

These findings provide partial evidence consistent with the Trade-off Theory when adapted to the institutional characteristics of Takaful operators. In particular, more mature, larger, and more liquid operators appear to be associated with higher leverage levels. However, these relationships should not be interpreted as evidence that higher leverage is necessarily optimal or that these firm characteristics directly cause greater leverage.

Similarly, the statistically insignificant coefficients for profitability and growth provide only limited evidence in relation to the Pecking Order Theory.

The findings should be interpreted cautiously because the study covers only four foreign-owned international Takaful operators. Although these firms represent the population defined for the study, the small number of cross-sectional units limits the generalizability of the findings and introduces uncertainty into statistical inference. The use of cluster-robust standard errors with only four firm clusters also warrants caution when interpreting significance levels. Consequently, the results are best regarded as evidence specific to this highly specialized segment of the Malaysian Takaful industry rather than as conclusions applicable to the entire Takaful sector.

Future studies could extend the analysis to domestic Takaful operators, incorporate a larger number of firm-year observations, and compare foreign-owned and locally owned operators. Further research could also distinguish between different categories of liabilities, including technical reserves, participant-related liabilities, and Shariah-compliant financing, to provide a more refined understanding of capital structure in Takaful institutions.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Adapting Porter's Five Forces for International Competitiveness: Strategies for International Business

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**Abstract:** This paper explores the complexities of the global business environment and its effect on international competitive advantage in a world that is characterized by volatility, uncertainty, complexity, and ambiguity (VUCA). It highlights the critical role of competition in shaping the most effective international business strategies and how to sustain competitive advantage in the global marketplace. The study explores the importance of analyzing foreign market environments, particularly from an industry perspective, by using Michael Porter's Five Forces framework for international settings. Porter's Five Forces framework has been widely used to analyze industry competition; however, studies related to the impact of competitive pressures on firms' ability to maintain international competitive advantage remain under-explored. This research underscores the necessity of understanding the relationship between competitive forces and international competitiveness to enable firms to effectively strategize and sustain performance in global markets.

**Keywords**: *International Competitive Advantage, Rivalry among Competing Firms, Bargaining Power of Suppliers, Bargaining Power of Buyers, Threat of Substitute Products, Threat of New Entrants*

## 1. Introduction and Background

The business environment in the global economy is vulnerable, uncertain, competitive, and extremely ambiguous (VUCA) in nature (Bennett & Lemoine, 2014). Businesses nowadays operate in a complex global environment, characterized by rapid product life cycles, disruption in technological development, changes in consumer lifestyles, and pressure from competition in the global market (Schilke et al., 2018; Teece, 2014). In this VUCA environment, competition at the global level is the key enabler and determinant of activities in international business. The greatest challenge for international companies is to strategize for the attainment and sustaining of competitive advantage (Barney, 1991). Competitive advantage is the ability of an international firm to attain greater performance than its competitors in multi-market competition.

To develop strategic business activities, businesses need to analyze the environments of foreign countries in an effort to align their activities with external market conditions (Ghemawat, 2001). The primary strategic analytical tool to assess these environments is Michael Porter's Five Forces framework (Porter, 2008). This framework maps an industry-based view through five distinct forces: competitive rivalry among existing competitors, threat of new entrants, threat of substitute products, bargaining power of buyers, and bargaining power of suppliers (Porter, 1979: 2008). In an international setting, these five forces are not stagnant. The forces that greatly affect the dynamic nature are shaped by geographical distance, regulatory policies, differences in culture, and complexity and variation in competitors' personalities (Peng et al., 2008; Ghemawat, 2001). Thus, international competitiveness is directly determined by the firm's ability to respond strategically to these five forces in the international market (Peng et al., 2008; Porter, 1986).

While Porter's Five Forces framework has been widely used to analyze industry competition, little attention has been given to the effect of competitive pressure on the ability of international firms to develop and sustain international competitive advantage. Failure to respond effectively to strategic competitive forces can decrease market share, decrease profitability, and finally weaken the firm's sustainability in the international market. Hence, the relationship between competitive forces and international competitive advantage in internationally operated firms needs to be examined. Understanding the relationship between industry competition and international competitiveness is important to help firms compete effectively in the global markets.

## 2. Literature Review

**International Competitive Advantage:** As firms increasingly compete in complex, interconnected, and rapidly changing global markets, the quest for international competitive advantage remains a central theme in international business research. International competitive advantage explains the capacity of a firm to achieve superior performance over its international rivals by developing and utilizing valuable resources, unique capabilities, and strategic positions, which lead to the creation of more customer value and sustainable economic returns (Peng et al., 2008; Teece et al., 1997; Barney, 1991; Porter, 1985). International competitiveness is referred to as the systemic capability of a firm to deliver superior performance and maintain market share in the evolving global competition (Kumar & Chadee, 2024). In international business, international competitive advantage is defined as a business's ability to attain above-average return relative to competitors on a global scale (Barney, 1991; Porter, 1998). International competitiveness is fundamentally dynamic and driven by its capacity to localize strategic rivalry, foster a productive ecosystem and drive innovation (Abdelkawy, 2026; Vu & Pham, 2016). Therefore, firms expanding abroad must create and sustain a competitive position in increasingly competitive global industries (Tasheva & Nielsen, 2022; Verbeke & Kano, 2021).

Sustainable competitive advantage is the basis for executing successful value creation activities in the foreign market, as it principally directs the effective measures for foreign market complexities and cross-border expansion (Alharbi, 2026; Porter, 1985). International business activities are inherently characterized by the liability of foreignness, including host country regulations, intense local and global competitors, and different governance and customer expectations (Liu, 2025). Within a highly competitive international environment, a well-established competitive advantage allows a firm to exploit its unique organizational resources and capabilities to create superior value that is hard for foreign competitors to imitate (West et al., 2026; Chen et al., 2022). Hence, distinctive competitive advantage is important to empower international business firms to mitigate risk in the foreign market and to successfully achieve above-average returns (McKee, 2026; West et al., 2026).

Achieving international competitive advantage is complicated as international businesses face unique institutional, market, cultural, and competitive conditions in various countries (Yang, 2026). International businesses encounter stiff and aggressive competition in the foreign market due to evolving consumers' tastes and preferences, the threat of new entrants, and substitute products (Kusumah, 2026; Müller, 2026). Additionally, hyper-globalization, rapid technological development, and the structural complexity of cross-border competition have led to an escalation in the importance of international competitive advantage (Moraga, 2026; Toksoy, 2026). Apparently, firms that develop dynamic competitive advantages are more capable of penetrating the international market and enjoy a sustainable market position, coping efficiently with unexpected threats, and eventually achieving superior performance (Alharbi, 2026). The determinant of long-term survival depends on the capability of understanding the competitive forces in the foreign market (Gafni, 2026; Porter, 1985).

Research indicates that firms' ability to withstand aggressive competitive intensity is a valuable asset that strategically enhances brand equity and investors' confidence level (Dukhaykh & Alangri, 2026). The necessity of multinational firms to consistently appraise competitive settings is crucial since the decision related to entry strategy and sustainable performance depends on the firm's capability to understand competitors' strategic moves (Yao et al., 2024). Hence, understanding and responding to competitive forces has become a key indicator in international accomplishment. The recent finding suggests that global competition has become more intense and dynamic. Businesses need to understand their direct rivals and other global industry forces that determine profitability and the recognition of new opportunities in foreign markets (Verbeke & Kano, 2015).

Despite the recent development in research related to competitive advantage, understanding how to sustain competitive advantage at the global level remains a significant research focus. Although existing studies have observed multiple dimensions of competitive advantage, the five forces perspective remains particularly vital because it explains the extent to which external industry conditions influence a strategic choice and a firm's performance outcome. Therefore, examining international competitive advantage through Porter's Five Forces

Framework provides valuable insights into how firms analyse competitive environments, develop appropriate strategies, and sustain superior positions in global markets.

**Porter's Five Forces Framework:** The foundation that governs Porter's Five Forces Framework is the industrial organization (IO) approach (Bruijil, 2018; Porter, 1981). This theory served as an underpinning theory for the establishment of a competitive strategy that guides firms on how to evaluate competitive forces. Porter (1981) argued that a firm's achievement is greatly affected by the industrial setting in which the company operates. From the Five Forces Framework, businesses must understand the competition level, the bargaining power of the buyer and supplier, threats of substitutes, and threats of new entrants before developing effective strategies in any market. This approach focuses on an outside-in perspective that focuses on responding to five competitive forces, including responding to the rivals' moves, customers, suppliers, substitute items, and possible new entrants for value creation in international business activities (Asseraf et al., 2019). From this context, it explains why some business players are more gainful than others and how the business players can position themselves strategically to attain an international competitive advantage.

The expansion of business activities globally has resulted in intensified competition faced by international firms. In the current era of globalization, firms often experience a difficult situation in sustaining their competitive advantage in the global context. Technological developments, changes in market preferences, ease of access to information, and various disruptive innovations are challenges that must be faced by every business player (Ningsih et al., 2025). Competitive advantage demonstrates a firm's capability in mitigating the rivalry forces, bargaining power of suppliers and buyers, threat of foreign entry, and substitute products (Brujil, 2026). Hence, the focus on Porter's Five Forces Framework is due to its significance as one of the most influential explanations of how firms develop international competitive advantage through industry analysis and shape the attractiveness of the industry.

Studies show that the Five Forces Framework remains important in contemporary international business research. The competitive forces are explained as determinants that significantly influence competitive advantage and organizational performance (Baird et al., 2024). From this finding, it can be concluded that businesses that systematically analyze industry pressures are in a better state to design a strategy that improves business performance. Dynamic interaction between international business players remains a critical issue in international business since businesses are continuously responding to competitors' moves and changes in the industry structure (Yao et al., 2024).

**Rivalry among competitors:** The level of competitive contestation within an industry is referred to as rivalry among current competitors. It is typified by tactical strategies like aggressive marketing campaigns, price reductions, ongoing product innovation, and improvements in customer service with the goal of gaining market share (Porter, 1980, 1985). As international firms navigate hypercompetitive global landscapes, divergent regulatory regimes, and varying national competitive dynamics across diverse geographic markets, competitive rivalry extends well beyond domestic boundaries from an international business perspective (Mosina, 2026; Verbeke & Hutzschenreuter, 2021).

The fear of substitution intensifies competitive struggle in these contested cross-border situations, directly determining an international firm's capacity to extract economic value and preserve an international competitive edge. Based on the economics of the Industrial Organization (IO) theory, the existence of substitute products imposes a rigid artificial ceiling on the prices that an industry can command, intensifying market competition and reducing profit margins unless businesses develop strong counter-differentiation strategies (Mosina, 2026; Porter, 1980). Because host markets sometimes provide low-cost regional substitutes that avoid standardised global product offerings, alternative local technologies, or changing consumer behaviours, international firms are more vulnerable to substitution concerns (Chen et al., 2026; Verbeke & Hutzschenreuter, 2021).

To mitigate competitive rivalry fueled by cross-border substitution, contemporary strategy literature emphasizes the deployment of dynamic internationalization capabilities, cross-border strategic alliances, and relational governance mechanisms (Peng, 2025; Valbuena-Hernandez & Ortiz-de-Mandojana, 2026). Rather than engaging in defensive price wars that degrade international margins, international firms respond through

digital business model adaptation and co-developed, context-specific solutions with local network partners (Chen et al., 2026; Peng, 2025). By transforming standard global offerings into high-value, locally tailored solutions embedded with high institutional switching costs, firms neutralize substitute threats, insulate themselves from destructive price rivalry, and secure a sustainable international market position (Chen et al., 2026; Valbuena-Hernandez & Ortiz-de-Mandojana, 2026).

Intense local competition considerably reduces a firm's export performance and foreign revenue growth, according to an empirical study assessing cross-border marketplaces (Iriyama et al., 2016). Businesses must devote significant resources to price reduction, frequent marketing campaigns, and ongoing product customisation in highly competitive situations in order to protect their local and regional market shares (Mosina, 2026; Porter, 1980). According to Chen et al. (2026) and Ozturk Kose (2023), this fierce competition for market share severely depletes operating cash flows, limits the deployment of R&D capital for cross-border expansion, and erodes the price-cost margins necessary to create sustainable worldwide distribution networks. Moreover, escalating foreign competitive rivalry in host markets actively compresses profit margins and increases customer churn, particularly when entering price-sensitive international sectors (Nuruzzaman et al., 2019). Intense competitive rivalry directly erodes the profitability, financial flexibility, and price competitiveness of the firm in the global marketplace. Since rivalry among competitors can directly dictate the international performance and strategic positioning of a firm, it is proposed that intense competitive rivalry among competitors has a significant impact on the international competitive advantage of the company

**Proposition 1:** Rivalry among existing competitors is a significant competitive force in determining international competitive advantage.

**Bargaining power of suppliers:** The bargaining power of suppliers explains the extent to which suppliers of raw materials, components, or services hold power over the industry or companies (Porter, 1979, 2008). In situations where the bargaining power of the supplier is high, the supplier can raise the price of supplies, determine the quality and availability of supplies, and directly reduce the profit margin of the buying company (Porter, 2008). On the other hand, when the bargaining power of the supplier is low, the buyer enjoys greater flexibility to switch to another supplier, negotiate favourable terms, and enjoy greater profit. Understanding this competitive force is critical for any business to attain targeted profitability and determine long-term competitive strategy (Porter, 2008).

For international business players, cross-border transactions involve complex value chain activities where logistics costs and economic interdependencies significantly affect the bargaining power of foreign suppliers (Stiller, 2023; Takele & Tveter, 2025). The complexity of the VUCA world navigates international business players through rapid inflation, geopolitical issues, and unexpected geopolitical disruptions, requiring firms to proactively predict and strategically mitigate unexpected risks (Gao et al., 2025; Kimario & Mwagike, 2024). Inadequate assessment and mitigation of the bargaining power of suppliers on a global scale may give rise to abrupt structural vulnerabilities, volatile operational costs, and a diminished global competitive advantage, thereby constituting a crucial and prospective consideration in the formulation of international corporate strategy.

According to Industrial Organization (IO) economics, suppliers can obtain a disproportionate share of value by raising prices due to high supplier bargaining power, which can be caused by supplier concentration, high switching costs, or proprietary inputs (Porter, 1980). International businesses' capacity to implement a global cost leadership strategy is severely limited when they deal with dominant domestic or foreign suppliers (Porter, 1985). On the other hand, international businesses can counteract supplier leverage, reduce input costs, and improve price competitiveness in price-sensitive international markets by utilizing global sourcing techniques to aggregate purchasing power across emerging and developed countries (Coetzee et al., 2020).

Supplier relationships influence value creation and differentiation capabilities in addition to cost effectiveness. Research shows that strong suppliers often control proprietary technology and rare, non-replaceable resources (Barney, 1991). International firms can gain distinctive product features and a clear, non-price competitive advantage in international markets by securing exclusive access to high-quality inputs or co-developing vital technologies with important international suppliers (Dyer & Singh, 1998; Pittz et al., 2024).

Lastly, organizational international competitive advantage is significantly impacted by supplier bargaining power. Over-reliance on strong international suppliers increases the cost of risk mitigation, negotiation, and monitoring (Reckendrees et al., 2023). International firms develop dynamic skills including multi-region supplier diversification, standardized component design, and selective vertical integration to lessen these structural vulnerabilities. By eliminating supplier lock-in, businesses can strengthen their long-term position in international markets by gaining the operational flexibility needed to quickly reorganize supply networks in reaction to shocks to the global market (Pittz et al., 2024; Sun, 2026).

A study that evaluated large-scale manufacturing companies shows that high bargaining power of suppliers significantly lowers the trade volume (Watanabe & Yanagawa, 2013). In this situation, purchasing firms are forced to operate with less favorable commercial credit schemes and are forced to increase their cash-holding requirements (Zhang, 2021). This tactic draws a lot of money, reduces financial options, and lowers their cost advantage in the global markets. The cross-border transaction has actively inflated the bargaining power of suppliers, in particular the transport and input suppliers (Takele & Tveter, 2025). The high bargaining power of suppliers directly grinds down the competitiveness of the firm in the global marketplace. Since the bargaining power of suppliers can influence the competitive advantage of the purchasing company, it is proposed that higher supplier bargaining power has a significant impact on the international competitive advantage of the company.

**Proposition 2:** Bargaining power of suppliers is a significant competitive force in determining international competitive advantage.

**Bargaining power of buyers:** The bargaining power of buyers explains the leverage that the buyers possess to influence the negotiation terms in the commercial transaction within a particular industry (Porter, 1985). When the buyers are highly concentrated and purchase in bulk volume, they can aggressively bargain the prices, demand superior product quality, and consequently compress the profit margin of the competing firms (Porter, 2008). The bargaining power of buyers increases in an industry with standard products because customers can easily switch between options and compare competitors.

In the context of international business, the bargaining power of buyers is significant as a determinant of profitability, trade patterns, and value creation across the global market (Bair & Mahutga, 2023). Buyers who are buying in large quantities use their size to force sellers to give them a price discount of up to 7%, and because of their high bargaining power, buyers have the power to walk away and find other options (Ignatenko, 2025). Grundy (2006) proved that the bargaining power of the buyer depends on larger orders and low switching costs. It is also found that larger international buyers use their data systems to create a strong network, and it is used to quickly replace those who don't integrate well (Jacobides et al., 2018; Kenney & Zysman, 2020). Mladenovic et al. (2024) state that any companies that are unable to meet automated buyer systems become easily replaceable, as global buyers constantly use digital platforms to compare and switch suppliers across countries. Apparently, the multinational buyers leverage their digital sourcing platforms to control the negotiation terms with foreign suppliers to protect their competitive advantage in the international marketplace.

Buyer negotiating power has a direct impact on a company's ability to extract value and create a long-term global competitive advantage. High buyer power, which is based on Industrial Organization (IO) economics and is typified by concentrated buyer groups, low switching costs, and high price sensitivity, continuously drives down prices and profit margins (Porter, 1980, 1985). In order to maintain baseline profitability during international expansion, international firms must attain global scale economies and cross-border operational efficiency in the face of strong global purchasers (Yip, 1992).

Concurrently, research on global marketing emphasises that buyer power stimulates innovation and customer-focused differentiation (Kohli & Jaworski, 1990; Narver & Slater, 1990). Strong foreign consumers sometimes require localised adaptations, stringent compliance, and customised product criteria. Although fulfilling these expectations raises immediate coordination costs, it pushes businesses to develop dynamic localisation and quality control capabilities, giving them non-price competitive advantages over less flexible foreign competitors (Douglas & Craig, 2011; Kaleka & Morgan, 2019).

Finally, international firms can reduce the risks of buyers' opportunism and switching behaviour through cooperative strategic alliances (Dyer & Singh, 1998; Inderst & Wey, 2003). International businesses successfully increase consumer switching costs by co-developing proprietary inputs, integrating global supply networks, and using dynamic internationalisation capabilities (Peng, 2025; Snyder, 1996). This ensures strong operational alignment and maintains a competitive position internationally by converting potential buyer power into lock-in mechanisms (Mbabu & Ombok, 2024; Valbuena-Hernandez & Ortiz-de-Mandojana, 2026).

When buyers have high power due to low switching costs, high price sensitivity, or strict quality standards, it serves as an external force that encourages international business players to continuously improve their core capabilities, leading to greater efficiency and distinctive value in international markets. High bargaining power of buyers is a competitive force that drives international business players to continuously innovate and upgrade their competencies to enhance their long-term performance. Henceforth, the bargaining power of the buyer is significant in explaining international competitive advantage.
**Proposition 3:** Bargaining power of buyers is a significant competitive force that determines international competitive advantage.

**Threat of new entrants:** In Michael Porter's framework, the threat of new entrants is defined as the risk that new firms pose to existing businesses by competing for market share (Porter, 1979). New entrants are perceived as a threat because their entry can reduce the profitability of incumbent firms (Ningsih et al., 2025). Any lucrative business attracts new firms, which lower the price of offerings, raise the cost of innovation to keep customers, and reduce profit margins (Porter, 2008). The threat depends on the entry barriers such as economies of scale, high capital needs, switching costs, government rules and regulations, and the countermeasures from the existing firms (Porter, 1979, 2008). Industries with high entry barriers face less competition and enjoy greater stability and sustainability in performance (Porter, 2008).

International firms often pose a greater threat of new entrants than local businesses because they have a different cost structure. International firms are global in scale, large in capital, advanced and unique in technology, and strong international brands (Yip, 1989; Caves, 2007). In international business, the threat of new entrants is critical because it can change industry structure and motivate global innovation, disrupt stable domestic industries, and motivate companies to improve performance. Global competition in this decade is shaped by digital platforms and innovates the entry strategy for international firms, enabling rapid market entry (Yang et al., 2025). Any international firm that enters a new market they bring their productive capacity and competitive advantage, which leads to profit reduction for local firms (Porter, 1986). It also pushes incumbents to optimize operations and create innovation in operations, logistics, and distribution to gain better market access (Hamdi et al., 2026).

The ability of an established company to safeguard profit margins and preserve a long-lasting global competitive edge is strongly impacted by the threat of new competitors. According to Michael Porter's Industrial Organization (IO) theory, unless strong entry barriers are in place, new market entrants increase capacity, escalate price rivalry, and reduce industry profitability (Porter, 1980; Mosina, 2026). When expanding internationally, international firms use structural entry barriers, such as global economies of scale, high capital requirements, and exclusive distribution channels, to protect their market share from both foreign and domestic competitors trying to enter new markets (Porter, 1985; Mosina, 2026).

However, recent research highlights how conventional structural obstacles are becoming more susceptible to innovations in business models and digital transformation. Through network effects and flexible go-to-market tactics, emerging global digital platform economies enable non-traditional entrants to avoid traditional physical capital needs and quickly scale across borders (Verbeke & Hutzschenreuter, 2021; Chen et al., 2026). As a result, established international firms are no longer able to rely exclusively on static scale economies, but they must build dynamic internationalization skills to consistently strengthen entry barriers.

International firms mitigate the threat of new entrants by constructing deep context-specific advantages, such as localized institutional knowledge, co-developed R&D ecosystems, and high switching costs created through customer integration (Barney, 1991; Peng, 2025; Valbuena-Hernandez & Ortiz-de-Mandojana, 2026). By converting physical and institutional entry barriers into agile, non-imitable strategic assets, MNEs suppress the

threat of entrant disruption, ensuring sustainable performance and long-term channel dominance across foreign markets (Hung & Wang, 2024; Chen et al., 2026).

This competitive threat drives firms to improve business efficiency, innovate, and some may consider international expansion to survive (Yip, 1989). This threat may also raise tariff barriers to protect local industries, and some other governments may reduce the barriers to attract foreign companies (Caves, 2007). Understanding this competitive threat is essential for assessing market stability and guiding strategic changes to achieve international competitive advantage. The threat of new entrants is significantly linked to sustainable global competitive advantage since it creates aggressive competition that drives incumbent firms to improve operational efficiency and speed up innovation to strengthen resilience in the international market. Therefore, the threat of new entrants is significant in explaining international competitive advantage.
**Proposition 4:** Threat of new entrants is a significant competitive force that determines international competitive advantage.

**Threat of Substitution:** The competitive threat refers to the risk a company faces when different products or alternative products can meet the customer's needs (Porter, 1979). Substitution provides an alternative solution that may stop customers from using the company's offerings altogether (Porter, 2008). This threat restricts the amount of profit generation when customers shift their preferences to the alternative solutions, particularly if the alternative solution is more attractive, has low switching costs, and is more reliable (Porter, 2008). A common strategy in dealing with the threat of substitution includes innovation in product, service, or technology (Ningsih et al., 2025). In the digital economy, the threat of substitution is more intense because rapid changes in technology s and global digital platforms can rapidly make existing products outdated (Yang et al., 2025; Silva-Rêgo & Kogut, 2026).

In international markets, the threat of substitution is characterized by market forces and accelerated by government institutions, including rules and policies (Porter, 2008). The host government frequently uses coercive power to make alternative options offered by the domestic players cheaper and more appealing to the market (Vargas-Hernández et al., 2023). For instance, an international company that invested in carbon-intensive infrastructure may face a quick, legally driven threat of substitution when the host government enforces strict environmental standards, thereby pushing consumers in favour of green technologies that are supported and subsidized by the government (Fischer, 2003; Vargas-Hernández et al., 2023). In the international market, when the threat of substitution is constantly exposed to alternative offerings, firms are logically driven to innovate rapidly to maintain their relevance (Silva-Rêgo & Kogut, 2026).

The ability of international firms to retain long-term price premiums in foreign markets and capture economic value is directly determined by the danger of substitution. According to Michael Porter's Industrial Organization (IO) framework, the existence of substitute products artificially limits the prices that an industry can charge, reducing profit margins and limiting competitive performance unless businesses develop effective counter-differentiation strategies (Porter, 1980, 1985; Mosina, 2026). Because host markets often offer alternative local solutions, unique consumer habit shifts, or regional technological paradigms that can circumvent standard product offerings, international firms are more vulnerable to substitution threats in the context of international strategy (Verbeke & Hutzschenreuter, 2021). As a result, when low-cost or technologically superior alternatives reach outside markets, businesses that only rely on traditional product advantages frequently suffer from quick cross-border margin deterioration.

Scholars emphasize the deployment of relational ecosystems and dynamic innovation skills to overcome the threat of substitution and create a sustained international competitive advantage (Peng, 2025; Valbuena-Hernandez & Ortiz-de-Mandojana, 2026). Leading multinational corporations respond with strategic adaptation, digital business model transformation, and cross-border strategic alliances rather than defensive pricing battles that jeopardize profitability (Chen et al., 2026; Peng, 2025). Businesses turn weak global products into tightly integrated value offerings by using proprietary technology, collaborating with local network partners to generate context-specific solutions, and imposing high institutional switching costs (Valbuena-Hernandez & Ortiz-de-Mandojana, 2026). International firms can maintain long-term market share across several global markets, secure channel dominance, and protect international pricing premiums by neutralizing the danger of replacement products (Chen et al., 2026; Mosina, 2026).

The threat compels international firms to develop a unique value proposition and pursue distinct differentiation strategies to raise profit margins (Islam, 2025; Porter, 2008). Firms that put effort into upgrading value creation yield a competitive advantage over foreign rivals who face less substitution pressure (Silva-Rêgo & Kogut, 2026; Yang et al., 2025). The threat of substitute products is significantly related to international competitive advantage, such as when firms plan to optimize efficiency, actively involve themselves in innovation, and proactively plan for strategic moves when entering foreign markets. When international firms systematically upgrade their competencies to counter the threat of substitute products, they can drive the company towards a sustainable international competitive advantage. Thus, the threat of substitute products is significant in explaining international competitive advantage.

**Proposition 5:** Threat of substitution is a significant competitive force that determines international competitive advantage.

## 3. Methodology

The study proposes to explore the relationship between the five competitive forces and international competitive advantage. To create a cohesive conceptual model that connects the Five Competitive Forces to international competitiveness, this study uses an integrative literature synthesis design (Torraco, 2016). An analytical deductive strategy was used to assess current theoretical frameworks and empirical studies since conceptual research aims to improve theory by interconnecting previously isolated domains rather than producing primary evidence (Jaakkola, 2020). To ensure high data quality and construct validity, a purposive sampling technique is proposed to be used in selecting suitable respondents based on two stringent inclusion criteria: (1) the firm actively participates in export activities, cross-border strategic alliances, or foreign market operations; and (2) the respondent has at least three years of experience making strategic decisions within the organization.

The target respondents should consist of senior strategic decision-makers in multinational enterprises (MNEs) and exporting manufacturing companies that operate in international marketplaces to experimentally assess the links within this theoretical framework. Chief Executive Officers (CEOs), Chief Strategy Officers (CSOs), Global Procurement Directors, and International Business Managers are the only target respondents using a key informant technique. These respondents are chosen because they have the thorough strategic oversight needed to accurately assess internal firm capabilities, cross-border market performance metrics, and external industry structural forces.

The measurement items for the five forces framework and international competitive advantage will be obtained from reliable sources. First, the bargaining power of suppliers is operationalized by the degree of supplier concentration, the existence of high switching costs when switching vendors, the supplier's control over essential proprietary inputs, and the supplier's ability to set pricing and terms of payment, all of which are used to operationalize (Wagner & Johnson, 2004; Porter, 1980). Second, to gauge the bargaining power of buyers, buyer concentration, buyer price sensitivity, low buyer switching costs, and the degree to which customers demand special requirements or price concessions are all used to operationalize the variable (Spina et al., 2013; Porter, 1980, 1985). Next, according to Karakaya and Stahl (1989) and Mosina (2026), the threat of new entrants is evaluated by calculating the financial needs for market entry, access to worldwide distribution channels, brand loyalty of current customers, and government regulatory hurdles. Then, the availability of alternative regional products and technologies, the relative price-performance ratio of substitutes, customer willingness to switch, and the low switching costs associated with adopting substitute offerings are all used to operationalise the threat of substitution (Chen et al., 2026; Mosina, 2026). According to Jaworski and Kohli (1993) and Iriyama et al. (2016), measurement of competitive rivalry includes price competition intensity, the frequency of marketing and promotional conflicts, the rate at which overseas competitors introduce new products, and aggressive tactics to gain local market share. Finally, international competitive advantage is measured by assessing relative foreign market share growth, protection of price premiums, superior product quality relative to global competitors, and overall cross-border profitability (Zou et al., 1998; Kaleka & Morgan, 2019).

## 4. Managerial Implications and Recommendations

The proposed study underscores the critical need for international firms to continuously evaluate and adapt their strategies in response to dynamic competitive forces in the global market. By applying and contextualizing Porter's Five Forces framework to international settings, firms can better understand the complex interplay of geographical, cultural, regulatory, and competitive factors that influence industry rivalry. This study is expected to strategically guide international firms to remain competitive for business sustainability. Therefore, managers and decision-makers must prioritize strategic agility and environmental analysis to effectively navigate the VUCA global business landscape, enhancing their ability to achieve and sustain competitive advantage across diverse international markets. The proposed study will guide policymakers and international firms in terms of explanations related to factors that affect international competitive advantage. The information would benefit both parties in designing the strategic move for the attainment of competitive advantage.

### Limitations

This study is mainly conceptual in nature, establishing the conceptual framework and derived premises through theoretical deduction and integrated literature synthesis. The model lacks empirical confirmation using primary quantitative data, despite the fact that it consistently connects Porter's structural factors with international competitive advantage through relational and dynamic mechanisms. As a result, the suggested direct, mediating, and moderating pathways have not been confirmed in particular operational contexts. Future academics are strongly invited to test the suggested framework through empirical study in order to address these boundary conditions. In particular, cross-sectional or longitudinal survey data from senior executives (such as CEOs, CSOs, and Global Procurement Directors) in international firms could be gathered for quantitative studies using Structural Equation Modelling (SEM) or Partial Least Squares (PLS-SEM). To evaluate the model's generalisability, more empirical studies should examine any context-specific differences across various industry sectors or geographical areas.

## 5. Conclusion

This study aims to create a conceptual framework for empirical research explaining the relationship between Porter's Five Forces Framework and International Competitive Advantage. The global business environment requires firms to develop strategies for the attainment of competitive advantage. Porter's Five Forces framework remains a vital tool for analyzing industry competition, but its application must consider the unique complexities of international markets, including geographical, cultural, and regulatory differences. For international companies, this finding would benefit them in designing the most effective strategy for sustaining competitiveness in the international marketplace. This study highlights the importance of understanding and responding strategically to competitive pressures to maintain market position and profitability. Ultimately, firms that effectively align their strategies with external competitive forces will be better positioned to succeed and thrive in the highly competitive global economy.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Job Satisfaction and Perceived Organizational Support on Employees' Psychological Wellbeing: A Study of a Private Healthcare Company in Malaysia

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**Abstract:** Private healthcare organizations are expected to take more initiative in understanding their employees' psychological well-being. This is to ensure employees' strong performance, which directly translates into high-quality patient care. This study aims to determine the relationship between job satisfaction (extrinsic satisfaction and intrinsic satisfaction) and psychological well-being; secondly is to identify the relationship between perceived organizational support and psychological well-being. Data were collected from 231 employees at a private healthcare organization located in Klang Valley, Malaysia. The findings revealed that perceived organizational support was found to be the most important factor that influences employees' psychological well-being, followed by intrinsic satisfaction and extrinsic satisfaction. This study is significant to human resource practitioners and the management of private healthcare organizations in understanding the importance of perceived organizational support and job satisfaction as imperative drivers that influence employees' psychological well-being.

**Keywords**: *Psychological well-being, job satisfaction, perceived organizational support, private healthcare employees, Malaysia*

## 1. Introduction and Background

The healthcare industry has been rapidly growing due to increased demand for its services and products. Recent data from the Malaysia Healthcare Travel Council (MHTC) has shown that the number of medical travellers to Malaysia has increased since the post-pandemic era, reaching 1.84 million travellers in 2025, and this number is expected to continue to grow (Malaysia Healthcare Travel Council, 2026). This positive trend has made Malaysia a strong candidate to compete with other countries in becoming one of the best healthcare service providers.

In view of this, private healthcare employees are expected to work more intensely to provide a higher quality of service to be successful. Healthcare professionals, including doctors, nurses, midwives, pharmacists, and other healthcare personnel, play an essential role in delivering safe and high-quality healthcare services. Their contribution extends beyond clinical treatment, as their work can directly influence patients' comfort, recovery, and overall satisfaction with healthcare services (Chiremba et al., 2019). However, working in a hospital environment can be particularly demanding. Healthcare employees often work long hours and shifts while managing heavy workloads, complex patient needs, and rapidly changing working conditions. Ongoing changes in the healthcare sector have reshaped how both medical and non-medical employees perform their roles and interact with colleagues and patients. These changes may place additional demands on employees who are already working in highly challenging environments. Portoghese et al. (2014) reported that healthcare professionals are frequently exposed to time pressure, uncertainty in patient treatment, limited social support, heavy workloads, and emotional strain associated with caring for patients who are suffering or dying. Continuous exposure to such working conditions can affect employees' physical and psychological well-being. Consequently, healthcare employees may be particularly vulnerable to work-related stress, burnout, depression, and anxiety (Fiabane et al., 2013). On top of that, increased workload and dissatisfied healthcare employees show a negative impact on patients' satisfaction, quality of patient care, and loyalty to a hospital (Hall et al., 2016).

The consequences of these demanding working conditions are not limited to employees themselves. When healthcare employees experience excessive workloads and dissatisfaction at work, the quality of healthcare delivery may be affected. Previous research has shown that poor employee well-being and burnout can have negative implications for patient satisfaction, quality of care, and patients' overall experience with healthcare

services (Hall et al., 2016). Therefore, understanding the factors that contribute to a more supportive and satisfying job and work environment for healthcare employees is important not only for employee well-being but also for maintaining the quality and effectiveness of healthcare services.

Psychological well-being (PWB) is increasingly recognised as an important aspect of healthcare work, particularly in maintaining a satisfied and committed workforce and supporting employee retention (Chiremba et al., 2019). Given the demanding nature of healthcare settings, employees' psychological well-being is important not only for their personal functioning but also for their ability to perform their roles effectively. Chancellor et al. (2018) similarly emphasised that promoting well-being in the workplace can bring meaningful benefits to both employees and organizations. Previous studies have also linked psychological well-being to several work- and individual-related factors, including wellness (Liu et al., 2013), resilience (Sagone & De Caroli, 2014), stress (Clemente et al., 2016), and leadership behaviour (Damien, 2019).

Within the healthcare context, employee satisfaction and well-being are particularly important because their consequences may extend to patient care. Deng et al. (2018) highlighted that doctors' satisfaction can influence their own well-being as well as patient well-being, quality of care, and developments within the medical profession. Similar concerns have been reported among nurses, where job dissatisfaction has been associated with higher turnover, lower morale, and poorer well-being (Ronald et al., 2013). These findings suggest that healthcare organizations need to pay greater attention to the organisational conditions that can protect and enhance employees' psychological well-being.

One such condition is perceived organisational support (POS). When employees believe that their organisation values their contribution and is concerned about their well-being, they may feel better supported in managing stressful situations and carrying out their responsibilities effectively (Eisenberger et al., 2001). Support from immediate supervisors may be equally important, particularly in healthcare environments where employees regularly face demanding and emotionally challenging situations. Vera et al. (2016), for example, found that supervisor support can help reduce work-related stress and contribute to a healthier workplace for nurses. Taken together, these findings highlight the potential importance of organisational and supervisory support in promoting the psychological well-being of healthcare employees.

However, limited studies have been identified to examine these two predictor variables (job satisfaction and perceived organizational support) simultaneously towards psychological well-being (PWB) in the context of private healthcare organizations in Malaysia. The deficiency of studies on PWB and its relationship with other variables in the context of healthcare organizations may be the cause of the lack of understanding regarding PWB. This is supported by Wright and Cropanzano (2000), who argue that psychological well-being is a complicated concept that covers the overall individual psychological function and mental health. In fact, this research gap necessitates a more granular investigation into how these motivational orientations and organizational inputs independently and collectively shape the psychological health of the modern workforce. Thus, the focus of this study is to determine: (1) the relationship between job satisfaction (extrinsic satisfaction and intrinsic satisfaction) and psychological well-being; (2) the relationship between perceived organizational support and psychological well-being.

## 2. Literature Review

**Psychological Well-Being.** Psychological well-being has a variety of definitions in various fields (Gao & McLellan, 2018). Su, Tay and Diener (2014) described psychological well-being as an integrated model of well-being that includes "life satisfaction, positive emotion, supportive and enriching relationships, interest and engagement in daily activities, meaning and purpose in life, sense of mastery and accomplishment, feelings of autonomy, and optimism". On the other hand, Duan et al. (2016) stated that psychological well-being emphasizes "human flourishing and functioning, going beyond the traditional hedonia-versus-eudaimonia framework". Psychological well-being has been conceptualized as a multidimensional construct that is formed by the regulation of emotions, personal and social identity, personality characteristics, and life experience (Luthans et al., 2019).

Although there are differences in opinions and concepts among many researchers, psychological well-being has been agreed to be a form of multi-dimensional concept (Ryff et al., 2015). Hence, Ryff (1989) examination led to the construction of a theoretical model that included six dimensions of well-being, namely autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Subsequent studies confirmed the six (6) dimensions of well-being (Ryff & Keyes, 1995). The definition of each dimension of PWB is displayed in Table 1.

**Table 1: Dimensions of PWB (Ryff, 1989)**

| **Dimension of PWB** | |
|---|---|
| Autonomy | Someone who is self-determining and independent; able to resist social pressures to think and act in certain ways; regulate behavior from within; and evaluate self by personal standards |
| Purpose in Life | Someone who has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; and has aims and objectives for living. |
| Positive Relations with Others | Someone who has warm, satisfying, trusting relationships with others; is concerned about the welfare of others; is capable of strong empathy, affection, and intimacy; and understands the give and take of human relationships |
| Personal Growth | Someone who has a feeling of continued development; sees self as growing and expanding; is open to new experiences; has a sense of realizing his or her potential; sees improvement in self and behavior over time; and is changing in ways that reflect more self-knowledge and effectiveness. |
| Environmental Mastery | Someone who has a sense of mastery and competence in managing the environment; controls a complex array of external activities; makes effective use of surrounding opportunities; and can choose or create contexts suitable to personal needs and values |
| Self-Acceptance | Someone who possesses a positive attitude toward the self; acknowledges and accepts multiple aspects of self, including good and bad qualities; and feels positive about past life. |

**Job Satisfaction and Psychological Well-Being.** Throughout decades, job satisfaction has been defined in the literature in many ways and has been explained countless times by countless scholars and researchers (Slemp et al., 2014). Generally, job satisfaction can be understood as "the extent to which people like or dislike their jobs" (Spector, 1997). Others describe job satisfaction as "an emotional state that comes from a self-assessment of an employee's job" (Hosseinabadi & Etemadinezhad, 2018). Job satisfaction has been identified as one of the drivers for employee well-being (O'Driscoll, 2010). In fact, job satisfaction is often related to one's life contentment as it affects the person's social, physical, and mental health. Faragher et. al (2005) demonstrated that the level of job satisfaction has an essential impact on the health of the workforce. Thus, it is a crucial element to evaluate the individual's satisfaction with his or her job that eventually influences personal and organizational development. Self-Determination Theory (SDT) serves as an integrative framework for these constructs, positing that when work environments satisfy basic psychological needs for autonomy, competence, and relatedness, employees transition from extrinsic compliance toward more sustainable intrinsic fulfilment (Sireno et.al., 2020).

Job satisfaction can be understood as a positive state due to intrinsic or extrinsic variables regarding an individual's job (Edwards & Cable, 2009). Spector (1997) defines intrinsic job satisfaction as how people feel about the nature of their job tasks. Most business leaders use intrinsic satisfaction to identify various layers of work outcomes to increase organizational productivity (Nawi et al., 2016). Examples of intrinsic job satisfaction factors include interaction among colleagues, positive relationships, and a feeling of purpose (Arnett & Polkinghorne, 2010). Literatures highlight the direct link between intrinsic job satisfaction and employees' psychological well-being. Specifically, when tasks are intrinsically rewarding, work is experienced as meaningful rather than taxing, which actively fosters positive affect and psychological capital. In their systematic review of workplace well-being, Nunes et al. (2023) demonstrated that autonomous motivation is a robust predictor of flourishing mental health and functions as a critical buffer against occupational stressors. Furthermore, doing work that satisfies our inner desires changes how we view workplace hurdles. Instead of

seeing challenges as threats, we begin to look at them as opportunities to learn and grow. Expanding on this, Martela (2025) explains that the active, hands-on agency sparked by intrinsic motivation gives employees a real sense of vitality. This directly translates into lower anxiety and much higher job satisfaction. Ultimately, when people work out of genuine enjoyment and personal value rather than just to comply with external pressures, they maintain a healthier, more resilient mindset that keeps their overall well-being thriving. Additionally, Durkin et al. (2016) found that how nurses perceived themselves had implications for their sense of accomplishment and general well-being. Meanwhile, Burke et. al. (2012) highlighted that intrinsic factors such as enjoyment of work have significantly led to higher psychological well-being at the workplace. Finally, Ryan and Deci (2000) found that recognition at the workplace is effective in determining one's psychological well-being. Therefore, it is hypothesized that:

***H1: There is a relationship between intrinsic job satisfaction and psychological well-being***

*H1a: There is a positive relationship between intrinsic job satisfaction and autonomy.*
*H1b: There is a positive relationship between intrinsic job satisfaction and self-acceptance.*
*H1c: There is a positive relationship between intrinsic job satisfaction and positive relations with others.*
*H1d: There is a positive relationship between intrinsic job satisfaction and environmental mastery.*
*H1e: There is a positive relationship between intrinsic job satisfaction and purpose in life.*
*H1f: There is a positive relationship between intrinsic job satisfaction and personal growth*.

Extrinsic satisfaction, on the other hand, is referred to as satisfaction that comes from external benefits provided by the organization to its employees, including competitive pay and flexible schedules (Randolph & Johnson, 2005). Recent literature suggests that appropriately designed extrinsic job satisfaction can positively influence employees' psychological well-being, provided that employees perceive this as fair, supportive, and reflective of employees' contributions. For example, fair compensation, career advancement opportunities, and meaningful recognition reduce financial stress, strengthen employees' perceived organizational support, and enhance their confidence in achieving career goals. As a result, employees are more likely to experience positive emotions, greater job satisfaction, and improved psychological functioning (Olafsen, 2024). A few studies that examine human resource (HR) practices through the lens of SDT demonstrate that supportive HR practices can lead to positive outcomes. For example, fair reward systems, career development opportunities, and recognition programmes can enhance employees' basic psychological need satisfaction and autonomous forms of motivation. This subsequently leads to improved work engagement, organizational commitment, and employee well-being (Laguerre & Barnes-Farrell, 2025). These findings indicate that extrinsic job satisfaction is most beneficial when employees perceive it as developmental rather than controlling. Thus, it is hypothesized that:

***H2: There is a positive relationship between extrinsic job satisfaction and psychological well-being.***

*H2a: There is a positive relationship between extrinsic job satisfaction and autonomy.*
*H2b: There is a positive relationship between extrinsic job satisfaction and self-acceptance.*
*H2c: There is a positive relationship between extrinsic job satisfaction and positive relations with others.*
*H2d: There is a positive relationship between extrinsic job satisfaction and environmental mastery.*
*H2e: There is a positive relationship between extrinsic job satisfaction and purpose in life.*
*H2f: There is a positive relationship between extrinsic job satisfaction and personal growth.*

**Perceived Organizational Support and Psychological Well-Being.** Perceived organizational support (POS) is defined as the generalized opinions of employees that their organization values their contribution and cares about their well-being (Eisenberger et al., 1986; Kurtessis et al., 2017). In other words, organizational support functions as an essential resource in meeting employees' psychological and emotional needs (such as approval, esteem, affiliation, and emotional support) within the work environment. When these needs are satisfied, individuals experience heightened positive affect, reduced emotional strain, and an enhanced self-identity tied to their work role.

Previous literature has demonstrated how a supportive workplace environment acts as an important factor for mental health. For example, when a company offers flexible frameworks, structural assistance, and relevant validation, it fundamentally changes how employees process stress. Darmawan (2022) highlighted that a highly supportive organizational environment directly lowers occupational anxiety and gives a major boost to overall life satisfaction. Knowing that management support is accessible creates a deep sense of security, which further leads to satisfying human needs for esteem and belonging. This kind of support doesn't just minimize the

negatives; it actively builds psychological strength**.** Deniz and Kocabaş (2024) studied professionals dealing with intense workplace pressures and found that high levels of organizational support directly predicted greater self-acceptance, autonomy, and environmental mastery. When you know your management stands firmly behind you, your psychological vulnerability drops, making you far more resilient when the organization's goals shift or uncertainties arise.

Additionally, perceived organizational support is an important driver for both organizational performance outcomes and individual well-being" (Kurtessis et al., 2017). Similarly, Payne et al. (2018) also addressed how perceived organizational support is associated with well-being. This has been supported by Wright et. al. (2012) that perceived organizational support (POS) is considered a highly functional organizational resource that contributes positive effects on individuals' mental health and positive work outcomes. Moreover, perceptions of support can foster employees' positive emotions, and it is strongly associated with their level of psychological well-being (Ryff & Singer, 1998). Therefore, it is hypothesised that:

***H3: There is a positive relationship between perceived organizational support and psychological well-being.***

*H3a: There is a positive relationship between perceived organizational support and autonomy.*

*H3b: There is a positive relationship between perceived organizational support and self-acceptance.*

*H3c: There is a positive relationship between perceived organizational support and positive relations with others.*

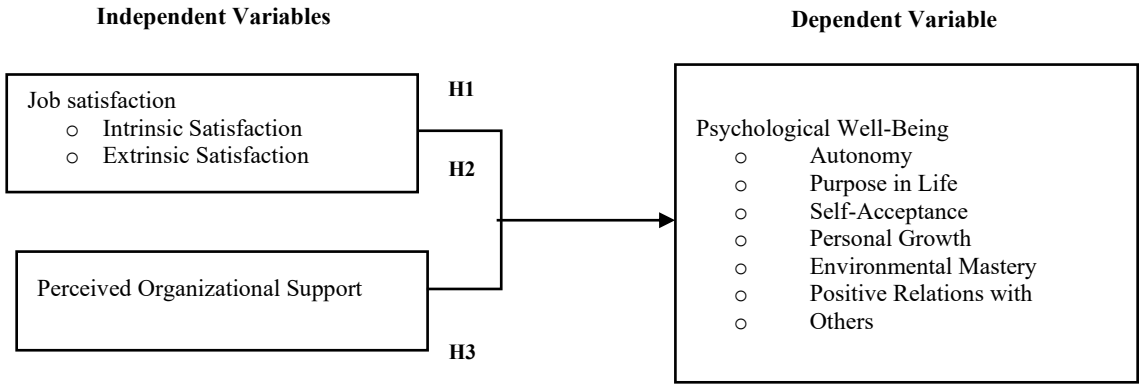
*H3d: There is a positive relationship between perceived organizational support and environmental mastery.*

*H3e: There is a positive relationship between perceived organizational support and purpose in life.*

*H3f: There is a positive relationship between perceived organizational support and personal growth.*

**Figure 1: Research Framework**

The proposed research framework is as displayed in Figure 1




## 3. Research Methodology

This study utilized a quantitative research design. A cross-sectional study was chosen because the objective of the study was to determine the relationship between job satisfaction and perceived organizational support, and psychological well-being. The study utilized purposive sampling involving full-time medical and non-medical healthcare employees from a private healthcare organization in Klang Valley, Malaysia. In this study, purposive sampling provides the operational flexibility needed in targeting available and eligible employees across shifts without disrupting patient care or administrative healthcare workflows. The selection of the respondents from both medical and non-medical employees was done to provide a holistic view of the organization's healthcare employees' psychological well-being. The non-medical employees selected in this study included employees from administration, operations, human resources, finance, customer service, information technology, public relations, and sales and marketing. Meanwhile, for medical employees, the sample selected included physicians, therapists, nurses, medical assistants, pharmacists, radiographers, dietitians, physiotherapists, and ambulatory support.

To measure psychological well-being, the study adopted a shorter version of the instrument from Van Direndonck (2004), which consisted of 39 items covering six dimensions of the variable. Job satisfaction, on the other hand, was measured using 13 items developed by Weiss et al. (1967). Each of the dimensions, namely intrinsic and extrinsic job satisfaction, consisted of seven and six items, respectively. For perceived organizational support, the study adopted a short version of 8 items from the Survey of Perceived Organizational Support (SPOS) developed by Eisenberger et al. (1986). This study used a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree" for psychological well-being. On the other hand, the job satisfaction scale ranged from 1 = "very dissatisfied" to 5 = "very satisfied". For PSOS, the study utilized a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree". A pre-test was conducted to ensure the validity of the instruments used. Before data collection, the instruments were validated by an academic and two healthcare human resource practitioners. Pilot study was also conducted to 40 respondents that yield a result of acceptable reliability values of 0.7 for all variables. Statistical analyses such as descriptive analysis, reliability analysis, and multiple regression analysis were used in the study to achieve the objectives of the study. All data collected were analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 26.

## 4. Results

**Demographic Profile of the Respondents.** Data were collected from 231 respondents, yielding a response rate of 77 per cent. The respondents of this study consisted of 68.8 percent female respondents and 31.2 percent male respondents. Most of the respondents (45 %) were in the range of 20 – 29 years old. Most respondents' ethnic group was Malay (85.3 percent), and more than half of them were married (55.4 percent). Almost half of the respondents graduated with a Diploma (45.5 percent). Out of the 231 respondents, 57.6 percent were medical employees, and the remaining respondents were non-medical (42.4%). Besides that, almost half of the surveyed respondents (46.8%) worked within the range of 46 – 50 hours weekly. It was also reported that more than half of the respondents (57.1%) have a tenure between 1 – 5 years at the current healthcare organization. The monthly income range for most of the respondents was between RM2,000 and RM4,000 (41.1%).

**Normality Test**. According to Coakes and Steed (2009), the assumption of normality is a prerequisite for many inferential statistical techniques, and Coakes and Ong (2011) stated that "normal distribution is acceptable when the skewness and kurtosis values are in the range of +/-3". Based on Table 2, the data were determined to be normally distributed, since the values of skewness and kurtosis were in the range of +/-3 for each variable, as displayed in Table 2.

**Table 2: Normality Test**

| Variables | Skewness | Kurtosis |
|---|---|---|
| **Job Satisfaction** | | |
| Intrinsic Satisfaction | -.14 | .63 |
| Extrinsic Satisfaction | -.05 | -.13 |
| **Perceived Organizational Support** | -1.22 | 1.37 |
| **Psychological Well-Being** | | |
| Autonomy | -.82 | .73 |
| Self-Acceptance | -.70 | .82 |
| Positive Relations with Others | -.44 | .31 |
| Environmental Mastery | -.19 | .21 |
| Purpose in Life | -.03 | -.11 |
| Personal Growth | -.46 | -.22 |

**Factor Analysis.** Factor analysis aims to explain the patterns of correlation within a set of observed values by identifying the variables and factors that influence those values (Huyen, 2015). Confirmatory Factor Analysis (CFA) was used in this study, as the instrument used was adopted from previous research. Based on the analysis conducted, it can be concluded that all three variables; psychological well-being, job satisfaction and perceived organizational support are significant based on the values of the Bartlett test of Sphericity and Kaiser-Meyer—Olkin were also adequate.

Job satisfaction was measured based on two dimensions, namely intrinsic and extrinsic job satisfaction. 13 items consisted of seven items for intrinsic satisfaction, and six items of extrinsic satisfaction were analyzed. After conducting the CFA for job satisfaction, six items were eliminated, and subsequently only three items of intrinsic satisfaction and four items of extrinsic satisfaction were retained. KMO value of .80 was found in the analysis, and the Bartlett Test of Sphericity was found to be significant at $p < .00$. The factor analysis for job satisfaction shows the total variance at 66.03 percent; thus, it was appropriate for further analysis. The first factor consists of four items to measure extrinsic satisfaction. The items of the first factor with an eigenvalue of 3.34 shared factor loadings ranging from .76 to .83, which explained 47.72 percent of the total variance in the data. The second factor consists of 3 items relating to intrinsic satisfaction. The items of the second factor, have an eigenvalue of 1.28 and shared factor loadings ranging from .55 to .86, which explained 18.31 percent of the total variance in the data (Refer to Table 3).

**Table 3: Factor Analysis of Job Satisfaction**

| Variables | F1 | F2 |
|---|---|---|
| **Extrinsic Satisfaction** | | |
| My pay and the amount of work that I do | .83 | |
| The chances for advancement at my job | .82 | |
| The way policies are put into practice | .76 | |
| The praise I get for doing a good job | .76 | |
| **Intrinsic Satisfaction** | | |
| The chance to do something that makes use of my abilities | | .86 |
| The chance to do things for other people | | .85 |
| The feeling of accomplishment I get from the job | | .55 |
| Total Variance | 66.03% | |
| KMO Measures of Sampling Adequacy | .80 | |
| Bartlett's Test of Sphericity | 5556.18 | |
| Sig. | .00 | |

The next CFA was conducted for perceived organizational support (POS) as displayed in Table 4. Originally, the number of items for POS was eight items. The result shows that only one component was extracted; hence, the solution cannot be rotated, and the number of items remained unchanged. Table 3 shows the result for perceived organizational support. Based on a KMO value of .92, which is greater than .5, it is suitable to be conducted. It also shows that the Bartlett Test of Sphericity is significant at $p = .00$. The factor analysis for perceived organizational support shows an eigenvalue of 5.06, which explains 63.19 percent of the total variance in the data. Hence, it is appropriate for further analysis.

**Table 4: Factor Analysis of Perceived Organizational Support**

| Variables | F1 |
|---|---|
| The organization would notice if I did the best job possible. | .85 |
| The organization really cares about my well-being | .83 |
| The organization shows huge concern for me. | .83 |
| The organization takes pride in my accomplishments at work. | .80 |
| The organization cares about my general satisfaction at work | .78 |
| The organization appreciates any extra effort from me. | .78 |
| The organization would not ignore any complaint from me. | .75 |
| The organization values my contribution to its well-being. | .74 |
| Total Variance | 63.19% |

| | |
|---|---|
| KMO Measures of Sampling Adequacy | .92 |
| Bartlett's Test of Sphericity | 1097.99 |
| Sig. | .00 |

Psychological well-being originally consisted of 39 items with dimensions of autonomy (eight items), self-acceptance (six items), positive relations with others (six items), environmental mastery (six items), purpose in life (six items), and personal growth (seven items). However, nine items were eliminated, and subsequently only 30 items were left in total. Table 5 shows the finalized result for psychological well-being. Based on the KMO value of .94 (*p>.05*) which can be interpreted as adequate to predict each factor. It also shows that the Bartlett Test of Sphericity is significant at p = .00. The factor analysis for psychological well-being shows the total variance at 66.51 percent; therefore, it is appropriate for further analysis. Based on the CFA, the first factor consisted of seven items relating to purpose in life. The items of the first factor with the eigenvalue of 12.94 shared factor loadings ranged from .62 to .72, which explained 43.12 percent of the total variance in the data. The second factor consists of seven items relating to personal growth. The items of the second factor, with an eigenvalue of 1.94, shared factor loadings ranging from .52 to .81, which explained 6.47 percent of the total variance in the data. The third factor consisted of six items relating to autonomy. The items of the first factor, with an eigenvalue of 1.67, had shared factor loadings ranging from .57 to .76, which explained 5.55 percent of the total variance in the data. The fourth factor consisted of five items relating to positive relations with others. The items of the fourth factor have an eigenvalue of 1.40 and shared factor loadings ranging from .66 to .76, which explained 6.47 percent of the total variance in the data. The fifth factor consists of three items relating to self-acceptance. The items have an eigenvalue of 1 shared factor loadings ranged from .64 to .70, which explained 3.66 percent of the total variance in the data. The sixth factor consists of two items relating to environmental mastery. The items of the sixth factor had an eigenvalue of .92 and shared factor loadings ranging from .70 to .76, which explained 3.06 percent of the total variance in the data.

**Table 5: Factor Analysis of Psychological Well-being**

| Variables | F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|---|
| **FACTOR 1: Purpose in Life** | | | | | | |
| I have a good sense of what it is I'm trying to accomplish in life. | .72 | | | | | |
| I have a sense of direction and purpose in life. | .71 | | | | | |
| I feel good when I think of what I've done in the past and what I hope to do in the future. | .68 | | | | | |
| I enjoy making plans for the future and working to make them a reality. | .65 | | | | | |
| I have been able to build a home and a lifestyle for myself that is much to my liking. | .65 | | | | | |
| I am an active person in carrying out the plans I set for myself | .64 | | | | | |
| My aim in life has been more satisfying than frustrating to me. | .62 | | | | | |
| **FACTOR 2: Personal Growth** | | | | | | |
| When I think about it, I have really improved much as a person over the years. | | .81 | | | | |
| I have the sense that I have developed a lot as a person over time. | | .71 | | | | |
| I want to try new ways of doing things—my life is fine the way it is. | | .69 | | | | |
| I think it is important to have new experiences that challenge how you think about yourself and the world. | | .66 | | | | |
| I never gave up trying to make big improvements or changes in my life a long time ago. | | .61 | | | | |
| For me, life has been a continuous process of learning, changing, and growth. | | .60 | | | | |
| In general, I feel that I continue to learn more about myself as time goes by. | | .52 | | | | |

| | | | | |
|---|---|---|---|---|
| **FACTOR 3: Autonomy** | | | | |
| I am not easily influenced by people with strong opinions. | .76 | | | |
| I have confidence in my opinions, even if they are contrary to the consensus. | .72 | | | |
| I'm not worried about what other people think of me. | .67 | | | |
| I am not afraid to voice my opinion, even when they are in opposition to the opinions of most people. | .66 | | | |
| I am not concerned about how other people evaluate the choices I have made in my life. | .66 | | | |
| I judge myself by what I think is important, not by the values of what others think is important. | .57 | | | |
| **FACTOR 4: Positive Relations with Others** | | | | |
| I have people who will listen when I need to talk. | | .76 | | |
| I have experienced many warm and trusting relationships with others. | | .72 | | |
| I rarely feel lonely because I have many close friends with whom I share my concerns. | | .67 | | |
| I feel like I get a lot out of my friends. | | .67 | | |
| I know that I can trust my friends, and they know they can trust me. | | .66 | | |
| **FACTOR 5: Self-Acceptance** | | | | |
| In many ways, I feel happy about my achievements in life. | | | .70 | |
| For the most part, I am proud of who I am and the life I lead. | | | .68 | |
| I like most aspects of my personality. | | | .64 | |
| **FACTOR 6: Environmental Mastery** | | | | |
| Given the opportunity, I would not change anything about me. | | | | .76 |
| In general, I feel I oversee the situation in which I live. | | | | .70 |
| Total Variance | 66.51% | | | |
| KMO Measures of Sampling Adequacy | .94 | | | |
| Bartlett's Test of Sphericity | 4167.46 | | | |
| Sig. | .00 | | | |

**Reliability and Descriptive Analysis.** Table 6 shows the reliability values and descriptive analysis of all variables used in the study. All variables were found to be reliable, with acceptable reliability values ranging from 0.66 to 0.92, and exceeded Nunnally's (1978) minimum requirement of 0.60. Specifically, the mean scores for all variables used in the study ranged from 3.33 to 4.19. Meanwhile, the standard deviation of the variables ranged from .53 to .72.

**Table 6: Reliability and Descriptive Analysis**

| Variables | No. of Item | Cronbach Alpha | Mean | Standard Deviation |
|---|---|---|---|---|
| **Job Satisfaction** | | | | |
| Intrinsic Satisfaction | 6 | 0.82 | 3.30 | .69 |
| Extrinsic Satisfaction | 7 | 0.71 | 3.87 | .55 |
| **Perceived Organizational Support** | 8 | 0.92 | 3.83 | .62 |
| **Psychological Well-Being** | | | | |
| Autonomy | 6 | 0.88 | 3.77 | .59 |
| Self-Acceptance | 7 | 0.89 | 4.19 | .53 |
| Positive Relations with Others | 8 | 0.88 | 3.74 | .66 |
| Environmental Mastery | 6 | 0.87 | 3.81 | .65 |
| Purpose in Life | 6 | 0.85 | 3.77 | .70 |
| Personal Growth | 6 | 0.66 | 3.75 | .72 |

**Multiple Regression Analysis.** Multiple regression analysis was conducted to test the relationship between the independent and dependent variables (Sekaran, 2006). Table 7 summarizes the results of multiple regression analysis. Based on the findings, intrinsic job satisfaction was found to have a positive, significant relationship with five dimensions of psychological well-being, namely purpose in life, personal growth, autonomy, positive relations with others and self-acceptance. In other words, intrinsic satisfaction contributes to purpose in life (β = .24, p < .05), personal growth (β = .41, p < .05), autonomy (β = .22, p < .05), positive relations with others (β = .17, p < .05), and self-acceptance (β = .18, p < .05). No relationship was reported with environmental mastery. Thus, all hypotheses were supported except for H1d.

Extrinsic job satisfaction was found to have a positive significant relationship with only three dimensions, namely purpose in life, positive relations with others, and self-acceptance. In other words, extrinsic satisfaction contributes to purpose in life (β = .31, p < .05), positive relations with others (β = .16, p < .05), and self-acceptance (β = .26, p < .05). It was also found that extrinsic satisfaction has no relationship with three dimensions, namely personal growth, autonomy, and environmental mastery. Thus, only H2b, H2c, H2e were supported.

Additionally, it was found that there was a positive relationship between POS and all six dimensions of psychological well-being. Specifically, POS was found to have a positive, significant relationship with purpose in life ($\beta$ = .28, $p < .05$), personal growth ($\beta$ = .33, $p < .05$), autonomy ($\beta$ = .44, $p$ < .05), positive relations with others ($\beta$ = .25, $p$ < .05), self-acceptance ($\beta$ = .20, $p$ < .05), and environmental mastery ($\beta$ = .45, $p$ < .05). Therefore, all hypotheses were supported.

**Table 7: Multiple Regression Analysis**

| | Dependent Variable (Psychological Well-Being) (β) | | | | | |
|---|---|---|---|---|---|---|
| | Purpose in Life | Personal Growth | Autonomy | Positive Relations with Others | Self-Acceptance | Environmental mastery |
| **Independent Variables** | | | | | | |
| Intrinsic Job Satisfaction | .24** | .41** | .22** | .17* | .18** | .02 |
| Extrinsic Job Satisfaction | .31** | -.09 | .10 | .16* | .26** | -.03 |
| **Perceived Organizational Support** | .28** | .33** | .44** | .25** | .20** | .45** |
| F Value | 52.78 | 35.43 | 46.86 | 19.09 | 24.58 | 18.91 |
| $R^2$ | .41 | .32 | .38 | .20 | .25 | .20 |
| Adjusted $R^2$ | .40 | .31 | .37 | .19 | .24 | .19 |

## 5. Discussion and Conclusion

The findings revealed that intrinsic satisfaction was related to five dimensions of psychological well-being, namely purpose in life, personal growth, autonomy, positive relations with others, and self-acceptance. This result indicated that intrinsic satisfaction had a more positive impact on employees' overall psychological well-being at work compared to extrinsic satisfaction. Five reasons can be used to explain this. Firstly, purpose in life is someone who has goals in life and a sense of directness. From a healthcare industry perspective, we can conclude that most employees in private healthcare value their meaningful work, which is deemed to have an impact on society. This is consistent with the previous study conducted by Ryff and Keyes (1995) that "highly anxious individuals who believe that there is meaning to life are considerably more likely to be satisfied with their jobs. Secondly, personal growth refers to someone consistently developing and becoming aware of their development, rather than choosing to be in a fixed state. This can be interpreted as the circle of colleagues, supervisors, and the work itself being more important factors that will have a direct and major influence on how far one will go to seek to expand their level of personal growth. Thirdly, Katz and Kahn (1978) supported that "increasing autonomy in a job creates intrinsic motivation due to the perception that one can control one's job performance". Thus, it is suggested that, from the healthcare perspective, organizational culture reflected through establishing their own scope of duties among nurses, for example, would have more impact on the

individual employee. This can be done by granting the nurses greater autonomy in making decisions, which is part of their work culture in the company. Intrinsic satisfaction was also found to have a significant positive relationship with positive relations with others. This can be explained by the fact that stronger intrinsic satisfaction has better friendship relations (Kasser & Ryan, 1996), and they tend to cooperate and display prosocial behaviour (Sheldon & McGregor, 2000). Besides that, intrinsic satisfaction was also found to be significantly related to self-acceptance. Seifert (2005) argued that when employees experience more satisfaction in their jobs, they have come to a point in their lives where they have accepted themselves despite their weaknesses. Overall, the findings were supported by a previous study conducted by Nunes et. al. (2023) and Martela (2025).

In view of this, the findings of the study suggested that private healthcare organizations should establish recognition programs that motivate employees at work and are able to increase their psychological well-being. Besides that, private healthcare organizations should establish effective career planning for employees by providing opportunities for upskilling, continuous learning, and eventually leading to better promotional outcomes. This can also be materialized through various educational program assistance and attending various skill-set training programs. These programs will encourage the employees to accomplish personal goals and subsequently motivate them to provide high-quality care to patients. In addition, activities such as team-building or integrating employees' families at the workplace should be put in place to establish better relationships and networking among employees. With a great teamwork culture and abundance of trust, employees tend to be more open, and this helps to boost the process of self-acceptance in the long run. Intrinsic job satisfaction was found to have no significant relationship with environmental mastery. This suggests that satisfaction derived from the job itself may not necessarily enhance healthcare employees' ability to manage the demands and challenges of their work environment. Instead, environmental mastery may depend more on situational and organisational factors, such as workload, autonomy, available resources, and workplace support. This is consistent with the findings of the study by Madhuchandra and Srimathi (2016).

The study also demonstrated that extrinsic satisfaction has a positive relationship with some of the dimensions of psychological well-being. Specifically, extrinsic satisfaction was found to be related to only three dimensions of psychological well-being (purpose in life, positive relations with others, and self-acceptance). This is supported by three justifications. Firstly, Brdar et al. (2009) indicated that people who pursued a pleasant life (purpose in life) placed more value on extrinsic aspirations, like money, fame, and an appealing image. Secondly, when the employee is satisfied with extrinsic factors such as pay, allowance, and a flexible schedule, this fundamentally leads to greater teamwork, and medical employees such as nurses will maintain good relations with their patients. Thirdly, employees have a high degree of self-acceptance because they feel good about themselves for being well-compensated and working in an established private healthcare organization. In view of this, it is suggested that private healthcare organizations establish competitive pay practices that match the employees' performance and skill set. The management at private healthcare organizations may consider enhancing company policies related to salary progression and promotions to assure the employees' job security. However, no relationship was found between extrinsic satisfaction and the other three dimensions, which were personal growth, autonomy, and environmental mastery. The result of the recently concluded study agreed with Niemiec (2009) that people with strong extrinsic satisfaction have more difficulty fulfilling their needs for autonomy. This is because most employees feel that they have the autonomy to do what they are supposed to do, and they experience an abundance of self-confidence in their roles. Besides that, the extrinsic factors would have no bearing on their desire to raise the bar in their career and will continue to display work motivation to focus on their personal growth. In the case of the hospital as the workplace environment, employees who have high environmental mastery can also be seen as perceiving themselves to be competent enough to face the challenges in treating patients regardless of the extrinsic circumstances that they are facing. This finding was also similar to studies conducted by Olafsen (2024) and Laguerre and Barnes-Farrell (2025).

Additionally, the study revealed that perceived organizational support was found to have a positive relationship with all six dimensions of psychological well-being. The findings are consistent with Darmawan (2022) and Deniz and Kocabaş (2024). Specifically, Jain et al. (2013) found that POS reduces occupational stress and consequently leaves a positive impact on the psychological well-being of employees. In the nursing context, "with organizational support, nurses can succeed in continuing their professional development" (Bradley et al.,

2005). In fact, Hinno et al. (2009) noted that "there is rising indication that when registered nurses perceive more support, they are likely to be happier with their job and plan to stay with their present hospital". Therefore, it is suggested that private healthcare organizations proactively manage any negative sentiment between employees and organizations or between members before it grows bigger, as this may jeopardize employees' well-being if measures to address it are not taken as soon as possible. This is because, when employee have a supportive workplace environment, it will increase their productivity (Arogundade et. al., 2015). Moreover, this may also protect our medical employees from the "harmful effects of stress by enhancing their self-esteem and communicating that the organization cared for their well-being" (George et al., 1993).

Two suggestions for future study. Firstly, future studies should be expanded to the public healthcare sector for new insights and perspectives, especially during the post-pandemic era. As public healthcare is a more affordable alternative for the community and subsidized by the Malaysian government, it is usually overcrowded with a high number of patients. The difference in the work environment may provide significant discovery on the level of psychological well-being among healthcare employees. As a result, the management of healthcare organizations and human resource professionals can benefit from the findings of the study in initiating transformation of their current talent management practices in producing a happier and more productive workforce in the future.

Secondly, future studies should utilize a longitudinal research design. This counters the disadvantages of cross-sectional design. A longitudinal design involves the collection of data over a long period of time. It would help researchers to learn more about the cause-and-effect relationship and subsequently allow for better results and perspectives. Finally, as this study was limited to the direct relationship of the variables, future researchers could seek to expand the pool of potential explanatory variables and additional moderating or mediating variables to enable researchers to better understand the dynamic framework between job satisfaction, perceived organizational support, and psychological well-being.

**Conclusion**

To conclude, for private healthcare leaders, this study serves as a vital reminder that employee well-being doesn't consist only of luxury HR perks through extrinsic job satisfaction. While competitive pay and decent workspace tools keep both medical and administrative staff from leaving, it is the human elements through intrinsic job satisfaction such as autonomy, sense of purpose, and the belief that management supports them when things get out of control keep them from burning out. By moving away from only 'superficial' wellness initiatives and actively building a culture where frontline medical employees' exhaustion is met with structural relief and administrative employees' behind-the-scenes effort is genuinely valued, the healthcare management team can transform their workplace from a highly stressful environment into a resilient, thriving community where taking care of the employees is understood as the most important step to taking care of the patients.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Workplace Harassment and Anxiety Among Internship Students in Malaysia: The Moderating Role of Gender

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**Abstract:** Workplace harassment poses a significant threat to the psychological well-being of internship students, yet limited evidence exists on whether gender shapes this relationship in Malaysian organizational contexts. This study examined the relationship between workplace harassment and anxiety among internship students in Malaysia and evaluated the moderating role of gender. A cross-sectional survey was conducted among 247 internship students from the Faculty of Business and Management, Universiti Teknologi MARA. Workplace harassment was measured using three dimensions: workplace bullying, abusive supervision, and interpersonal conflict, while anxiety was assessed using the Generalized Anxiety Disorder scale (GAD-7). Pearson correlation analysis showed that all harassment dimensions were positively and significantly related to anxiety: bullying ($r = .367$, $p < .001$), abusive supervision ($r = .386$, $p < .001$), and interpersonal conflict ($r = .376$, $p < .001$). The composite harassment scores also demonstrated a significant positive association with anxiety ($r = .420$, $p < .001$). Hierarchical moderated regression analysis revealed that workplace harassment significantly predicted anxiety ($b = .621$, $p < .001$, $R^2 = .188$). However, the interaction between workplace harassment and gender was non-significant ($b = -.163$, $p = .452$), indicating that gender did not moderate the relationship. The findings suggest that workplace harassment is a substantial predictor of anxiety among interns regardless of gender. Universities and host organizations should implement gender-inclusive anti-harassment policies and psychological support mechanisms to safeguard interns' well-being.

**Keywords:** *Workplace harassment, anxiety, gender moderation, abusive supervision, workplace bullying, interpersonal conflict, interns' well-being*

## 1. Introduction

In this context, internship programs serve to connect academic preparation with professional practice, bridging students and real organizational contexts before their final entry into the job market (Tran & Nguyen, 2021). But those environments are not always friendly. Interns are in a structurally vulnerable position within host organizations: They have none of the employment protections afforded to permanent staff, and their academic grades often rely on evaluations from the same supervisors who might be mistreating them. That mix makes formal grievance reporting feel high-stakes in ways it does not for tenured employees (Lian et al., 2022; Yusoff et al., 2021), and creates conditions under which harassment can persist with minimal institutional accountability.

Workplace harassment refers to a persistent pattern of unfavorable, hostile interpersonal behaviors aimed toward a victim (Ariza-Montes et al., 2020; Giorgi et al., 2020). The construct encompasses several related yet distinctly different forms: systematic unhealthy behavior by peers or supervisors, on the one hand, sustained antagonistic conduct from those in positions of authority (abusive supervision), and the friction of daily negative interactions with coworkers (Mackey et al., 2021; Tepper et al., 2020). Each varies in mechanism, but all have a documented ability to create psychological strain such as anxiety, depression, and burnout.

One of these consequences that we must particularly focus on in the internship context is anxiety. It affects cognitive functioning and career decisions in ways that can endure well beyond the placement period itself (Rajgopal, 2020; Salihu & Shehu, 2022). However, although there is accumulating evidence that student psychological health and occupational stressors are associated with each other, studies on the relationship between harassment and anxiety in internship contexts have been sparse, especially within higher education systems of Southeast Asia (Ahmad et al., 2021; Rahim et al., 2023).

Gender is another dimension of this portrait. Women report experiencing higher levels of hostile workplace behaviors across occupational sectors (McDonald et al., 2021; Munn & Munn, 2020), and some socialization differences contribute to their being more psychologically reactive than men when targeted with such behaviors (Liu et al., 2020). Whether gender moderates the psychological effect of harassment, rather than just how often it occurs, is a separate and less settled empirical question (Nielsen et al., 2020; Spector et al., 2021). Malaysia provides a useful case study for understanding these dynamics. Our country exhibits high power distance in its organizational culture, which limits harassment disclosure and intensifies the hierarchical gap between supervisors and interns (Abdullah et al., 2022; Hamid et al., 2020).

As Malaysia's largest public university, Universiti Teknologi MARA (UiTM) has tens of thousands of business students who undergo industrial training every year, making it a sizeable and ecologically valid setting for this type of research. The main contribution of this paper is addressing these two questions: does workplace harassment predict anxiety among business internship students in Malaysia, and does gender moderate that relationship? Both directly influence intern welfare policy, as well as the institutional support structures that universities and host organizations create.

## 2. Literature Review and Theoretical Framework

### *Workplace Harassment: An Exploration of Dimensions*

Generally, rather than being regarded as a unidimensional phenomenon, workplace harassment is currently considered a multidimensional construct, in which separate but overlapping forms of interpersonal aggression are given different theoretical and psychometric consideration (Ariza-Montes et al., 2020; Einarsen et al., 2020). This study not only does the former but also operationalizes three of those forms of harassment.

Bullying in the workplace typically describes repeated, systematic negative acts toward another target who finds it difficult to defend himself or herself, usually occurring within contexts of actual or perceived power imbalance (Einarsen et al., 2020; Samnani & Singh, 2021). NAQ-R is a measure of negative acts at the workplace that distinguishes work-related bullying by obstructing tasks and withholding information from person-related bullying in terms of humiliation and social isolation. Evidence from meta-analyses demonstrates a reliable negative relationship between exposure to bullying and psychological distress in organizational settings (Nielsen et al., 2020).

Abusive supervision is defined as subordinates' ongoing evaluations of hostile verbal and nonverbal behaviors directed at them by supervisors, excluding physical contact (Mackey et al., 2021; Tepper et al., 2020). Its distinction from peer bullying lies in the formal authority behind it: the supervisor oversees evaluations, references, and daily working conditions, leaving targets of this behavior with few legitimate avenues to seek recourse. This problem is acute for internship students, whose grade and post-placement references all rely on the very person who may be mistreating them (Lian et al., 2022). Recent meta-analyses have established abusive supervision as a fairly consistent risk factor for anxiety and emotional exhaustion (Mackey et al., 2021). Interpersonal conflict at work is defined as hostile or antagonistic exchanges between coworkers that lead to chronic relational friction (Kwan et al., 2018; Spector et al., 2021). Quantified here using the Interpersonal Conflict at Work Scale (ICAWS), this kind of behavior is typically less flamboyant than bullying or abusive supervision, but its cumulative impact on psychological well-being has been documented many times over.

### *The Harassment and Anxiety Link through the Lens of Conservation of Resources Theory*

Conservation of Resources (COR) theory (Hobfoll, 1989; Hobfoll et al., 2018) provides a unified explanation for why harassment creates anxiety. This theory posits that humans seek to protect and build resources, broadly defined to encompass psychological safety, self-efficacy, social belonging, and professional standing. Harassment attacks those resources directly. Bullying eats away at one’s sense of self-worth; abusive supervision compromises the safety that characterizes the supervisory relationship and undermines the intern’s feeling of competence therein; an interpersonal conflict leeches away the cooperative social capital that can otherwise help protect against work stress. [When resources are threatened or lost, the resultant strain is experienced as anxiety, as people make their choices under threat of additional loss with diminished capacity to engage (Hobfoll et al., 2018; Lian et al., 2022).

Supplementary occupational research data confirm that sustained resource threat of this type will engender anxiety as an outcome (Giorgi et al., 2020; Kwan et al., 2018). For interns in particular, the picture is a bit more complex than for full-time hires. Interns come in with fewer organizational resources at their disposal, as they lack existing relationships, institutional knowledge, or positional authority. They are also operating within a high-stakes evaluative frame whereby resource losses have academic as well as psychological repercussions (Yusoff et al., 2021; Rahim et al., 2023). Both factors point to sexual harassment potentially affecting interns more, or at least differently, than the existing research on permanent employees would find.

***Gender as a Moderating Variable***

There are two opposing positions that frame the debate over gender and outcomes in harassment cases. According to the vulnerability hypothesis, women react more vigorously to workplace aggression than men do because socialization processes lead them to direct their focus on relational harmony (Liu et al., 2020; McDonald et al., 2021), which implies that interpersonal hostility is particularly threatening toward attacking relational resources that individuals value (Gershon et al, 2008). An alternative view is the differential exposure hypothesis: observed gender differences in harassment outcomes are due to differences between men and women in their overall prevalence or severity of harassment, not their sensitivity to it. Adjust for exposure, and the outcome gap should disappear (Nielsen et al., 2020; Munn & Munn, 2020).

The empirical record does not speak decisively to either position. Some studies find harassment–strain associations are stronger for women (e.g., Liu et al. 2020); however, other studies have reported that effect sizes are statistically equivalent across genders (Nielsen et al. 2020; Spector et al. 2021). Cultural context makes matters more complicated. In high power-distance cultures, such as that of Malaysia, masculinity norms that stigmatize the sharing of emotional states may mute self-reported anxiety among men, thus possibly compressing mere differences in psychological outcomes even when actual reactivity is equivalent (Abdullah et al., 2022; Hamid et al., 2020). This possibility suggests testing the moderation rather than assuming it.

***Hypotheses***

From the review above, four hypotheses were developed:
H1: Workplace bullying has a positive and significant relationship with anxiety among students in internships.
H2: Internship students are significantly and positively associated with anxiety due to abusive supervision.
H3: Internship students' anxiety is positively and significantly associated with interpersonal conflict.
H4: Gender moderates the relationship between composite workplace harassment and anxiety, such that the positive relationship is stronger for female than male interns.

## 3. Methodology

### Research Design and Sample

A quantitative cross-sectional survey design was employed, which is appropriate for determining concurrent associations between predictor and outcome variables in a defined population (Sekaran & Bougie, 2022). The subjects in this study were internship students from the Faculty of Business Management at UiTM during the data collection phase. Purposive sampling focused on students who were doing supervised industrial training placements. Listwise deletion of incomplete records resulted in 247 usable responses. The sample was gender-skewed (n = 193, 78.1% female; n = 54, 21.9% male), a pattern consistent with the overall gender composition of Malaysian public university business faculty enrollment (Ministry of Higher Education Malaysia, 2023). The mean age of participants was 22.4 years (SD = 1.12). The majority of participants were carrying out placements in the services sector (61.5%), followed by finance and banking (22.3%) and public administration (16.2%). The length of placements ranged from 12 to 24 weeks.

***Measures***

Workplace bullying was measured with the Negative Acts Questionnaire–Revised (NAQ-R; Einarsen et al., 2020), a 22-item instrument scored on a 5-point frequency scale (1 = Never to 5 = Daily). The NAQ-R has shown strong cross-cultural reliability and validity across organizational contexts (Samnani & Singh, 2021). Cronbach's alpha for the current sample was $\alpha = 0.91$. Tepper et al. (2005) were used to measure abusive supervision. The 15-item Abusive Supervision Scale (AS, Tepper, 2000) uses anchors of 0 (I cannot remember him/her ever using this behavior with me) and 4 (He/she uses this behavior very often with me). The scale has well-established criterion validity for employee well-being outcomes (Mackey et al., 2021). Alpha was $\alpha =. 93$.

Using a 5-point scale, the Interpersonal Conflict at Work Scale (ICAWS; Kwan et al., 2018), comprising 4 items, was used to measure interpersonal conflict. In occupational samples, the ICAWS exhibits reasonable reliability and convergent validity with strain measures (Spector et al., 2021). Alpha was α =.82.

Anxiety was assessed using the 7-item Generalized Anxiety Disorder scale (GAD-7; Löwe et al., 2021) on a 4-point scale (0 = Not at all to 3 = Nearly every day). In clinical and general populations, the GAD-7 has good reliability and screening validity (Rutter et al., 2021). Alpha for the current sample was α =. 89. ≥ 10 corresponds to moderate-to-severe anxiety.

A composite workplace harassment score was calculated by standardizing and averaging the scores of the three scales measuring harassment. Gender was coded as a dichotomous variable (0 = male, 1 = female). Items were administered in both Bahasa Malaysia and English, with back-translation procedures conducted to verify semantic equivalence (Sekaran & Bougie, 2022).

***Strategy of Data Analysis***

The analysis was conducted in three phases. Descriptive and Pearson's bivariate correlation statistics were first calculated to profile the sample and test Hypotheses 1 through 3. To test Hypothesis 4, hierarchical moderated regression was conducted following the procedures of Cohen et al. (2003). The composite harassment score was entered at Step 1; the gender variable was added at Step 2; the harassment-by-gender interaction term, calculated using mean-centered variables, was entered at Step 3. A significant $\Delta R^2$ >. 01 with $p < .05$ at Step 3 was chosen as the threshold for moderation. Gender stratification regression analyses were then conducted to explore within-group associations. Harman's single-factor test was employed to assess the common method variance. IBM SPSS Statistics Version 27 was used for all analyses.

## 4. Results

***Preliminary Analyses***

Harman's single-factor test indicated that the largest common factor accounted for 28.7% of total variance, well below the 50% threshold, suggesting common method variance did not critically distort the data (Podsakoff et al., 2020). Skewness and kurtosis values for all harassment subscales and the GAD-7 fell within the ±2.0 range, supporting the use of parametric tests.

***Descriptive Statistics and Correlation Analysis***

Table 1 presents descriptive statistics and Pearson correlations for all study variables. Mean harassment scores were moderate across all three dimensions. The mean GAD-7 score of 7.14 (SD = 4.23) sits within the mild anxiety range but close to the clinical screening threshold, consistent with evidence of elevated psychological distress among Malaysian university students (Ahmad et al., 2021; Salihu & Shehu, 2022). Hypotheses 1 through 3 were supported: all three harassment dimensions correlated significantly and positively with anxiety. The composite harassment score showed the strongest association ($r = .420$, $p < .001$), supporting the case for aggregating the three dimensions.

**Table 1: Descriptive Statistics and Pearson Correlations Among Study Variables (N = 247)**

| Variables | M | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| 1. Workplace Bullying (NAQ-R) | 1.73 | 0.58 | — | | | | |
| 2. Abusive Supervision | 1.82 | 0.64 | .412*** | — | | | |
| 3. Interpersonal Conflict (ICAWS) | 1.79 | 0.61 | .374*** | .453*** | — | | |
| 4. Composite Harassment | 1.78 | 0.55 | .814*** | .821*** | .784*** | — | |
| 5. Anxiety (GAD-7) | 7.14 | 4.23 | .367*** | .386*** | .376*** | .420*** | — |

*** $p < .001$.

***Hierarchical Moderated Regression***

Table 2 presents the hierarchical regression results. At Step 1, composite workplace harassment significantly predicted anxiety and explained 18.8% of its variance ($b = .621$, $SE = .089$, $\beta = .433$, $t = 6.97$, $p < .001$, $R^2 = .188$). Adding gender at Step 2 produced a non-significant increment ($b = .318$, $p = .214$, $\Delta R^2 = .006$), indicating that

gender did not account for additional variance in anxiety beyond harassment exposure alone. The harassment-by-gender interaction term at Step 3 was also non-significant (b = −.163, t(243) = −0.753, p = .452, $\Delta R^2$ = .002), providing no support for Hypothesis 4. The total model at Step 3 explained 19.6% of the variance in anxiety. The $\Delta R^2$ of .002 falls well below conventional thresholds for meaningful moderation (Lakens, 2022), and the 95% confidence interval for the interaction coefficient [−0.591, 0.265] included zero throughout, which confirms the null finding.

**Table 2: Hierarchical Moderated Regression: Workplace Harassment Predicting Anxiety (N = 247)**

| Predictor | b | SE | β | t | $R^2$ | $\Delta R^2$ |
|---|---|---|---|---|---|---|
| Step 1 | | | | | | |
| Composite Harassment | .621 | .089 | .433 | 6.97*** | .188*** | .005 |
| Step 2 | | | | | | |
| Composite Harassment | .614 | .090 | .428 | 6.82*** | .194*** | .006 |
| Gender (0=Male, 1=Female) | .318 | .254 | .077 | 1.25 | | |
| Step 3 | | | | | | |
| Composite Harassment | .621 | .091 | .433 | 6.83*** | .196*** | .002 |
| Gender | .309 | .257 | .074 | 1.20 | | |
| Harassment × Gender | −.163 | .217 | −.048 | −0.75 | | |

*Note. *** p < .001. Predictors mean-centered before interaction term computation.*

***Within-Group Stratified Analyses***

Stratified regression analyses confirmed that harassment significantly predicted anxiety within both gender groups: female interns (b = .653, SE = .094, β = .449, t = 6.94, p < .001, $R^2$ = .202) and male interns (b = .489, SE = .175, β = .392, t = 2.79, p = .006, $R^2$ = .154). The unstandardized coefficient was numerically larger for women than for men, but the confidence intervals overlapped substantially (female: [.468, .838]; male: [.143, .835]). Given the non-significant interaction term, this numerical difference should not be interpreted as a meaningful gender effect.

## Discussion

***Workplace Harassment as a Universal Predictor of Intern Anxiety***

The results are clear-cut on the main question: workplace harassment predicts anxiety among Malaysian business students struggling through an internship, and it does so across the board. The other index, the composite harassment index, accounted for 18.8% of variance in GAD-7 scores (a statistically significant and practically meaningful effect size, one which lies within the range observed for samples of permanent employees reported in the meta-analyses conducted by Nielsen et al. (2020), Mackey et al. (2021)). The size of correlations produced by all three harassment dimensions with anxiety was comparable, implying that the anxiety-generating potential of workplace hostility is not unique to any one of the aggression modes.

This pattern can be reasonably explained by COR theory (Hobfoll et al., 2018; Lian et al., 2022). Bullying saps self-worth; abusive supervision steals psychological safety within a relationship from which they cannot extricate themselves easily; interpersonal conflict drains the cooperative social resources that would serve as buffers against occupational stress. The fact that these threats work via different mechanisms may account for the composite harassment measure, which includes all three channels, yielding the strongest anxiety correlation (r = 420), where the cumulative burden of resource loss from multiple sources exceeds what any one dimension can capture on its own (Giorgi et al., 2020).

Noteworthy too is the mean GAD-7 score (7.14). This is mild anxiety but near the population-level screening cut-off of 8 (Löwe et al., 2021; Rutter et al., 2021). This is in line with broader evidence of elevated psychological distress among Malaysian university students and young workers (Ahmad et al., 2021; Rahim et al., 2023) and indicates that workplace harassment during placements adds to the burden faced by students before they enter their internships.

***The Nulling Moderation of Gender***

The gender interactions were non-significant (b = −. 163, p =. 452, $\Delta R^2$ =. 002), and the confidence interval for the interaction term did not cross zero by a wide margin. This null finding is theoretically instructive. After

controlling for exposure to harassment directly, gender does not moderate the relationship between harassment and anxiety. Male interns showed a statistically significant harassment-anxiety association (b = .489, p = .006), along with a smaller numerical female coefficient (b = .653) that was not markedly different therefrom. The vulnerability hypothesis, which would expect a meaningfully stronger effect for women, has no support here.

This result fits with a growing line of research indicating that gender-invariant harassment effects are more prevalent than previously thought (Nielsen et al., 2020; Munn & Munn, 2020). A plausible explanation for this phenomenon can be found in Malaysian culture, where male coefficients, although significant, were lower because they controlled for the impact of women. The norms of masculinity in high power-distance societies may have stifled men's self-reporting of their anxiety (Abdullah et al., 2022; Hamid et al., 2020). If anything, that suppression would have operated in the opposite direction, working against finding a strong male association and rendering its presence in this data more striking, not less.

However, the small male subsample (n = 54) does limit the statistical power to detect moderation, leaving open the possibility of a Type II error. Equivalence testing per Lakens (2022) showed that the interaction effect (d = −. 096) was within the bounds of practical equivalence [−. 40, 40], which offers confirmation rather than simply non-confirmation of the null moderation conclusion.

***Limitations for Organizations and Higher Education Institutions***

The gender-invariant finding has no frills take-home message for practice: anti-harassment programs that defend principally female employees will leave male interns, at equivalent psychological risk, unprotected. Commenting on these challenges, we advocate for gender-inclusive terms for intern mental health protection and support from both universities and host organizations (Yusoff et al., 2021; Rahim et al., 2023). For universities and colleges that operate mandatory placement courses, there are several appropriate responses. Pre-placement psycho-education on harassment identification and management, confidential reporting mechanisms not channelled through academic supervisors, and post-placement psychological screenings using measures such as the GAD-7 (Löwe et al., 2021), each address a hole that existing arrangements leave unfilled. Internship partnership agreements with host organizations should include standard conditions requiring demonstrable anti-harassment policies and accessible pathways for mental health referrals (Ahmad et al., 2021).

Abusive supervision within-group regression results suggest supervisory behavior is a particularly high-leverage target for intervention. More structured training programs that focus on hostile communication patterns have shown efficacy in similar settings (Mackey et al., 2021; Tepper et al., 2020), especially when hierarchical organizational norms would otherwise normalize supervisory aggression. Integrating supervisor evaluations with intern satisfaction data would create a new accountability mechanism in Malaysian internship arrangements (Abdullah et al., 2022) that was not available before.

## 5. Limitations and Directions for Future Research

Several limitations qualify these findings. Due to the cross-sectional nature, causation cannot be determined. The association between harassment and anxiety is theoretically consistent with the view that harassment causes anxiety, but may also be true in principle: people low on baseline or dispositional anxiety are likely to interpret interactions as less hostile (Podsakoff et al., 2020). Longitudinal designs measuring harassment exposure and GAD-7 scores on several occasions throughout the placement period would provide stronger causal evidence and allow examination of whether trajectories differ by gender.

As the sample was predominantly female (78.1%), this limits statistical power for analyses of the male subsample. The male regression coefficient has wider confidence intervals than the female estimate, and the possibility of a Type II error in the moderation test cannot be ruled out. Future studies may strive for gender-balanced recruitment or implement prospective power analyses based on the effect sizes reported here. Reporting equivalence tests together with standard significance tests (Lakens, 2022) would bolster claims of null moderation.

A third limitation is our reliance on self-report measures, although Harman's test results were reassuring regarding common method variance. Future work could also mitigate this concern by supplementing self-reported harassment with supervisor-rated indices of organizational climate or peer-nominated behaviors (Podsakoff et al., 2020). The sample is also drawn from a single faculty member at one institution, and the findings are not generalizable beyond a single discipline, institutional type, or national context. This would effectively address issues of local and culture-bound error, with multi-site replication within Malaysia and comparative designs involving other high power-distance societies, strengthening external validity.

Future studies could also investigate the mechanisms through which harassment leads to anxiety. COR theory implicates processes of resource depletion, in particular lower self-efficacy, diminished organizational belonging, and erosion of supervisory trust, as likely mediators (Hobfoll et al., 2018; Giorgi et al., 2020). Whether supportive factors like peer social support, the quality of mentoring, or predispositions for proactive coping styles would mitigate these indirect harm effects, and whether they may differ between male and female interns, remains an open and practically relevant question.

**Conclusion**

In Malaysia's business internship students, workplace harassment (bullying, abusive supervision, and interpersonal conflict) is a significant predictive factor of their anxiety. Gender does not moderate that relationship at all, as both male and female interns experience the same amount of anxiety elevation per unit exposure to harassment, and the interaction term accounts for a small, non-significant share of variance. The data do not support the supposed assumption that female interns have a disproportionately heavier psychological burden. Framing intern mental health protection as a gender-based concern is not just theoretically unsupported; it leaves a psychologically at-risk male population without adequate institutional response. Anti-harassment policies, accessible psychological support, and accountability mechanisms for supervisory conduct need to be universal rather than targeted to address the harm documented here. The effect sizes are large enough to warrant institutional action. They should not be used to justify leaving half the intern population out of scope.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Workload, Work-Life Balance and Job Satisfaction Among Medical Officers in Public Hospitals in The Klang Valley: A Proposed Conceptual Framework

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**Abstract:** Job satisfaction is a key factor in retaining the medical workforce, especially in public hospitals where medical officers often face demanding clinical duties and organizational pressures. This concept paper proposes a framework to examine the relationship between workload, work-life balance, and job satisfaction among medical officers in public hospitals in the Klang Valley, Malaysia. The framework is guided by the Job Demands–Resources theory. Workload is viewed as a job demand requiring constant physical and psychological effort, and work-life balance is the extent to which medical officers can manage work responsibilities alongside recovery and personal life. The proposed study will employ a quantitative cross-sectional correlational design. Proportionate stratified random sampling will be used to select the medical officers from the participating hospitals. Data on workload, work-life balance, and job satisfaction, together with relevant demographic and occupational information, will be collected using validated instruments. Descriptive statistics will be used to describe the respondents and study variables, and correlation and multiple linear regressions analysis will be used to examine the relationship among the variables. The proposed framework is expected to provide evidence that is more specific to the working conditions of medical officers in public hospitals in the Klang Valley. Future studies may also test the framework in other regions and hospital settings in Malaysia.

**Keywords:** *Job Satisfaction, Workload, Work-Life Balance, Medical Officers, Public Hospitals*

## 1. Introduction and Background

Job satisfaction is a central workforce outcome because it captures how employees evaluate their work and employment conditions rather than only whether they are psychologically exhausted. Contemporary research treats job satisfaction as an overall evaluative judgement with both cognitive and affective components (Williams et al., 2024). This distinction is important in medicine. Burnout concerns exhaustion and strain arising from prolonged occupational stress, whereas job satisfaction concerns whether the job, taken as a whole, is evaluated favorably. A medical officer may therefore report strain while remaining satisfied with important aspects of the job, or may report low satisfaction without meeting criteria for burnout. Conflating these constructs obscures the organizational conditions that shape whether doctors regard public-sector employment as sustainable.

Job satisfaction is also relevant because it is connected to workforce retention. A 2025 systematic review and meta-analysis covering 34 studies and 97,672 doctors estimated a pooled turnover-intention prevalence of 39% and identified lower job satisfaction as a significant factor associated with intention to leave (Wang et al., 2025). This global evidence does not establish the magnitude of the relationship in Malaysia, but it provides a strong reason to treat job satisfaction as more than a desirable employee attitude. In a health system that depends on retaining trained doctors, unfavorable evaluations of work can become an organizational risk when they contribute to withdrawal intentions and loss of experienced personnel.

Malaysian evidence points to similar pressures, although the available studies are fragmented across settings and outcomes. In a Malaysian study of primary care physicians, Ab Rahman et al. (2019) found that public-sector doctors reported lower overall job-satisfaction scores than private-sector doctors. Administrative overload was reported by 59.7% of public doctors compared with 36.0% of private doctors, while 62.9% of public doctors reported a good effort-reward balance compared with 85.8% in private practice. These findings demonstrate that organizational and work-related conditions are relevant to physician satisfaction in Malaysia. They do not, however, answer the present question because the participants were primary care physicians

rather than medical officers working in public hospitals.
The Klang Valley is an important setting in which to examine this question because public hospitals within the states and federal territories encompassing the region operate within a substantial volume of healthcare service activity. Ministry of Health Malaysia data for 2024 recorded 3,130,531 outpatient attendances at MOH hospitals in Selangor and 755,337 in W.P. Kuala Lumpur (Ministry of Health Malaysia, 2025). These figures represent state and federal-territory totals and should not be interpreted as direct measures of service volume within the study sample. However, they provide an overview of public hospital activity in the wider Klang Valley context.

More direct evidence of workforce instability has emerged in the same geographical setting. Mohamad et al. (2025) surveyed 380 permanently employed doctors across ten public hospitals in the Klang Valley and found that 58.16% of them met the study's threshold for intention to leave public service. Distributive justice and temporal justice were both negatively related to turnover intention. This study did not test for job satisfaction and included doctors rather than isolating medical officers as a single occupational group. Thus, its relevance is contextual rather than evident for the proposed relationships. However, it shows that retention issues are of concern to public hospitals in Klang Valley and that management of time and work demands is related to doctors' employment intentions.

Other Malaysian studies have confirmed the need to differentiate occupational strain from job satisfaction. In a study of doctors from seven tertiary public hospitals in Malaysia, Mohd Fauzi et al. (2020) found high mean scores for acute and chronic fatigue, but relatively lower intershift recovery scores. Work-related rumination during non-work time was commonly reported and significantly associated with several fatigue and recovery outcomes. Although job satisfaction was not examined directly in this study, the findings suggest that occupational demands may carry over and interfere with recovery among doctors working in Malaysian public hospitals. Later, Roslan et al. (2021) reported high levels of personal and work-related burnout among a heterogeneous sample of Malaysian healthcare workers in the COVID-19 period, with workload and work-family difficulties appearing in participants' accounts of strain. These studies show that demands and recovery are locally relevant, but neither directly establishes how medical officers evaluate their jobs.

Recent medical-officer evidence makes the remaining gap more visible. Muhammad et al. (2025) interviewed 18 medical officers in a Malaysian university hospital and identified satisfaction and dissatisfaction around patient care, family time, educational responsibilities, teamwork, hospital systems, salary, and career advancement. The study is valuable because it focuses specifically on medical officers. However, its qualitative design and university-hospital setting do not determine whether workload and work-life balance are independently associated with job satisfaction among medical officers in the Ministry of Health or other public hospitals in the Klang Valley. The evidence base therefore contains relevant pieces, but not a direct test of the proposed explanatory structure.

**Problem Statement**

The core problem is not simply that medical work is demanding. High clinical demand is inherent in hospital practice and may coexist with professional meaning. The unresolved issue is whether medical officers' job demands are experienced at a level that weakens their evaluation of public-hospital employment, and whether the compatibility of work with recovery and non-work responsibilities helps explain that evaluation. This distinction makes job satisfaction an appropriate outcome because it captures the medical officer's judgement of the employment relationship rather than using burnout, fatigue, or turnover intention as substitutes.

The workforce problem is particularly consequential in Klang Valley public hospitals. First, official service statistics indicate a high-volume public-hospital environment in Selangor and Kuala Lumpur (Ministry of Health Malaysia, 2025). Second, recent evidence from ten public hospitals in the Klang Valley indicates that more than half of the surveyed doctors met the threshold for intention to leave the public service, with temporal justice significantly associated with turnover intention (Mohamad et al., 2025). Malaysian studies involving physicians and other healthcare workers also identify administrative overload, inadequate recovery, burnout, and work-family strain as important occupational concerns. Ab Rahman et al. (2019) documented administrative overload among public-sector primary care doctors, while Mohd Fauzi et al. (2020) reported comparatively lower intershift recovery among doctors working in tertiary public hospitals. Roslan et al.

(2021) further identified workload and challenges in maintaining work-family balance as reported sources of burnout among Malaysian healthcare workers during the COVID-19 pandemic. Taken together, these findings establish an urgent workforce-management problem, but they do not show whether medical officers who experience heavier workload and poorer work-life balance are also less satisfied with their jobs.

The current literature is limited in four specific ways. Much of the Malaysian evidence measures burnout, fatigue, stress, or turnover intention rather than job satisfaction. Studies that do assess job satisfaction often focus on primary care doctors or university-hospital medical officers rather than medical officers in public hospitals. Klang Valley evidence on doctor retention does not isolate job satisfaction as the focal outcome. Furthermore, workload and work–life balance are often discussed as related pressures, but they are not conceptually identical and have rarely been examined together as distinct predictors of medical officers' job satisfaction in this setting. A clear and context-specific explanation remains limited in the literature identified for this review.

Accordingly, this article proposes a framework that evaluates workload and work-life balance as separate correlates of job satisfaction among medical officers working in public hospitals in the Klang Valley. The framework relates to the question posed by the evidence: when public-hospital work is demanding, is dissatisfaction more closely related to the intensity and accumulation of job demands, the extent to which work disrupts recovery and non-work life, or both? Answering this question can provide a more precise basis for subsequent empirical testing and for distinguishing between interventions aimed at the amount and organization of work and interventions aimed at recovery and work–life compatibility.

## 2. Literature Review

### Theoretical Background: Job Demands-Resources Theory

The framework is primarily based on the theory of Job Demands-Resources (JD-R). The original model differentiates between job demands, which require sustained physical or psychological effort and may therefore lead to costs when the demands are high, and job resources, which support the achievement of goals, reduce the costs of demands, or stimulate growth (Demerouti et al., 2001). Subsequent formulations outline two general procedures. The health impairment process involves continual demands that drain energy and heighten strain, while the motivational process involves the use of resources to promote work engagement and positive work outcomes (Bakker & Demerouti, 2017). The theory is deliberately flexible because the demands and resources that matter vary by occupation and organizational context.

Recent developments in JD-R theory make this contextual flexibility more explicit and recognize that work processes interact with experiences outside work (Bakker et al., 2023). That development is relevant to medical officers, but it creates a conceptual problem that this framework must resolve. Work-life balance is sometimes treated loosely as if it were a conventional job resource. Doing so risks mixing an organizational condition with an employee's appraisal of whether work remains compatible with recovery and non-work roles. The present framework therefore does not classify work-life balance as a job resource in the original JD-R sense. It treats workload as a job demand and work-life balance as a cross-domain recovery-compatibility appraisal that reflects the practical consequences of work demands for life outside work.

Job satisfaction is positioned as an attitudinal outcome. JD-R theory was initially developed around burnout, but later theory and evidence do not require the health-impairment process to terminate only in exhaustion. Bakker and Demerouti (2017) established this broader theoretical scope, which Bakker et al. (2023) subsequently developed further. Persistent demands can also shape employees' evaluations of their work. This distinction matters because dissatisfaction is not simply a milder form of burnout. It is a judgement about the job and its conditions. The proposed model therefore uses JD-R reasoning to explain why excessive demand and insufficient recovery compatibility may be associated with less favorable job evaluations, while retaining job satisfaction as conceptually distinct from strain.

The framework is intentionally bounded. It does not measure the full set of possible job resources such as supervisory support, autonomy, recognition, or career development. It also does not test all JD-R mechanisms. Its purpose is narrower: to use the demand and recovery logic of JD-R to separate two theoretically related but

non-equivalent conditions, workload and work-life balance, and to examine their association with medical officers' job satisfaction. This scope prevents the article from claiming a full test of JD-R theory and makes the proposed theoretical contribution more defensible.

**Job Satisfaction among Medical Officers**

Job satisfaction refers to an overall evaluative judgment about one's job, informed by both beliefs about work conditions and affective responses to work experiences (Williams et al., 2024). In healthcare, this evaluation can involve several domains. A factor-analytic study by Karaferis et al. (2022) demonstrated that healthcare job satisfaction is multidimensional rather than reducible to a single working condition. For medical officers, relevant domains can include the content of clinical work, organizational systems, remuneration, professional development, collegial relationships, and the capacity to sustain responsibilities outside work. The qualitative findings of Muhammad et al. (2025) illustrate this multidimensionality in a Malaysian medical-officer sample.

Evidence from physician studies also indicates that job satisfaction is associated with multiple work-related factors and should not be interpreted solely in relation to working hours. Voltmer et al. (2024) found that effort and reward were significantly associated with job satisfaction among physicians in Germany and Norway. In Malaysia, Ab Rahman et al. (2019) similarly reported differences in job satisfaction between public and private sector primary care doctors, alongside differences in administrative overload and perceived effort-reward balance. These studies support the proposition that doctors evaluate both what work requires and what the work arrangement provides. However, the international findings are not directly transferable to Malaysian public hospitals, while the Malaysian primary-care study does not represent medical officers in hospital-based services.

The strongest recent local reason to study job satisfaction is its potential connection to retention. The global meta-analysis by Wang et al. (2025) identified lower job satisfaction as a significant risk factor for turnover intention among doctors. In the Klang Valley, Mohamad et al. (2025) reported turnover intention among doctors working in public hospitals, but did not examine whether job satisfaction was associated with this pattern. This evidence is relevant because it highlights concerns about doctors' continued employment in the public sector, while leaving the role of job satisfaction unresolved. The same relationships therefore cannot be assumed among medical officers working in public hospitals in the Klang Valley. A context-specific study is needed rather than relying on inference from related occupational outcomes.

**Workload**

Within the proposed framework, workload is the cumulative intensity of clinical, administrative, cognitive, temporal, and coordination demands placed on a medical officer during work. The construct is broader than scheduled hours. Two doctors can work similar hours but face different patient complexity, interruption frequency, documentation burden, on-call intensity, or decision pressure. Demerouti et al. (2001) define such features as job demands when they require sustained effort and consume physical or psychological resources. Bakker and Demerouti (2017) maintain this theoretical logic in the later formulation of JD-R theory. The framework therefore focuses on perceived overall demand rather than treating hours alone as a sufficient representation of workload.

Evidence in healthcare shows that perceived overload has consequences even when job satisfaction is not measured directly. Rotenstein et al. (2023), using a large healthcare-workforce sample, reported that 37.1% of physicians experienced work overload. Among physicians, overload was associated with an adjusted risk of burnout 2.42 times that of physicians without reported overload. Overload was also associated with intention to leave across healthcare occupational groups. Because job satisfaction was not the primary outcome, these results should not be presented as direct evidence for the present hypothesis. They instead show that overload can have consequential attitudinal and health-related correlates.

Malaysian findings make the workload issue locally plausible but still incomplete. Public primary care doctors reported substantial administrative overload in Ab Rahman et al. (2019), while doctors working in tertiary public hospitals in Mohd Fauzi et al. (2020) reported high fatigue and comparatively lower intershift recovery, with work-related rumination during non-work time associated with poorer fatigue and recovery outcomes. Roslan et al. (2021) also identified workload as one of the reported sources of burnout among Malaysian

healthcare workers during the COVID-19 pandemic. The consistency of these findings supports workload as a relevant demand. Yet the studies vary in occupational group, care setting, period, and outcome, and none establishes the independent association between multidimensional workload and job satisfaction among Klang Valley public-hospital medical officers.

**Workload and Job Satisfaction**

The proposed negative relationship follows from theory rather than from a simple accumulation of empirical correlations. In JD-R terms, workload becomes problematic when the sustained effort required to meet clinical and organizational demands repeatedly consumes more capacity than can be restored. Over time, an employee may evaluate the job less favorably because the work arrangement is experienced as difficult to sustain. This pathway does not imply that demanding clinical work is inherently dissatisfying. Challenge, professional responsibility, and complex work can remain meaningful. The critical condition is whether the overall demand remains manageable relative to available time, energy, and organizational support.

This interpretation also reconciles apparently mixed evidence. International physician studies link effort-related conditions with lower satisfaction (Voltmer et al., 2024), while overload studies more often report burnout and withdrawal outcomes rather than job satisfaction (Rotenstein et al., 2023). Malaysian studies identify the same broad problem from different settings. Ab Rahman et al. (2019) report administrative burden in primary care, while Mohd Fauzi et al. (2020) demonstrate fatigue and recovery difficulties among public-hospital doctors. The evidence therefore supports a plausible demand-attitude relationship, but its magnitude and relevance for medical officers in Klang Valley public hospitals remain empirical questions. The framework proposes the following directional hypothesis:

**H1:** There is a significant relationship between workload and job satisfaction among medical officers in public hospitals in the Klang Valley

**Work-Life Balance**

Work-life balance is conceptualized as an individual's appraisal of the degree of compatibility between work and non-work roles, in terms of the ability to combine these roles in accordance with personal priorities, recovery and effective functioning. Contemporary work-nonwork research acknowledges that non-work life encompasses more than just family obligations; it also includes recuperation and other important roles. Kerksieck et al. (2024) emphasize active balancing across life domains, while Casper et al. (2025) review the organizational conditions shaping work-life balance. Thus, for medical officers, the construct therefore concerns the sustainability of the work arrangement across domains rather than the absence of professional commitment.

This definition is theoretically distinct from workload. Workload refers to the amount of work that has to be done. Work-life balance is about whether those demands are still compatible with adequate recovery and participation in non-work life. A medical officer may report high workload but acceptable work-life balance if schedules, autonomy, recovery opportunities, or personal circumstances make the arrangements workable. By contrast, even a moderate workload is sufficient to cause poor balance when demands are unpredictable or constantly encroach on recovery time. Treating the two variables as interchangeable would therefore conceal potentially different organizational mechanisms.

The recovery dimension has support in both Malaysian and international physician research. Mohd Fauzi et al. (2020) found that work-related activities and rumination during non-work time were associated with worse fatigue and recovery among Malaysian doctors. Shanafelt et al. (2022) reported a marked decline in satisfaction with work-life integration among United States physicians during the first two years of the COVID-19 pandemic, alongside higher burnout. The latter study is pandemic-specific and was conducted outside Malaysia, so it cannot establish the present relationship. It nevertheless illustrates why intrusion of work into non-work recovery is occupationally meaningful for physicians.

**Work-Life Balance and Job Satisfaction**

A positive relationship between work-life balance and job satisfaction is expected because employees evaluate a job partly through the consequences of that job for life outside work. Clinical work can be meaningful while the employment arrangement is judged unfavorably if schedules repeatedly disrupt sleep, family

responsibilities, recovery, or other valued activities. Within the bounded JD-R interpretation used here, work-life balance signals whether exposure to job demands remains compatible with replenishment of resources across domains. Better compatibility should therefore be associated with a more favorable overall job evaluation.

Local evidence supports the relevance of this mechanism without fully resolving it. Mohamad et al. (2025), in a study of doctors working in public hospitals in the Klang Valley, found that temporal justice was inversely associated with turnover intention, suggesting that perceived fairness in the allocation of work and personal time is relevant to doctors' intention to remain in public service. Muhammad et al. (2025) also identified family time as part of the personal fulfilment experiences associated with job satisfaction among medical officers in a Malaysian university hospital. Neither study tests work-life balance as a quantitative predictor of job satisfaction in public-hospital medical officers. The proposed relationship is therefore theoretically defensible, locally relevant, and still empirically open.

**H2:** There is a significant relationship between work-life balance and job satisfaction among medical officers in public hospitals in the Klang Valley.

**Critical Synthesis and Research Gap**

The literature converges on one broad point: the organization of doctors' work matters. It does not converge on a single outcome or a single mechanism. Some Malaysian studies measure job satisfaction, others measure burnout, fatigue, recovery, or turnover intention. Some examine primary care physicians, some heterogeneous healthcare workers, and some broader groups of doctors. The resulting evidence cannot be combined as if these constructs and populations were interchangeable. Table 1 summarizes the evidence most directly relevant to the proposed framework and the limitation each study leaves unresolved.

**Table 1: Critical Synthesis of Empirical Evidence Relevant to the Proposed Framework**

| Study and context | Primary focus | Relevant evidence | Limitation for the present framework |
|---|---|---|---|
| Ab Rahman et al. (2019), Malaysia, public and private primary care | Job satisfaction | Public-sector doctors reported greater administrative overload and lower overall job-satisfaction scores than private-sector doctors. | Primary care setting. Does not isolate public-hospital medical officers or directly examine work-life balance. |
| Mohd Fauzi et al. (2020), seven tertiary public hospitals in Selangor, Malaysia | Fatigue and recovery | Doctors reported high acute and chronic fatigue scores alongside comparatively lower inter-shift recovery. Work-related rumination during non-work time was associated with poorer fatigue and recovery outcomes. | Does not measure job satisfaction or test workload and work-life balance together. |
| Roslan et al. (2021), Malaysian healthcare workers | Burnout | High levels of personal and work-related burnout were reported. Workload and challenges in maintaining work-family balance emerged as reported sources of burnout in the qualitative findings. | Mixed healthcare occupations, COVID-19 pandemic context, and burnout rather than job satisfaction. |
| Mohamad et al. (2025), ten public hospitals in the Klang Valley | Turnover intention and organizational justice | More than half of the surveyed doctors met the study threshold for intention to leave the public | Directly relevant setting, but the sample was not restricted specifically to medical officers and job |

| | | | |
|---|---|---|---|
| | | sector. Distributive and temporal justice were significantly associated with turnover intention. | satisfaction was not examined as an outcome. |
| Muhammad et al. (2025), Malaysian university hospital | Medical-officer job satisfaction | Patient care, family time and educational responsibilities, teamwork and hospital facilities, and concerns related to hospital systems, salary, and career advancement emerged as themes related to job satisfaction and dissatisfaction. | Medical officer-specific but qualitative and conducted in a university-hospital setting rather than among Medical officers working in MOH public hospitals in the Klang Valley. |
| Rotenstein et al. (2023), US healthcare-workforce sample across 206 organizations | Work overload, burnout, and intention to leave | Work overload was significantly associated with burnout and intention to leave across healthcare occupational groups, including physicians. | US context, mixed healthcare occupations, and job satisfaction was not directly measured. |
| Voltmer et al. (2024), Germany and Norway | Physician job satisfaction and work stress | Effort and reward were significantly related to physician job satisfaction. | Cross-sectional evidence from Germany and Norway, where healthcare-system and employment conditions differ from Malaysia. |

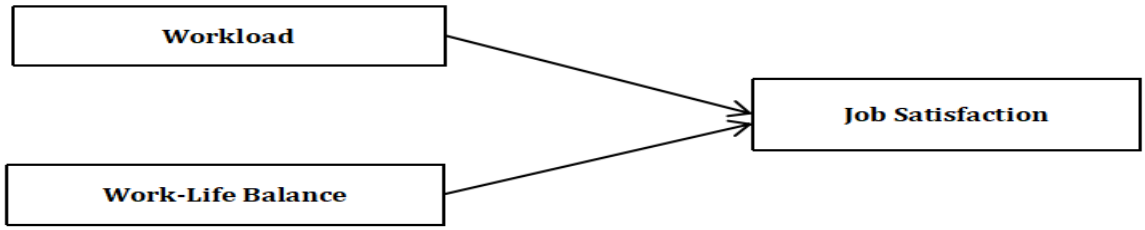
The synthesis exposes several unresolved limitations. Outcome substitution is common. Burnout, fatigue, and turnover intention are consequential, but none is equivalent to job satisfaction. Occupational aggregation also limits inference because findings from healthcare workers or doctors generally do not necessarily describe medical officers, whose career stage and hospital responsibilities may differ from other groups. Contextual transfer remains uncertain as well. Evidence from primary care, university hospitals, or foreign health systems can establish plausibility but cannot determine the pattern within Klang Valley public hospitals.

The research gap is therefore narrower and more defensible than the claim that job satisfaction has never been studied in Malaysia. Relevant Malaysian studies do exist. What remains insufficiently explained is the joint and distinct relationship of workload and work-life balance with job satisfaction among medical officers in Klang Valley public hospitals. This is the gap the proposed framework addresses. It retains relevant prior evidence but does not treat indirect outcomes as proof of the hypothesized relationships.

## 3. Proposed Conceptual Framework and Theoretical Contribution

The framework is derived in four steps. First, JD-R theory identifies workload as a job demand that can consume energy when exposure is sustained. This principle originates in Demerouti et al. (2001) and remains central in Bakker and Demerouti (2017). Second, recent JD-R developments recognize the importance of work–home processes and therefore support the consideration of recovery beyond the formal work environment (Bakker et al., 2023). Third, work-life balance is a conceptually distinct construct from workload and formal job resources. It is treated as an appraisal of whether occupational demands remain compatible with recovery and non-work responsibilities. Fourth, job satisfaction is conceptualized as an attitudinal evaluation instead of a proxy for burnout or turnover intention. The two direct relationships in Figure 1 follow from this sequence rather than from combining variables solely because prior studies found statistical associations.

**Figure 1: Proposed conceptual framework**




The primary theoretical contribution of the framework is the clarification of its construct. Workload and work-life balance are often discussed together, but they refer to different questions. Workload asks how hard the job is. Work-life balance considers whether the resultant work arrangement is compatible with recovery and valued non-work roles. The framework, when separated, can distinguish dissatisfaction due to too much occupational demand from dissatisfaction due to interference from other domains. This distinction provides a more informative overview than a single undifferentiated construct of work pressure.

The framework also extends the outcome focus of the local literature without claiming a new universal theory. Malaysian healthcare research has produced important evidence on burnout, fatigue, stress, and turnover intention. The proposed framework shifts the focal outcome to job satisfaction and explicitly protects the boundary between these constructs. This matters theoretically because an attitudinal evaluation of the job can be influenced by demand and recovery conditions even when burnout is absent, and because retention problems cannot be assumed to operate only through exhaustion.

A further contribution is context specification. JD-R theory argues that relevant demands and resources depend on occupational context. The framework therefore applies a general theoretical logic to a defined workforce and setting: medical officers in public hospitals in the Klang Valley. The contribution lies in testing whether a demand-recovery-attitude explanation holds in this context, not in claiming that Klang Valley medical officers are governed by a unique psychological process. This bounded claim is stronger than presenting the framework as universally novel because it is falsifiable and proportionate to the variables included.

The model deliberately avoids adding unsupported pathways. Workload may affect work-life balance, and organizational resources may moderate the effects of demands, but the present framework does not specify mediation or moderation because those mechanisms are not part of the stated research objectives. Future studies can extend the model if theory and measurement justify those pathways. The immediate test is whether workload and work-life balance show distinct associations with job satisfaction when examined within the same medical-officer population.

## 4. Research Methodology

### Research Design

This study will employ a quantitative approach using a cross-sectional correlational survey design. This design is suitable for examining the relationships between workload, work-life balance, and job satisfaction among medical officers working in public hospitals in the Klang Valley.

Data will be collected at one point in time. Therefore, the study will provide information on the relationships among the variables during the period of data collection rather than changes over time. As the variables will be measured concurrently, the findings will be interpreted as statistical associations rather than causal relationships (Wang & Cheng, 2020).

### Population and Sample Size

The target population will consist of medical officers working in public hospitals in the Klang Valley. The minimum sample size will be determined using G*Power 3.1 through an a priori power analysis for multiple linear regression, based on a medium effect size ($f^2 = 0.15$), a significance level of .05, statistical power of .80, and the predictors included in the final regression model (Faul et al., 2009). To support representation across

participating hospitals and medical officer grades, while allowing for possible non-response and incomplete questionnaires, the study will target 150 medical officers.

**Sampling Method**

Respondents will be selected using proportionate stratified random sampling. Medical officers will be segregated first by the hospitals they are participating in. Consideration will also be given to medical officer grade to ensure appropriate representation of different professional levels, subject to availability of an appropriate sampling frame.

The number of medical officers selected from each stratum would be proportional to the number of eligible medical officers in that stratum. Participants who qualify will then be randomly selected by a computer-generated random process. This approach is more suitable than applying simple random sampling to the entire population because medical officers are distributed across different hospitals and professional grades. Job tenure will be collected as an occupational characteristic and considered in the statistical analysis where theoretically relevant.

**Research Instrument**

Data will be collected using a structured questionnaire. The questionnaire will consist of demographic and occupational information together with validated scales measuring workload, work-life balance, and job satisfaction. Demographic and occupational information will include relevant characteristics such as age, gender, hospital, department, medical officer grade, employment status, and job tenure.

The methodology will identify the source of each measurement scale, number of items, response format, scoring procedure, and available evidence of reliability and validity. Any modification of existing items will be limited to changes necessary for the Malaysian public-hospital context while maintaining the original meaning of the items.

**Pilot Study**

A pilot study involving approximately 30 medical officers with characteristics similar to the target population will be conducted before the main data collection. Participants involved in the pilot study will not be included in the final study.

The pilot study will assess questionnaire clarity, completion time, response options, and the overall administration process. It will also help identify unclear or inappropriate items before the questionnaire is administered to the main sample.

**Validity of the Instrument**

Content validity will be assessed by experts with relevant knowledge of healthcare management, organizational behavior, research methodology, and the working conditions of medical officers. The experts will evaluate the relevance, clarity, and suitability of the questionnaire items. Face validity will also be assessed through feedback from medical officers during questionnaire pretesting and the pilot study.

**Reliability of the Instrument**

The reliability of the workload, work-life balance, and job-satisfaction scales will be assessed by using Cronbach's alpha. The reliability of each scale will be checked separately before the main statistical analyses.

**Data Collection Procedure**

Following ethical and institutional approval, selected medical officers will be invited to participate in the study. Participation will be voluntary, and informed consent will be obtained before questionnaire completion. The number of medical officers invited, responses received, incomplete questionnaires, exclusions, and questionnaires included in the final analysis will be recorded.

**Data Analysis**

Descriptive statistics will be used to summarize participant characteristics and the levels of workload, work-life balance, and job satisfaction. Correlation analysis will be used to examine the relationship between

workload and job satisfaction and the relationship between work-life balance and job satisfaction. Multiple linear regression will then be used to examine the contribution of workload and work-life balance to job satisfaction. Relevant characteristics such as medical officer grade and job tenure may also be included in the analysis where theoretically justified. The assumptions required for the statistical analyses will be examined before interpreting the results. Because the study uses a cross-sectional design, the findings will be interpreted as statistical relationships rather than causal effects.

**Ethical Considerations**

Ethical approval will be obtained from the relevant authorities before data collection. Participants will be informed of the purpose of the study, voluntary participation, confidentiality, and their right to withdraw. No personally identifiable information will be reported, and all research data will be stored securely.

## 5. Recommendations and Conclusion

**Recommendations**

Public hospitals should consider conducting periodic assessments of workload, work-life balance, and job satisfaction among medical officers using validated instruments. Where excessive workload is identified, hospital management could review staffing arrangements, the distribution of clinical workload, on-call schedules, documentation requirements, and administrative responsibilities. Work schedules should also provide adequate opportunities for recovery and minimize unnecessary interference with medical officers' personal responsibilities.

Organizational interventions should focus on working conditions rather than placing the main responsibility for managing occupational strain on individual medical officers. Individual wellbeing initiatives may provide additional support, but this should be alongside wider organizational measures such as workforce planning, improvement of work processes, reduction of unnecessary administrative burden and provision of adequate recovery opportunities.

Future research should empirically test the proposed framework among medical officers working in public hospitals in the Klang Valley. Future studies could extend the framework to the public hospitals in other parts of Malaysia to see if similar relationships are observed in different healthcare settings. Longitudinal studies may also be helpful to examine whether changes in workload and work-life balance precede changes in job satisfaction.

Future studies may also consider other organizational variables that may be related to job satisfaction, such as adequacy of staffing, professional autonomy, organizational support, job security and opportunities for career development. Examining these factors can lead to a better understanding of the factors relating to job satisfaction among medical officers in Malaysian public hospitals.

**Conclusion**

Job satisfaction among medical officers in public hospitals in the Klang Valley needs to be explored as it is associated with sustainability of the workforce, occupational demands and sustainability of continued employment in the public health care sector. Recent evidence from Malaysia suggests significant service activity, occupational stress, and workforce retention concerns, but existing studies on job satisfaction among medical officers in this particular setting have not provided a direct explanation for this. The proposed framework addresses this gap by distinguishing workload as a job demand from work-life balance as an appraisal of the compatibility between work demands, recovery, and personal responsibilities, while treating job satisfaction as a distinct attitudinal outcome. Therefore, the framework is used as a theoretical basis to examine the association of workload and work-life balance with job satisfaction amongst the medical officers in the public hospitals of Klang Valley.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Smart Cities, Stranded Seniors? Assessing Digital Integration and Technological Barriers in Elderly Mobility

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**Abstract:** Malaysia is digitizing at an accelerated pace, especially in urban areas. Meanwhile, its population is rapidly ageing, leaving a narrow window to develop integrated mobility solutions for active ageing within the framework of smart cities. This research explores the use of transport technologies by the elderly in urban Malaysia and analyses the factors influencing their choices of transportation services. This study reviews different transport technologies, including e-hailing, online/contactless transport ticketing and payment, and other mobility technologies and services. The research employs a qualitative approach to understand transport-related concerns of the elderly in the urban area in Selangor. The main source of data was a series of in-depth interviews. The main influences on the elderly's mobility behavior were found to be health conditions, personality, and travel confidence. Among the elderly with mobility challenges, there was a preference for private vehicles over public transport. Public transport was perceived as affordable and convenient. However, the elderly identified many usability barriers, including inadequate seating and extreme crowding. Many of the barriers would be mitigated with the use of various transportation mobility services. Generally, the elderly had positive views about safe, convenient, and affordable transport services. This study illustrates that incorporating integrated, accessible design and smart technology into the urban environments can provide secure, accessible transportation options for older adults living in 'smart cities'.

**Keywords:** *Ageing population, elderly mobility, public transportation, smart mobility, age-friendly cities*

## 1. Introduction

Growing older brings many changes to everyday life. Simple activities such as walking to the shop, going to the clinic, taking a bus, or visiting family and friends may become more difficult with age. At the same time, cities are changing, with new transport services and technologies becoming part of daily life. While these changes can make traveling easier, they may also create new challenges for older adults.

The number of older people worldwide is increasing. According to the United Nations, by 2050, one in every six people worldwide is expected to be aged 65 or older (Angel et al., 2011; Bloom et al., 2016; Keating, 2022). This growing older population shows the need for cities to provide better support for older adults, especially in helping them move around safely, easily, and independently. At the same time, a rapid digital transformation is changing how essential services, including transportation, are managed and used. For older adults, mobility extends far beyond convenience; it is essential for maintaining independence, accessing healthcare and vital services, participating in social life, and safeguarding overall well-being (Rogers & Mitzner, 2017; Vrančić et al., 2024; Webber et al., 2010). Urban environments that fail to accommodate the mobility needs of the elderly risk exacerbating social exclusion, dependence, and health disparities among an ever-growing portion of the population (Naughton et al., 2023; Ramalho & Petrica, 2023; Regnier, 2018; Rogers & Mitzner, 2017).

In Malaysia, the tendency for the population to age is growing stronger. By 2020, more than 7 per cent of the population were aged 65 or over; this figure is expected to reach 14% by 2040 (Abd Mutalib et al., 2020; Azhar & Omar, 2025). The Twelfth Malaysia Plan (RMK-12) recognizes this demographic situation and emphasizes

the need to improve liveability and mobility, particularly for older people (Rosnu et al., 2025). The RMK-12 sets out strategic aims to develop age-friendly cities, improve access to public transport, and ensure that all people have equal access to infrastructure and services. The National Transport Policy 2019–2030 (NTP) also supports these priorities by promoting a transport system that is people-oriented, sustainable, and inclusive (Abidin, 2020; Rosnu et al., 2025). According to the NTP, strategies should be put in place to enhance accessibility and convenience for the elderly and for persons with disabilities, such as applying universal design principles and improving first- and last-mile connections. Furthermore, the National Policy for Older Persons and the Action Plan for Active Ageing (2011–2020) confirm the need to promote health, participation and security among older people, with a focus on bettering community mobility. Yet even with such strong policy frameworks, implementation in Malaysian cities remains inconsistent. A number of urban areas still lack basic age-friendly facilities, such as smooth pavements, adequate seating, clear signage, and accessible transit stations (Liao, 2024; World Health Organization, 2007). The extent to which paratransit and community-based mobility programs reach people is often limited, so many older people continue to rely on private vehicles or family support for transport (Hosford et al., 2024; Liao, 2024; Sara, 2019).

Driven by these challenges, this paper aims to critically examine the mobility experiences of elderly individuals in urban Malaysia. Specifically, the study pursues twofold objectives: (i) to understand the current mobility behaviours and preferences of older adults, and (ii) to explore the technological factors that support or constrain their access to public areas and transportation facilities. Based on qualitative evidence, the study contributes to advancing strategies for inclusive and sustainable urban mobility systems that align with Malaysia's national development goals and international frameworks such as the UN Sustainable Development Goals.

## 2. Literature Review

As people grow older, moving around the city may become more difficult than it used to be. Simple activities such as grocery shopping, attending medical appointments, visiting friends, or using public transportation can become increasingly challenging as people age. These challenges often arise from a combination of health-related limitations, characteristics of the built environment, and the growing integration of digital technologies into transportation systems. As a result, older adults may need to adjust how they plan their journeys, select travel destinations, and choose their preferred modes of transport. Understanding the mobility experiences of older adults in contemporary urban settings requires careful consideration of both physical and technological factors that influence daily travel. Drawing on the previous literature, this review focuses on four interconnected domains, including transportation modes commonly used by older adults, travel patterns and destination choices, the role of the urban spatial environment, and the adoption of smart mobility technologies by the elderly. Examining these dimensions provides a more comprehensive understanding of how older adults navigate urban environments and the challenges they encounter in maintaining mobility and independence. In Malaysia, such insights are valuable for informing the development of more age-friendly, accessible, and inclusive urban transportation systems.

### Transportation Modes

Forecasts indicate that there will be 2.1 billion adults aged 60 and over by 2050, double the amount reported in 2020 at 1.4 billion. As a means of preserving independence and self-respect, driving remains the mode of transportation of choice for the elderly (Adler et al. 2006). The primary characteristic of the travel behaviour of senior individuals in many countries is their reliance on automobiles, whether as drivers or passengers. However, the physical abilities and health of older adults tend to deteriorate with age, resulting in a loss of driving ability. Previously, a study found that the number of individuals aged 85 years and older who drove a car declined significantly (Boschmann & Brady, 2013). Instead, they opted to be passengers in cars, walk, or use transit. As people grow older, they tend to take fewer trips, shorter journeys in both distance and duration, and more trips that do not involve driving as their ability to drive declines. In urban areas, the concept of vehicle sharing has begun to take on significance through private chauffeuring, ride sourcing, ride sharing, and on-demand rides. By 2025, the number of car shares is anticipated to increase from 7 million in 2015 to 36 million. A study in Korea reported that private cars, public transportation, and walking are the main modes of mobility for the elderly (Lee et.al., 2021). While the use of transit and walking is crucial for sustainable transportation, the use of private vehicles is gradually increasing. Recent empirical research on private chauffeuring and

companionship services categorises these products as viable alternatives to mobility solutions. Research incorporating viewpoints from transport operators, governmental entities, and municipal providers indicates that private chauffeuring has evolved alongside traditional models (peer-to-peer and business-to-consumer) and now encompasses a government-to-consumer (G2C) component, in which public institutions contract for or offer chauffeuring or companionship specifically for senior citizens. This diversity shows that people are aware of the mobility gap and that the service ecosystem has grown (Abdul Latiff et al. 2023).

**Travel Pattern and Destination**

Studies of varying depth and sophistication have examined the travel patterns and habits of older people. Findings generally show that older individuals make fewer trips and travel shorter distances, and for shorter travel durations than their nonelderly counterparts (Szeto et al. 2017; Boschmann & Brady, 2013). The activity patterns of the elderly differ from those of the nonelderly: the old engage in fewer activities, spend more time at home, and partake in activities such as visiting, shopping, recreation, and leisure. Shao et al. (2019) studied how older individuals travel differently on weekdays and weekends compared with younger people. Jordan et al. (2019) examined the travel-time disparities between two groups of older adults and identified significant differences in their trip durations and travel characteristics. Shi et al. (2020) examined the bus travel characteristics of the elderly using smart card data and compared their temporal, spatial, and trip-related patterns with those of non-elderly individuals. Boschmann and Brady (2013) found that the overall number of trips and average distance decrease with age; however, each age cohort within the senior population exhibits distinct patterns. Liu et al. (2017) found that younger and middle-aged adults with high household incomes travelled less, whereas older adults did so more. Women in the older group took fewer excursions than men, but there was no difference in the number of journeys between men and women in the middle-aged and younger groups. Factors affecting travel behaviours among the elderly include the regional context. In developed nations such as the United States and Europe, the elderly tend to depend more on automobiles, whereas in emerging urban areas in China, walking, cycling, and public transportation are more prevalent (Lee et. al., 2021). Additionally, physical health significantly impacts an elder's ability to travel; for instance, a physical disability has a strong negative effect on travel frequency.

**The Urban Spatial Environment**

The geographical and built environment characteristics of urban areas play a significant role in shaping the physical activity, health and social participation of older adults. Age-friendly cities that offer safe, walkable streets, accessible green spaces and opportunities for social engagement can enhance both physical and mental well-being in later life (Wood et al., 2022). A lack of access to or poorly maintained infrastructure may lead to social isolation and inactivity, which can lower quality of life (Tsai et al., 2022). Some countries have passed laws to make it easier for people to move about, which has led to more community involvement. For example, they help the elderly pay for their transportation needs (Karmacharya et al., 2022). Compared to rural areas, cities have better access to healthcare, education, and social services. This makes them appealing to the elderly, even when they have problems like heavy traffic, noise pollution, and high living costs (Tiwari, 2022; Wang et al., 2022). But urbanisation also makes inequity worse. People often think that cities are better places to live since they are close to important services. People who live in rural areas may benefit from programs that reduce social and spatial isolation (Fan et al., 2022). Fair growth in both urban and rural areas is necessary to ensure that everyone has a fair experience as they grow older (Aravin Pillai, 2016). To promote active ageing in cultures that are becoming more urbanised, it is important to develop places that are safe, welcoming, and easy to access.

**Smart Mobility for the Elderly**

Smart mobility has become an essential element of sustainable urban development, especially in accordance with the United Nations Sustainable Development Goals (United Nations, 2015). Smart mobility is a transportation system that is connected to the internet and uses technology to make it easier, safer, and more efficient for everyone, including the elderly (Lam & Head, 2012; Joumard et al., 2010). Smart mobility solutions can help the elderly be more independent and get more involved in their communities. Combining smart transportation systems with designs that are easy for the elderly to use makes walking safer, provides real-time trip information, and improves public transportation for the elderly (Battarra et al., 2018). These solutions make it easier to get around and give people more opportunities to participate in social and economic activities. Malaysia, for example, has begun implementing smart city projects such as traffic control systems that use

sensors and lighting systems that adjust based on the time of day. These may help the elderly go around (Fan et al., 2022; Torrens, 2022). Smart mobility makes it easier to get around by offering services like the Smart Selangor Bus, which provides free Wi-Fi, GPS tracking, and free rides for senior citizens (Smart Selangor Bus, 2025). It is important to include age-friendly ideas in plans for smart mobility. Smart cities that prioritize comfort, safety, and inclusion ensure that new technology improves the lives of the elderly (Emlet & Moceri, 2012; Kano et al., 2018; Tiraphat et al., 2017; Luciana Castro Gonçalves, 2022). As cities grow and change, it is important to ensure that smart transportation meets the needs of the elderly. This will help build cities that are both technologically advanced and socially stable.

## 3. Methodology

### Research design and data collection procedures

An exploratory qualitative research design operating within an interpretivist paradigm was employed to achieve the research objectives. This research design focuses on understanding the variations in elderly behaviour, particularly in mobility activities and expectations. Qualitative research is well-suited for exploring complex social phenomena to enable researchers to gain in-depth insights into participants' lived experiences (Jailani et al., 2023). This approach enabled the collection of rich, descriptive data that captured the perspectives of elderly individuals regarding their mobility challenges and expectations (Lim et al., 2023). Face-to-face interviews were the primary data collection method because they elicit detailed and contextually relevant responses. A key advantage of this approach was that the interviewer's ability to clarify questions in real-time could minimise misunderstandings and enhance data accuracy (Mohd Hairi et al., 2022). Furthermore, while interviews were structured around pre-assigned themes, new questions were iteratively incorporated based on participants' responses to comprehensively explore emerging concepts and ensure robust data saturation (Lim et al., 2023).

The study employed a purposive sampling technique, selecting participants based on predefined criteria to ensure that their lived experiences aligned with the core research objectives (Jailani et al., 2023). Participants comprised older adults residing in Shah Alam, Selangor. This specific location was selected due to its high population density and favourable built environment. The urban infrastructure and accessibility features of Shah Alam provided a highly suitable context for investigating mobility behaviours among older adults. Studies have shown that the built environment significantly influences mobility patterns and access to essential services among older populations (Mohd Hairi et al., 2022). Prior to data collection, informed consent was obtained, ensuring participants' voluntary participation, confidentiality, and the right to withdraw at any time (Patton, 2015). This study has received ethical approval from the Faculty Research Ethics Committee.

### Data analysis

The interview data collected in this study were analysed using thematic analysis, a common qualitative approach that identifies patterns and themes in the data (Braun & Clarke, 2021). This method was chosen because it allows for a systematic, flexible, and detailed interpretation of the perspectives of elderly participants on their mobility experiences and expectations. The data collection was carried out through a structured interview with previously assigned themes. To enhance this present research analysis, interviews were audio-recorded and paired with detailed field notes to facilitate familiarity with the data and ensure the precise capture of verbal and non-verbal narratives. The analytical process then progressed to develop initial codes across the dataset that were subsequently clustered into broader potential themes, guided by the pre-assigned interview structure. The researchers systematically reviewed these themes with raw data to ensure they accurately reflected the core mobility challenges and adaptive strategies of the elderly participants. Finally, the themes were clearly defined and synthesized to address the research objectives directly.

Qualitative rigour was applied using explicit trustworthiness criteria to systematically and reliably analyse the elderly mobility experiences in Malaysia (McKim, 2023). To enhance credibility, real-time member-checking techniques were employed to ensure the findings reflected the perspectives of the participants accurately. Recent advancements in member-checking techniques, such as the ARC (Asking, Recording, Confirming) method, have been introduced to validate data in real time, thus reducing data loss and misinterpretation (Zairul, 2021). The interviews were audio-recorded to allow accurate capturing of the stories of participants. This method is recognised for its effectiveness in qualitative research, enabling in-depth analysis of verbal data.

After each interview, the researchers compiled a summary of the key discussion points and presented this to participants for confirmation and verification. Furthermore, as a form of data triangulation, researchers maintained detailed field notes to document key remarks and contextual information provided by informants in case of possible technical issues with audio recording devices. Transferability was established by detailing Shah Alam's urban environment. These explicit sampling criteria would thus allow later researchers to evaluate the applicability of these findings to other settings. Finally, methodological precautions against technical failure secured dependability and confirmability. This data collection was conducted using the structured application of the ARC validation method to ensure findings are firmly grounded in the narratives of participants rather than researcher bias.

## 4. Findings

The data for this study were collected through recorded audio interviews, complemented by manually documented notes to ensure the accuracy and completeness of the information. Following the interviews, the researchers meticulously transcribed the recordings into text format. An initial review of the transcripts and interview notes was conducted to enhance the depth of analysis and identify four key themes and underlying patterns in the conversations. A comprehensive summary of the participants' demographic profiles is presented below.

### Demographics background

The demographic data highlights several important characteristics relevant to elderly mobility. Results show 80% of the participants are female, and 20% are male. This gender difference reflects global patterns in older adult populations, where women generally outnumber men, a phenomenon attributed to longer female life expectancy.

In terms of age, respondents are between 60 and 73 years old. This age range places respondents in the younger-old and middle-old categories of ageing populations. People in this age group often experience gradual physiological changes, including decreased stamina, slower reflexes, and more chronic illnesses. These changes have a direct impact on their mobility, particularly when they are moving around in urban public areas and using transport systems. According to the World Health Organisation (2015), mobility limitations tend to increase significantly after the age of 60, highlighting the importance of having accessible and age-appropriate infrastructure for sustaining independence and quality of life among older adults. Referring to the level of academic background, it was found that respondents with higher education levels, such as PhD holders, tend to receive larger pensions compared to those with only SPM or a bachelor's degree. This pattern is consistent with previous studies, which found that education significantly influences both lifetime earnings and retirement benefits. Individuals with higher academic qualifications generally secure higher-paying jobs, enjoy greater career progression, and contribute more to retirement schemes, which results in larger pensions at retirement (Alaudin, Ismail & Isa, 2020).

In Malaysia, retirement wealth adequacy is closely linked to educational attainment. Research has demonstrated that those with tertiary education are more likely to accumulate sufficient savings and pensions to sustain their post-retirement life, while those with only secondary education often face challenges in meeting basic needs (Baharifar et.al., 2025). Furthermore, financial literacy, which tends to be higher among better-educated groups, plays an important role in planning and managing pensions effectively (Selvadurai, Kenayathulla, & Siraj, 2021).

Meanwhile, findings show that a majority of respondents (80%), continue to drive, while 20% no longer do so. Driving supports independence and social participation among older adults; however, declining cognitive and physical capacity often leads to driving cessation. Research demonstrates that driving cessation is associated with heightened risks of social isolation and reduced quality of life, emphasising the need for accessible alternatives in public transport (Liddle et al., 2020; Curl et al., 2020). Furthermore, in terms of health, 40% of respondents report good health, while 60% live with chronic conditions such as hypertension, diabetes, or high cholesterol. Multimorbidity of this nature is highly prevalent in older populations. A Malaysian study found that more than 40% of adults aged 60 years and above experience multiple chronic illnesses, which significantly influences their mobility, daily functioning, and healthcare needs (Ghazali et al., 2021). This supports the

current findings, where chronic illness appears to be a dominant feature of the sample.

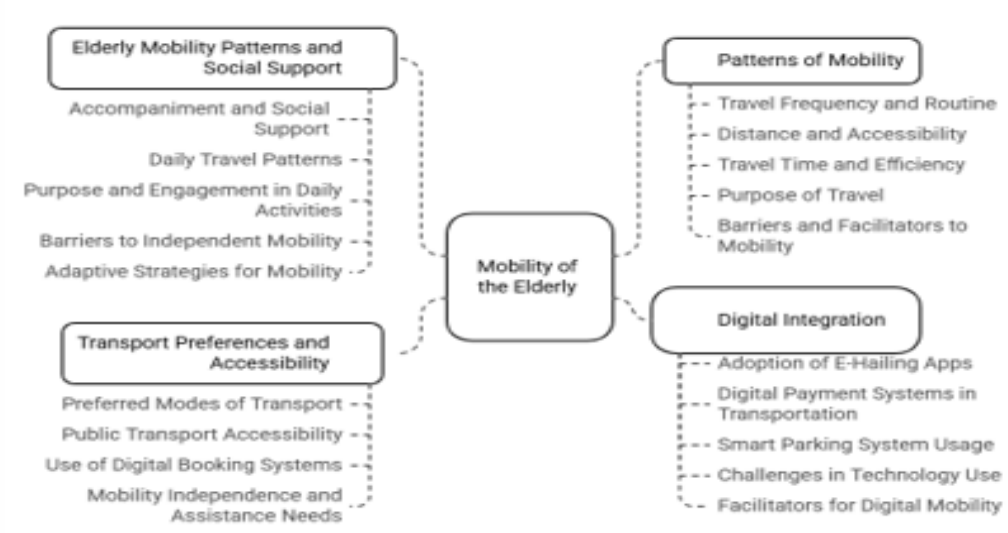
**Thematic analysis**

After transcribing and carefully reviewing the interview transcripts, a thematic analysis was conducted to uncover the recurring patterns in experiences of participants. As illustrated in Figure 1, this process analysis highlights four core themes that shape how older adults navigate urban spaces, including transport preferences and accessibility, elderly mobility patterns and social support, established mobility routines, and the ongoing challenges of digital integration.

**Transport Preferences and Accessibility**

Older adults in Malaysia face a complex range of considerations when choosing transportation, balancing the need for comfort, affordability, and convenience. Public transport such as RapidKL buses, KTM Komuter trains, MRT, and LRT remains a practical option for many, especially pensioners and those on fixed incomes, due to its lower cost. Yet, this affordability often comes at the expense of comfort and accessibility. For instance, elderly passengers in Kuala Lumpur may find it difficult to board overcrowded LRT trains during peak hours, while many suburban buses lack shelter, exposing users to both intense heat and rainfall common in Malaysia's tropical climate. Private transport options, including taxis and personal vehicles, are generally preferred by individuals who prioritise comfort, privacy, or have specific mobility needs. Nonetheless, these alternatives are not universally accessible; higher costs and the requirement to drive can pose significant barriers. The rise of e-hailing services such as Grab and MyCar has provided a valuable middle ground, offering door-to-door convenience and streamlined booking processes. However, the utility of such services is frequently limited by disparities in digital literacy and smartphone access, particularly among older adults residing in rural areas who may be unfamiliar with app-based platforms. Accessibility continues to represent a substantial challenge within the public transportation network. While some MRT stations in the Klang Valley have made strides in improving facilities with ramps and elevators, many older transit stations and bus stops still lack basic accessibility features such as ramps or priority seating. Physical barriers, including high bus steps, narrow aisles, and insufficient seating, further impede use for those with mobility impairments. In addition, crowded vehicles and complicated ticketing systems exacerbate discomfort and confusion. The adoption of digital solutions, such as online ticketing and e-hailing apps, is limited among the elderly population, largely due to low digital literacy, limited smartphone access, and concerns regarding privacy and security. As a result, many older individuals must rely on family members, caregivers, or community organisations for assistance with booking rides or navigating transport systems. While community support initiatives exist- for example, local NGOs sometimes help seniors with transportation- such assistance is not consistently available, and many elderly people express a strong preference for maintaining their independence.

**Figure 1: Thematic analysis of mobility of the elderly in urban spaces**




*Source: Authors' own work.*

**Elderly Mobility Patterns and Social Support**

Elderly mobility patterns in Malaysia are closely connected with prevailing social support structures and daily behavioural routines, reflecting the nation's profound cultural prioritisation of familial and community-oriented care. Among seniors, it is commonplace to seek accompaniment from family members, caregivers, or trusted peers when travelling. This reliance does not merely facilitate practical assistance but also instils a heightened sense of confidence and security, particularly in public environments that may otherwise be perceived as overwhelming or unfamiliar. Routine travel for older adults in Malaysia typically centres on essential destinations: local wet markets, clinics, religious institutions such as mosques and temples, and community parks. There is a clear preference for off-peak travel times, which allows elderly individuals to avoid crowded situations and potential physical strain. The rationale for these excursions is primarily to attend practical medical appointments, procure daily necessities, participate in religious observances, and engage in social or recreational activities. Collectively, these activities serve to maintain social inclusion and overall well-being. Nonetheless, significant physical and environmental barriers impede independent mobility for many elderly citizens. Long distances to transit points, uneven or hazardous pedestrian infrastructure, inadequate seating in waiting areas, and safety concerns, such as poor lighting or heavy traffic, are persistent issues, especially outside of urban centres. As a result, the elderly population's mobility is often contingent upon family or community support, and the frequency of independent outings may decline correspondingly. To navigate these challenges, adaptive strategies have emerged. Many elderly individuals opt for travel routes with superior infrastructure, adjust their schedules to less congested periods, or utilise specialised transportation services, such as community shuttles or volunteer driver initiatives organised by local non-governmental organisations. For instance, in the Klang Valley region, community-based transport assistance programs are available to facilitate seniors' access to healthcare appointments. Moreover, the use of mobility aids or reliance on family members when navigating complex transit systems is widespread.

**Patterns of Mobility**

The mobility of older adults in the areas of urban Malaysia is shaped by factors such as health status, transportation availability, and the built environment. Older adults generally make several trips per week for essential purposes, including medical appointments, grocery shopping, religious observances, and social engagements. As people age and encounter more health issues, the frequency of their travel trips declines. For example, research conducted in Kota Kinabalu found that individuals aged 75 and above travel less frequently and tend to limit trips to daylight hours due to concerns about night vision. Most of their journeys are short, which indicates the impact of physical limitations and the accessibility options of transport. Typical destinations include local markets, clinics, places of worship, and community centres. Malaysia's dependence on private vehicles results in reduced mobility for seniors who are unable to drive, particularly in areas where public transportation is unreliable or not tailored to their needs. Issues such as unpredictable schedules, extended waiting times, and inadequate route connectivity further discourage travel and lengthen journey durations. The lack of adequate rest spaces and the limited availability of priority seating on public transit compounds these challenges, often resulting in discomfort for elderly passengers. The motivations for travel among the elderly are predominantly driven by medical necessity, religious obligation, and the pursuit of social inclusion and mental well-being. Physical obstacles, extended walking distances to transit points, uneven pavements, suboptimal lighting, and broader safety hazards are considered barriers to mobility. These factors frequently necessitate a reliance on family members or caregivers for transportation. On the other hand, certain cities such as Penang and Ipoh have introduced initiatives to improve age-friendly infrastructure and transportation policies, including priority seating and the adoption of age-friendly urban frameworks.

**Digital Integration**

The adoption rate of digital mobility solutions among the elderly population, particularly e-hailing platforms like Grab and MyCar, remains notably lower than among younger cohorts. This trend is driven by several interrelated barriers, most prominently limited digital literacy, issues of trust, and the perceived complexity of app interfaces. Empirical studies consistently indicate that users of e-hailing services in Malaysia are predominantly young adults, especially those aged 18 to 28, while participation among individuals above 50 is minimal. Older Malaysians frequently encounter difficulties navigating smartphone applications, handling digital payment systems, and trusting online financial transactions. These challenges significantly restrict their ability to access the convenience that e-hailing offers. For instance, while Grab enjoys widespread popularity in urban centres such as Kuala Lumpur and Penang, many senior citizens continue to rely on conventional taxis

or depend on family members to arrange their rides. The ongoing transition from cash to digital payment systems, including e-wallets like GrabPay and Touch 'n Go eWallet, presents additional obstacles. Concerns about transaction security, the risk of digital fraud, and a lack of familiarity with online banking diminish confidence among elderly users. These issues are further exacerbated by limited smartphone ownership and digital skills, particularly in rural regions. Similarly, the uptake of smart parking solutions such as QR code scanning, RFID access, and app-based reservations remains very low among older adults, as these systems require a level of technological competence that many do not possess. Several technology-related challenges persist for Malaysian seniors, including complicated user interfaces, a shortage of tailored technical support, and a general reluctance to adopt unfamiliar technologies without adequate assistance. Nonetheless, certain facilitators have demonstrated promise in improving digital engagement within this demographic. Notable examples include government initiatives aimed at promoting digital inclusion, family members who provide technology guidance, and community-based educational programs. For example, local NGOs and senior groups in Klang Valley have organised workshops designed to help older adults safely utilise smartphones and e-hailing applications. Such efforts are pivotal in narrowing the digital divide and supporting mobility independence among Malaysia's ageing population.

## Discussion

This study explored the mobility experiences of elderly individuals in urban public spaces and transportation facilities in Malaysia. The findings offer important insights into behavioural patterns, technological engagement, and environmental factors that influence mobility among older adults. The discussion is organised according to the two research objectives.

### Objective 1: To Understand the Current Behaviour of the Elderly Towards Mobility Activities

The study found that older adults in urban Malaysia primarily engage in mobility activities for essential purposes such as medical appointments, religious obligations, grocery shopping, and social participation. These behavioural trends are consistent with recent studies that report similar mobility motivations among older adults in developing cities (Rosnu et al., 2023). The frequency and nature of travel are influenced by physical health, access to transport, and perceived safety within the built environment (Salim et al., 2019). Although public transport options such as MRT, LRT, and buses are considered affordable, they are often not perceived as convenient or comfortable by elderly users. The presence of physical barriers, such as high steps, crowded vehicles, and limited seating, contributes to low satisfaction with public transport systems among older adults (Zakaria et al., 2024). These findings align with previous literature highlighting that accessibility features in Malaysian transport systems remain inadequate, particularly for vulnerable populations (Ramli et al., 2022).

Apart from that, social support plays an essential role in facilitating elderly mobility. Most older adults rely on family members, caregivers, or friends to accompany them during travel. This reliance is embedded in Malaysian cultural norms, where intergenerational care is deeply valued (Rosnu et al., 2023). However, this dependency may also reduce autonomy, particularly for those who desire independent travel. Despite the challenges, older individuals demonstrate adaptive behaviours such as avoiding peak hours and choosing destinations with better infrastructure. These strategies reflect a level of resilience among older adults who continue to seek active participation in society despite environmental limitations (Salim et al., 2019).

### Objective 2: To Explore the Technological Factors That Support Mobility in Accessing Public Areas and Transportation Facilities

The digitalisation of transportation in Malaysia, including e-hailing services and online ticketing, has improved mobility for many. However, its uptake among older adults remains low. This study found that limited digital literacy, low confidence in online systems, and limited smartphone ownership prevent many elderly individuals from using these platforms independently. These findings are supported by Md Fadzil et al. (2023), who observed a significant gap in digital adoption among older adults with cognitive or physical impairments. The transition to fully digital ticketing systems for rail and bus travel has further complicated access for seniors. The Federation of Malaysian Consumers Associations reported that the removal of physical ticket counters and the requirement for digital-only bookings exclude many older adults who are unable or unwilling to navigate these platforms (FOMCA, 2025). These findings underscore the need for hybrid solutions that combine digital and traditional methods to ensure equitable access.

Nevertheless, alternative mobility services such as private chauffeur and companionship programs have shown potential to improve the mobility experience for older adults. Abdul Latiff and Mohd (2023) reported that such models provide safety, comfort, and autonomy, especially for non-driving seniors or those who face difficulties with public transport. Community-based digital education and intergenerational learning programs are emerging as important tools to address the digital divide. For instance, initiatives organised by local non-governmental organisations and community centres have provided digital literacy workshops that improve older adults' confidence in using smartphones and mobility applications (Zaid et al., 2023). These efforts are essential to promote digital inclusion and empower older adults to make independent travel decisions.

**Implications for Urban Planning and Policy**

The research highlights the lack of integration in the strategies implemented by authorities to address the mobility of the elderly in the physical and virtual worlds. In terms of the physical world, more attention should be paid to designing and building improved facilities for pedestrian and accessible transport. Age-appropriate design of the transport facility should include the provision of protected facilities and waiting seats at transport stops (Ramli et al., 2022). In the virtual world, mobile applications must be simplified and designed with older users in mind. Voice-enabled assistance, larger text, and local language support can improve usability for seniors. In addition, retaining some level of physical service, such as staffed counters or phone-based support, is necessary to prevent exclusion during the transition to digital services (FOMCA, 2025). Following that, urban planners and experts in transport should also take into account the diverse needs of the elderly. Factors including income, health condition, educational background, and living arrangements affect the mobility preferences and abilities of older adults. For this reason, any policy intervention must be inclusive, flexible, and context-specific.

## 5. Conclusion and Recommendations

This study identifies methods for examining the mobility of older adult populations, including the factors that pose challenges for older adults when using existing infrastructure and transportation systems. The study considers challenges older adults face while using different modes of transportation and the barriers to their independent movement within the built and social environments. Improving transportation systems and related technologies, as well as addressing the challenges older adults face when using various transportation systems, requires integrating social, transportation, and digital systems. Improving the above-mentioned systems would ultimately enable older adults to engage in social activities, gain and maintain independence, and improve their quality of life. Consequently, these findings indicate the urgent need for targeted strategies to improve transportation infrastructure, enhance digital literacy, and strengthen community-based support systems. Aligning these initiatives with Malaysia's national development agenda and international frameworks such as the Sustainable Development Goals (SDGs) will enable policymakers to advance a more inclusive, age-friendly urban environment.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Reconceptualizing Food Security in Malaysia: Integrating Household Food Affordability and Resilience Among B40 Households

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**Abstract**: With the continuous rise in food prices, the cost of living, and economic uncertainties, food security has become a serious public policy issue in Malaysia, especially for the B40 group. Despite its many dimensions, the existing research on food security has focused on food availability, food access, food utilization, and food stability, while being less focused on the factors of household food affordability and resilience that determine long-term food security outcomes. This conceptual paper proposes to broaden the definition of food security to reflect the situation faced by low-income households in Malaysia. This paper introduces an integrated conceptual model where food affordability is the proximal determinant of household food security and household resilience is the family's ability to "take a hit" and "bounce back" from economic shocks. This paper not only offers a conceptual framework for studying food security from the perspective of affordability and resilience, but it also offers insights for policymakers to consider in order to design more effective interventions. The proposed model is also a basis for future empirical studies.

**Keywords**: *Food security, food affordability, household resilience, B40 households, Malaysia*

## 1. Introduction

Food security is one of the most critical aspects of any nation's existence. Traditionally, the availability of resources is the primary indicator used to evaluate food security at both national and global levels. Although food production and self-sufficiency ratios (SSR) are essential, modern realities require reconsidering the paradigm and putting more attention on the national level. Global events such as extreme weather, geopolitical issues, and inflation can impact the local supply significantly, affecting access to food even if the national availability is at a sufficient level. Modern economic and social research trends increasingly report on food security issues from the bottom up rather than from the top down. In other words, the emphasis is put on citizens' individual experiences and power of choice rather than global supply chains and national statistics. For a country with a growing population and a delicate balance of social issues, food security is a matter of concern about day-to-day affordable nutrition, not self-sufficiency.

Malaysia's traditional approach to food security is to prioritize agricultural production and focus on self-sufficiency rates. As an open economy, Malaysia is highly dependent on international trade and vulnerable to external shocks. Malaysia is quite self-sufficient in poultry and eggs, but it imports most of its animal feed, fertilizers, beef, and vegetables. The country is highly integrated into the global economy, and some critical shortage risks are seasonal and impactful. Its national accounts and trade data serve as an essential indicator for regional food security.

While national indicators report a stable economy, the affordability gap between different population groups is growing. The challenge of food insecurity is particularly acute for the Bottom 40 (B40) income households. For these families, food is a massive, unavoidable expense. Statistics show that B40 households often spend more than one-third of their monthly income just on groceries. As a result, even a small increase in the Consumer Price Index (CPI) immediately threatens their financial survival.

The fact that this structural weakness shows a major shortcoming of the present domestic systems is that there is a conflict between the availability of food and its affordability. If the rate of increase in food prices exceeds that of wage growth, then B40 households are compelled to resort to ways of coping which have a negative effect on their long-term well-being. Such coping strategies often consist of 'dietary downgrading', that is, giving up nutritious foods such as fresh proteins and vegetables in favor of cheaper, calorie-rich, ultra-processed

foods. This change worsens the 'double burden of malnutrition' in Malaysia, in which cases of undernutrition (for example, stunting in children) and overnutrition (obesity) occur together in the same low-income areas. Hence, the existing approach to food security in Malaysia does not take these problems into consideration. This conceptual article therefore suggests that the idea of food security in Malaysia should be reviewed to incorporate affordability and other socio-economic factors. Instead of seeing food security as simply a measure of agricultural output, the paper presents it as the result of the interaction between purchasing power, market stability and the capacity of households to cope. By concentrating on the particular pressures experienced by rural and urban B40 communities, the paper aims at developing a conceptual framework that connects macro-level agricultural policies with the actual experiences of low-income consumers. The study thus intends to give a clearer conceptual understanding than that provided by traditional self-sufficiency indicators, and to offer new viewpoints for policymakers who are designing targeted safety nets, nutritional programs and resilient food distribution systems within the Madani economic framework.

**Problem Statement**

Global research on food security has predominantly focused on how to improve the availability and nutrition of food and reduce the prevalence of food and nutritional poverty. However, food price inflation and the cost of living have led to food becoming increasingly unaffordable for B40 households in Malaysia. Food price inflation, stagnant incomes, and developing financial commitments such as housing loans and raising children have exposed the vulnerability of B40 households' resilience and financial capacity to access both the quantity and quality of safe and nutritious food. Thus, food security has become a public policy concern in Malaysia. Moreover, while most of the food supply in Malaysia is sufficient to meet national needs, food insecurity has continued to remain widespread at the individual household level, as food insecurity is a cross-cutting problem that goes beyond food availability to impact accessibility, utilization, and stability. However, issues of affordability and household resilience have been under-discussed in Malaysia. The concept of affordability focuses on the way in which food price rises have led to food now becoming unaffordable for the B40 group. Crises such as the COVID-19 pandemic and disruptions caused by climate change have exposed the inability of B40 households to cope with current and future shocks. In addition, much of the Malaysian food security literature has focused on food availability, food production, nutrition, and poverty without addressing household resilience. This paper is based on existing literature to propose an integrated framework. This integrated conceptual framework is expected to contribute to food security theory and have practical policy implications for the enhancement of the food security and resilience of B40 households in Malaysia.

## 2. Methodology

This paper will analyze the causes and the impacts of food insecurity among the B40 in Malaysia through an analytical literature review, especially on the affordability and resilience of food, which is later used to develop a replicable framework. This paper proposes a food affordability-based framework in relation to food security that is developed by drawing on the literature on the affordability of food, resilience of food and food security. The literature review reinforces the perception that the four pillars of food security amalgamate to create an often-ignored concept – economic access, which is made available through the economic affordability of food. Besides, the affordability of food is also bound to be affected by household food poverty and resilience. Thus, the food security of B40 households could not be adequately analyzed without looking at the resilience of those households. This paper develops a three-pillar framework related to food affordability and food security, based on the analysis of the literature on the affordability of food, resilience of food, and food security in general, taking into account and building upon the implications of the four pillars of food security. The implications of this new framework will also be discussed – especially the future research that is needed yet beyond the scope of this paper. This article discusses the concept and definitions of food security, affordability and resilience, ensuring that the food affordability-based food security framework is desirable. Additionally, it will also discuss the food affordability-based framework, its implications and future research.

## 3. Literature Review

**The Evolving Concept of Food Security**

The concept of food security has evolved considerably over the past several decades in response to changing global food systems, socioeconomic conditions, and emerging environmental challenges. Until the 1974 World

Food Conference, which largely influenced definitions, food insecurity was considered mainly as a lack of food availability as a macro-level (larger scale) problem of agricultural production and logistics in food supply chains.

Productiveness, however, was so mitigated and so challenged, in many ways, famously by Amartya Sen (1981), who authored his seminal work on famines and poverty in it. In the "entitlements approach," Sen demonstrated that hunger and food shortage occur not necessarily because people don't have enough food, but because they are unable, due to legal, economic, or physical factors, to obtain it. Subsequent studies eventually proved that an adequate overall food supply in a country is not sufficient to provide an adequate amount of safe and healthy food within the household (Barrett 2010).

**The Evolution of the Four-Pillar Framework**

During the late 1990s, the global consensus on food security shifted from a macro-level focus on national supply to a micro-level focus on household and individual well-being. This shift culminated in the comprehensive definition formalized at the 1996 World Food Summit and maintained by the Food and Agriculture Organization (FAO, 2006). Today, food security is recognized as a multidimensional concept built upon four essential pillars:

Availability: The physical presence of adequate food supplies within a region or country, achieved through domestic agricultural production, commercial imports, or food aid (FAO, 2006).

Access: The economic and physical capacity of households to regularly acquire appropriate, nourishing foods. As established by Sen's (1981) foundational work on entitlements, economic access rather than absolute physical scarcity is typically the primary bottleneck preventing food security.

Utilization: The biological capacity of the human body to properly metabolize food into functional energy and nutrients. This pillar emphasizes that food safety, clean drinking water, adequate sanitation, and dietary diversity are critical components required to prevent chronic malnutrition (Webb et al., 2006).

Stability: The temporal dimension of food security, which dictates that availability, access, and utilization must remain stable over time. This dimension protects vulnerable households from seasonal shortages, sudden economic shocks, or unexpected political disruptions (FAO, 2006).

**Beyond the Four Pillars: The Modern Economic Reality**

Although the four-dimensional framework of food security continues to dominate, many scholars propose that it should be expanded upon and updated in order to address the growing number of economic and environmental issues affecting the global food system. With recent trends pointing to an increased vulnerability of food systems to economic shocks, rising food prices, increasing cost of living, and issues with income stability, it is evident that food security is highly susceptible to economic conditions. It appears that recent food price crises, such as those observed in 2007-2008, 2011, and the early 2020s, have demonstrated the vulnerability of food systems to economic shocks.

As such, recent studies have begun focusing on the role of economic resilience in food security at a household level. Despite food being available at a global level, many countries and households continue to experience food insecurity due to issues with income, inequality, and inflation (Devaux et al., 2020). Subsequently, it is evident that despite food being available in plenty in a country, its citizens may not have equal access to it, and it may not be nutritious.

While the four-dimensional approach to food security remains prevalent, it is becoming increasingly apparent that it has shortcomings when it comes to severe economic crises. With continued episodes of inflation and instability, there is a need to consider what role the economy plays in determining the level of food security that a household has. Contemporary studies give more attention to the issue of purchasing power of individuals and the impact that changing financial conditions can have on food security (FAO, 2023; Swinnen & McDermott, 2020).

The current approach to assessing food security should take into account the body of research that discusses the implications of financial stability, purchasing power, and inflation on the level of food security that a given household or population has. It is crucial to understand how the economy influences food security, and the mechanisms by which financial instability impacts the ability of a household to maintain an adequate,

nutritious diet.

The four-dimensional framework of food security assumes that food is available and accessible, but does not consider the ramifications that inflation and financial instability can have on the attempts of households to purchase food. It does not consider the nuances of purchasing power and the reasons why some populations with similar income levels may have differing levels of food security. As such, it can be stated that contemporary food security studies would benefit from further consideration of other aspects that affect the dietary habits and food choices of populations.

The existing framework recognizes economic access as one component of food security but provides limited explanation of how affordability constraints influence household food decisions under persistent economic pressures. Moreover, it offers little insight into why households with similar income levels often experience different food security outcomes. These limitations suggest that additional household-level mechanisms should be incorporated into contemporary food security frameworks.

**Household Food Affordability**

Food affordability is the capacity to access adequate, culturally relevant, and nutritionally sound food while still meeting other essential needs in a household, such as housing, health care, education, and transportation. Food availability is about the availability of food and food affordability is about the ability of households to afford adequate food. Household income, food prices, inflation rate, employment stability and cost of living are some of the factors that affect this capacity.

Food affordability is a serious concern in recent years in food security research. After the COVID-19 pandemic, the world has faced growing price volatility in food prices, driven by socio-economic factors such as disruptions in global supply chains, fuel shortages and escalating conflict, thus creating a higher financial burden on households (FAO, 2024; World Bank, 2024). Food inflation and the rising cost of living had a stronger impact on B40 households because a high proportion of their household expenditure goes towards food, transport and housing (DoS Malaysia, 2023).

Empirical studies suggest that adjustment to food scarcity may be effected through many coping mechanisms that are employed by households as a result of food scarcity. These strategies involve eating less, buying less expensive food, restricting diet variety, and/or not eating meals. While these responses might help families in the short term, they can lead to more food insecurity in the long term and more issues with nutrition (Kh'ng et al., 2022).

While this theme is becoming more important, food affordability is frequently analyzed as part of a larger discussion of 'economic access' and not considered as a stand-alone attribute. This approach may fail to capture the important role played by the affordability of food in determining household food insecurity, especially in middle-income countries like Malaysia, where food is available but is becoming a challenge for vulnerable families to access. Analyzing food affordability separately, therefore, allows us to better understand the role of inflation, food price increases and household financial insecurity on food security results.

Current literature demonstrates that affordability represents more than simply household income. Rather, it reflects the interaction between purchasing power, food prices, and competing household financial obligations. Nevertheless, existing food security models seldom position affordability as the central mechanism linking household economic conditions to food security outcomes. This limits our understanding of contemporary food insecurity among B40 households.

**Household Resilience**

The increasing frequency of economic, environmental, and public health crises has prompted researchers to recognize resilience as an essential component of household well-being. Household resilience refers to the capacity of individuals and families to anticipate, absorb, adapt to, and recover from adverse events while maintaining essential functions, including adequate food consumption (Béné et al., 2016).

Resilience in food security means more than having food right away. It means a household can keep its food

security when bad things happen, like losing a job rising prices, natural disasters or losing money all at once. Households that are resilient usually have things such as savings, ways to earn money, friends and family who can help and ways to adapt that let them handle short breaks without getting very food insecure.

Several studies have demonstrated that resilience contributes to long-term food security by reducing household vulnerability and improving adaptive capacity. Rather than merely responding to crises, resilient households are better equipped to manage uncertainty and maintain nutritional well-being over time (Ansah et al., 2019; Béné, 2020).

However, there is very little work done regarding household resilience and food security in Malaysia. Existing studies have focused primarily on household poverty, income levels, and household food expenditures; however, there is much less attention given to the adaptive capacity of households to deal with repeated economic shocks. Food affordability refers to the ability of households to buy food at regular market prices under normal economic circumstances. In contrast, resilience refers to the ability of households to maintain their food security throughout disruptions. Both concepts are related but not the same. Therefore, the incorporation of resilience into food security studies provides a more holistic view of household vulnerability.

**Food Security Among Malaysia's B40 Households**

In Malaysia, B40 households remain one of the nation's most economically vulnerable groups to this day, even though the government has rolled out various measures to alleviate poverty and improve people's livelihoods. Many people may not understand that the disposable income mentioned here refers to the money a household receives that can be freely allocated for spending. The price of food is getting higher and higher, housing costs rise year after year, transportation incurs expenses, and the burden of medical care is also growing heavier. When all these miscellaneous expenditures add up, they leave only a tiny portion of these households' disposable income that was originally meant to be spent on food. Layered increasing expenses take up the vast majority of their income. In the end, the majority of B40 households spend most of their income on the most necessities of life such as food and housing, leaving very little flexible discretionary money in hand. They simply cannot withstand any sudden economic shock—even an unexpected additional expense can completely upend their budget arrangements.

Recent national reports indicate that household expenditure has continued to increase, with food and non-alcoholic beverages constituting one of the largest expenditure categories (Department of Statistics Malaysia, 2023; 2025). Although government interventions such as cash transfers, targeted subsidies, and price control mechanisms have provided short-term relief, concerns remain regarding the long-term sustainability of household food security amid continued inflationary pressures.

Malaysian research to date has mostly analyzed food insecurity via poverty, nutritional health, agricultural yields, or household budgets. Fewer investigations have addressed how affordability and resilience jointly determine food security at the household level. This is a notable shortfall, particularly in light of Malaysia’s economic transition, where food insecurity is increasingly tied to purchasing power rather than supply constraints.

The Malaysian context illustrates that food insecurity is becoming increasingly associated with affordability challenges and limited adaptive capacity rather than inadequate food supply. This observation supports the need to reconsider traditional conceptualizations of food security within middle-income economies.

## 4. Challenges and Discussion

The literature illustrates considerable progress in food security research, spanning food availability, accessibility, nutrition, and poverty. However, three key limitations persist. First, the construct of affordability has not been distinctly conceptualized and is instead often subsumed within the broader concept of economic access. Second, the concept of household resilience to shocks is under-addressed, appearing primarily in the literature on disaster management, climate adaptation, and livelihoods with insufficient integration into the food security literature.

Third, food security studies in Malaysia have conceptualized food security as the availability of food and its

affordability. Studies have used descriptive or empirical approaches that explain determinants of food insecurity but have paid limited attention to revising the conceptual foundations of food security in response to the changing and worsening socioeconomic realities in Malaysia. Fourth, economic vulnerability should be considered as an additional construct in the conceptual framework of household food security. This paper constructs an analytical framework to explain possible food insecurity mechanisms under the impact of inflation volatility. Addressing food insecurity in Malaysia requires examination of the relationship between inflation volatility and its impact on the factors influencing household food consumption such as household coping strategies, food affordability, and household vulnerability. The authors argue that household coping strategies such as using savings, borrowing money, spending less on household needs including food, and borrowing food are triggered by increased inflation. Food inflation has attracted increasing attention in recent years as food has become an increasingly unaffordable commodity for many households in developing and middle-income countries where food is available in abundance. In middle-income countries, such as Malaysia, where food is generally available but, may be unaffordable for many households, the role of economic vulnerability is an important future research question to explain the effect of inflation on food security.

This paper thus proposes a reconceptualized framework that places food affordability (household purchasing power) as the immediate cause of food security and household resilience (household adaptive capacity) as the consequent to enable households to maintain food security when experiencing economic shocks. This paper is grounded in the literature on food security theories and theories of household purchasing power, resilience, and vulnerability. The households in Malaysia's Bottom 40% (B40) face elevated risks to food security given their limited purchasing power, and, often unrecognized, doing the necessary.

This paper proposes a reconceptualized framework that replaces the relationship between purchasing power and food security with a relationship between food affordability and household resilience. The paper suggests that household resilience, or the ability to absorb economic shocks and change responses as needed to maintain food security, moderates the impact of food affordability on food secrecy. This proposed framework will contribute to the existing food security theory and will provide a more detailed, contextually relevant insight into the food security challenges that Malaysia's B40 households face.

This study examines Malaysian food security challenges from the point of view of the SMPs (Bottom 40%). It proposes four hypotheses, one of which is significant and the remaining three are insignificant. The study uses a quantitative technique, and the data collected were used to run a multiple linear regression. The result indicated that there is a relationship between income level and food security. It shows that as the income level decreases, the food security level of these households decreases. This relationship indicates that the external shock has a negative effect on food security, especially for the B40 households. The study proposes a conceptual framework which explains how the external shocks have

**Redefining Social Safety Nets: From Flat Cash to Nutritional Subsidies**

Currently, institutional interventions like *Sumbangan Tunai Rahmah* (STR) rely on direct cash transfers. While cash assistance provides immediate financial relief, our framework illustrates that it does not necessarily prevent "dietary downgrading." Under intense inflationary pressure, households frequently divert generic cash aid to cover competing fixed costs, such as rent, utilities, or debts, rather than upgrading their diet to include fresh proteins and vegetables.

Therefore, policymakers should transition toward targeted nutritional subsidies or food voucher systems (such as expanding the *Sumbangan Asas Rahmah* or SARA program). Restricting subsidies specifically to nutrient-dense foods (e.g., fresh milk, eggs, local vegetables, and fish) would legally and economically protect the trade-based entitlements of B40 families, directly combating the double burden of malnutrition.

**Mitigating the Geographic Divergence**

The framework highlights that the food insecurity of urban and rural B40s is distinct and calls for targeted and specific policy measures:

- Regarding the Urban B40, measures should be taken to deal with the "urban penalty". The focus needs to be on further expanding the urban agriculture programmes, to promote community-based hydroponic farming in affordable urban flats (PPR), and to reduce the supply chain for the benefit of

the consumers by providing a direct-to-consumer supply chain (Pasar Tani) without depending on the complex commercial intermediate links.

- The spatial constraints are not the major concern in the case of the Rural B40; it's infrastructural and logistical. Emerging Policy Alternatives ought to be purposeful on rural cold-chain supply and development of subsidised transport programs. Therefore, it is crucial, if regional food affordability is to be maintained, that there are no large logistical mark-ups yet fresh food still reaches the remote areas of Sabah, Sarawak and the East Coast.

**Shifting Policy KPI Metrology**

For decades, Malaysia's progress has been measured through the Self-Sufficiency Ratio (SSR). This framework argues that a high SSR is an incomplete indicator of national well-being if the local population cannot afford the food being produced. The Ministry of Agriculture and Food Security, alongside the Ministry of Economy, should adopt household-centric KPIs, such as the Household Food Insecurity Access Scale (HFIAS) and regular tracking of the Nutritional Affordability Index, to gauge the real success of national food strategies.

## 5. Conclusion and Recommendations

Assessing food security on the basis of the state-level production data can mask significant economic and nutrition gaps at the local level. This conceptual paper has attempted to close this gap by explicitly incorporating considerations around food security affordability of the household and socio-economic resilience within the Malaysian framework of food security, but this time with an uncompromisingly sharp focus on the B40 income segment within a Malaysian context. The present paper emphasizes that the economic unavailability problem that underlies food insecurity in Malaysia is a significant consideration, and points to the importance of notions of economic affordability and resilience when understanding the vulnerability of households. Combined with low-income growth, structural inflation produces long-term public health crises, and this helps to slow down human capital accumulation. There is a need to change from production-centric to consumer-centric approaches that focus on empowering households to access and afford food, and ensuring fair distribution of food in building a truly resilient food system in Malaysia.

This framework is presented here as a conceptual paper, as a theory of sorts, and is intended to stimulate the testing of its predictions in future research. The following aspects might be considered by future researchers to further this study:

- Empirical studies with structural equation modelling (SEM) should be conducted to statistically test the empirical relationship between specific economic stressors (independent variable), dietary downgrading behaviors (middle variable), and real nutrition outcomes (dependent variable) for urban and rural B40 households in Malaysia.
- Evaluation of rationalization of subsidies: conduct a follow-up study to explore how the rationalization of domestic subsidies (such as fuel, electricity and other subsidies) affects the remaining food budget of near-poor B40 households.
- Explore the interest and capacity of B40 communities in establishing and sustaining urban community farming projects and the socio-psychological and structural barriers to generating food production through communities.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# The Engagement of University Students Towards Healthy E-Sports Activities

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**Abstract:** Electronic sports, popularly known as esports, have grown in popularity among the general public, especially university students. It is expected that excessive participation in esports activities has negative impacts not only on students' health but also on their quality of life. Despite increasing research interest in esports, there is a knowledge gap in addressing the health problems of the esports lifestyle. This research investigates the relationship between physical condition, physiological factors, social relations, environment, spirituality, and healthy esports engagement. This article proposes a framework for a holistic model to assess the features of a balanced quality of life, such as a healthy lifestyle for esports players. The framework includes two techniques from health and sports literature. A survey questionnaire to esports players consisting of 150 university students was established. Pearson Correlation Coefficient and Regression Analysis were conducted to examine the independent variables. The findings showed that two of the variables (physical condition and social relations) were significant, while the others (physiological, environment and spiritual) were not significant with healthy esports engagement. This study concludes that the framework can assist esports athletes, particularly university and college students, to maintain a balanced quality of life while engaging in esports activities.

**Keywords**: *Electronic Sports, Engagement, Healthy Lifestyle, Esports Activities, University Students*

## 1. Introduction and Background

Esports have grown in popularity among students in universities, especially during the Covid-19 pandemic outbreak. The lockdown period and the establishment of online distance learning, or ODL, are new things that students must adjust to. Unfortunately, these students were often constantly distracted by gadgets because everyone, including the students, has been obliged to stay at home and even study or work from there. During the ongoing period of lockdown and social distancing, many of us have observed a significant increase in the use of entertainment games (both analog and digital games) at home to pass the time and deal with stress (Kriz, 2020). Since there are various factors, they can still socialize and find enjoyment through their technological devices like smartphones and laptops. One sort of entertainment where people can play on their phones is electronic sports or esports. Previous studies have shown that gaming disorder is generally characterized by not being able to control gaming, with increased priority given to gaming when compared to the daily routine, and the presence of negative consequences (Palanichamy et al., 2020). It is expected that esports progressed with the establishment of the Internet as competitive gaming became increasingly accessible in households and across college campuses (Marsh et al., 2020).

Involvement in esports as a university student may be a fun way to release tension, but it may have positive or negative effects. Online gaming engagement has increased since the pandemic outbreak, but for students who also play online games, some may have been involved or playing since the beginning of their campus life or even before the lockdown period. Accordingly, it seems that during the pandemic there has been a significant increase in online gaming and various online activities, such as e-sports watching and live streaming (Giardina et al., 2021). These online games or electronic games have attracted almost all groups, from children to teenagers. This phenomenon might be driven by the pandemic, during which almost all students in schools or universities have gadgets and other IT facilities such as laptops, tablets, and smartphones. In addition, playing online games also allows students to interact with other players or interact with friends on online platforms; esports provide bonding opportunities. Multiplayer games provide an opportunity to stay in touch with friends

and still share in something together (Ellis et al., 2020). For example, the game Mobile Legends: Bang-Bang (MLBB) allows players to interact with each other and players can also communicate through in-game chat.

Furthermore, these online games or esports games can make an individual addicted to playing for a long period of time. This is also worrying because there are studies that show students spend a lot of time playing online games. Because of that, it can also affect the physiology of students, including lack of sleep, stress, and anxiety. Since the pandemic as well, many students have experienced stress and anxiety. This may indicate that because students had to isolate themselves to avoid infection, their desire for social connectedness was not met, resulting in more symptoms of depression (Debowska et al., 2022). Anxiety can occur when students worry about losing a game or points in a game. Then, extreme addiction will drive a person to stay up at night to play games. Lack of sleep is not good for students because it will lead to negative consequences such as staying awake at night, sleepiness during class, and even not attending class due to lack of sleep. This will then contribute to anxiety. This will also affect the students' academics. Based on all these consequences, this study will investigate the effect of healthy esports engagement in terms of physical condition, physiological, social relations, environment and spiritual well-being among university students located at Puncak Alam Branch Campus of Universiti Teknologi MARA, Malaysia.

**Problem Statement**

This study explores why students are so passionate about playing esports for long hours. Passion is defined as an individual's strong tendency to engage in an activity that he or she enjoys, an activity upon which the person places importance and in which he or she invests time and energy (García-Lanzo and Chamarro, 2018). Addiction to playing esports can be a factor that drives students to spend long hours gaming. Esports can be fun and a platform where students can interact with each other with their friends or outsiders who share the same interests. This leads students to a strong sense of passion and dedication. The Dualistic Model of Passion (DMP) provides a motivational perspective on passion and describes two kinds of passions which are harmonious passion (HP) and obsessive passion (OP) (Formosa et al, 2020). The passion of students will have an impact on health, mental, or social conditions.

According to Hellstrom et al. (2015), depressive musculoskeletal symptoms are associated with the addictive effects of excessive online gaming among university students. Very few studies have been done on the comprehensive framework of esports in sustaining quality of life, especially among university students. Most studies have focused on the adoption of online gaming using existing specific frameworks related to health effects such as those by Jenny et al. (2017). This includes gender and race equality, reduced societal issues, and improved well-being.

Besides that, Inagaki (2018) stated that social connection, the subjectively pleasurable experience of feeling close and connected to others, is important for well-being and continued social bonding. Social relationships can be thought of as an individual's self-perception of the closeness of interpersonal relationships with other people (Shan et al., 2023). Compared to the theoretical importance of social relationships for well-being, less research has focused on the underlying neurobiological mechanisms that support social bonding in close relationships. Therefore, this study was also conducted to examine the relationship between social relationships and healthy esports engagement.

Other than that, this study also investigates whether environmental factors contribute to healthy esports engagement among university students. External and internal social environments include an individual's exposure to media, nationality, and culture (Reich, Black, and Foliaki, 2018). The environment can sometimes motivate students to be involved with esports. The influence of peers on a student's gaming habits and social media exposure can also influence students to engage with esports. Such video game live streaming by professional gamers and tournaments of esports events aired live on social media accounts can attract students to play online games as well. Students will stay up late to join the live streaming or play online games with their friends because the streamers usually do their live streaming of video games late at night. Streamers can make and share videos in real-time as they play online games, while simultaneously communicating with their game-specific audience (Li et al., 2020). Social media is also a platform where students can get information about upcoming esports events and actively participate in competitions.

## 2. Literature Review

Esports is electronic gaming, also referred to as programming or competitive video gaming (DiFrancisco-Donoghue et al., 2019). This study aims to contribute to the body of knowledge of esports engagement among university students. Previous studies stated that esports is one of the fastest-growing sports on college campuses, as students are both spectators and players (Delello et al., 2021). Students were forced to stay at home and do online distance learning (ODL) during the pandemic. This led to stress, depression, or anxiety. Since esports are accessible on their devices, the number of esports users has risen rapidly during Covid-19, and the majority of them are students. Although trapped in a lockdown, they can still reach out to their friends and have fun through esports using online platforms. Esports can also be a way to relieve tension when students are playing and could help them to boost their mood or vice versa if they lose the game and gain more stress from it.

**Healthy Esports Engagement:** Referring to Lagunas (2019), despite the rapid growth and popularity of esports, it is not clear whether the pursuit is good or bad for gamers' health. Esports competitors are more likely to develop several chronic diseases and die from any cause because of prolonged periods of inactivity and poor diets. The public health effects of the esports phenomenon are now being studied in health research, which paints a dismal image of this megatrend. However, it is advised to get involved in this phenomenon and have a constructive impact on it rather than only noting the negative public health consequences of it (Hwu, 2022). Esports offers a setting for widely spreading treatments, has a lot of promise for increasing physical activity, and gives new approaches to reach a frequently ignored demographic. This paper discusses the potential of the esports phenomenon to promote physical activity, health, and well-being in gamers and esports players, as well as the strategic and preventive solutions to mitigate the potential negative health effects of esports, as well as the use of esports technology (streams, media platforms, exergames, etc.) as an innovative tool for health promotion, specifically targeting gamers and esports players with engaging and interactive interventions. This is to promote methodical scientific study in order to create evidence-based recommendations and intervention strategies involving regular physical exercise, a healthy diet, and good sleep hygiene for esports. In order to properly integrate esports with gaming, it is important to promote public health strategies.

**Physical Condition:** A person with good physical condition is likely to have optimally functioning body systems. Someone's character and actions can have an impact on their physical condition. For instance, a person's lifestyle choices, genetic make-up, and prolonged online gaming can all have an impact on their physical condition (Sampson, 2023). This is not just because there are no diseases present. Healthy physical condition is also influenced by regular exercise, a well-balanced diet, and enough sleep.

The outcome suggested that excessive esports participation and its competitive nature contribute to both physical and mental issues. Eye tiredness, blurred vision, low back pain, tension headaches, hand and wrist pain, and bad posture when gaming are examples of physical problems. For esports athletes, living a balanced lifestyle can boost both overall health and gaming performance (Palanichamy et al., 2020). Numerous advantages of exercise can assist gamers in improving their physical and mental performance. Sport is generally defined as any physical activity that promotes sports performance at any level while also fostering or enhancing one's physical and mental well-being through ad hoc or planned involvement. The study demonstrates that high-level and professional esports competitors exercise as well, with those who are 18 years of age and older working out more than three times daily recommendations of 21 minutes of physical activity from the World Health Organization. Moreover, the static alignment of your body while standing or sitting is referred to as posture. Therefore, your posture while gaming is just how you hold your body. And most frequently, this is done while sitting. Risks of poor posture when gaming can impact one's physical condition. Lower back pain, neck pain, upper crossed syndrome, and other conditions are among the risks. Sitting incorrectly can put more force on the spine than 150% of one's own weight. Increased pressure on the spine discs and bones can cause early degeneration (such as arthritis or "spondylosis"), which could result in more serious health issues (Palanichamy et al., 2020).

**Physiological:** The current study compiled all previous empirical studies aiming to evaluate the physical and psychological health difficulties in esports and found that excessive participation in esports leads to social,

emotional, and psychological issues like depression and anger. The mental health of esports athletes is significantly influenced by gender and game types. Teenagers who have an internet gaming disorder are more likely to have anxiety, depression, and alexithymia. Depression manifests more frequently in adolescent girls with internet gaming problems than anxiety or alexithymia. Online multiplayer battle arena games have been demonstrated to control emotions, whereas massively multiplayer online role-playing games seem to be linked to behavioral and mood disorders (Bonnaire and Baptista, 2019). It seems more advisable to comprehend this phenomenon and take advantage of the opportunities it provides rather than only highlighting the negative side effects and public health consequences. Depressive and musculoskeletal symptoms are associated with the addictive effects of excessive online gaming among teenagers (Hellstrom et.al., 2015). Due to various stressors like the pressure to have exceptional mental and performance skills and excessive gaming, esports athletes are more likely to experience problems like burnout, depression, anxiety, addiction, and aggression in an elite and highly competitive environment (Palanichamy et al., 2020). On the other hand, taking part in esports has certain advantages for college students as well. For instance, Bavelier and Green (2019) study discovered that playing video games improved memory, attentiveness, and decision-making skills, among other things. Additionally, it has shown promise in enhancing multitasking, lowering impulsivity, and even counteracting some of the cognitive impacts of aging on the brain.

**Social Relation:** The competitive gaming business has recently recognized esports, which has sped up the development of its applications and rules by the regulatory bodies (Funk et al., 2018). The growing number of participants and viewers in esports is evidence of its growing popularity (Cunningham et al., 2018). Nevertheless, because of the media's interest in this issue, more and more public and private organizations are organizing esports tournaments (Cunningham et al., 2018; DiFrancisco-Donoghue et al., 2019). While money and profits have emerged as the primary drivers behind the growth of esports, this modern activity complements traditional competition by encouraging fairness, teamwork, enthusiasm, and a healthy lifestyle (Jenny et al., 2024). This includes racial and gender equality, a decline in societal problems, and enhanced wellbeing. The foundation of esports studies and the identification of the constructs or domains to be further explored require a functioning definition, notwithstanding the lack of consensus over the concept of esports.

**Environment:** In terms of the environment's involvement in esports, research indicates that the video game industry has a terrible impact on the environment. The annual energy consumption of US gaming consoles is estimated to be 34 terawatt hours, or nearly five million automobiles worth of CO2 emissions. Like other electronics, gaming consoles pose a variety of environmental risks, from the metals and plastics needed to make them to the electricity they use, which is derived from fossil fuels, to the difficulties in recycling the equipment once the next generation is quickly introduced and replaced (Asher, 2022). The development of the video games themselves follows. Thousands of people are employed to develop popular game franchises like Grand Theft Auto, Gran Turismo, Mobile Legends, and Call of Duty, and their big, multi-location offices leave a significant carbon footprint. There is a whole industry behind video games that is full of air travel, air-conditioned offices, and lengthy commutes, even if the games and the platform they are played on become ecologically friendly (Fletcher, 2021).

**Spiritual:** People have always enjoyed playing games. People first played games with stones and wooden objects, then with cards or moving pieces but in the modern era, video gaming refers to screen-based activities and virtual reality, and more young people are getting interested in esports. Older people may recall moving a tiny green dot across a flickering screen in what looked like tennis, but where the excitement was more about the wonder of technology that made it possible, or connecting a basic computer to a television for a digital version of 'Noughts and Crosses' (Christianity Enquiry Agency, 2020). The annoyance that arises is when there are video games that contain content that contradicts societal norms and religious values, such as violence, immoral or abusive language, elements of abuse and crime as well as religious confusion. Video games containing the mentioned elements are now in the charts of popular games such as Far Cry 6, Dying Light 2, Mortal Kombat 11, Grand Theft, The Punisher, Manhunt 2, Hatred, League of Legends, Players Unknown's Battleground (PUBG), Resident Evil Village and Back 4 Blood (Mohd. Noor, 2021).

Industry players, whether developers or video players, need to understand this legal position; both purify the content and game methods and, at the same time, highlight the values and promote ethics and morality. The development of content that contains elements of racism, religion, and insulting individuals also needs to be

avoided to ensure harmony in the industry. We certainly do not want to earn income in a way that is abominable and rebuked by religion (Mohd. Noor, 2021). Screening and guidance of video games should be made in the form of a special standard, classification, and rating categorization (classification of movies such as U, P13, 18SG, 18SX, 18PA, 18PL and so on) according to the type of content and target age level of players. Parents who do not know the content of the game can use this classification as a guide for monitoring what their children are playing.

**Relationships between IV's and DV:** Before cultivating an excessive esports industry, it is first important to describe the health-related issues such as physical condition, physiological health, social connection, and environment of esports engagement among university students.

According to Chan et al. (2022), increased stress, sleep problems, obesity and behavioral issues are a few of the frequently discovered negative health effects associated with esports and gaming. In a similar vein, playing video games is connected to sedentary behavior, which has been related to an increased risk of noncommunicable diseases (Harding and Noorbhai, 2021). The posture of esports players in the gaming chair, prolonged screen exposure, and hundreds of repetitive motions during gaming sessions are all contributing factors to the development of physical conditions associated with esports engagement among university students (Emara et al., 2020).

The esports industry has seen rapid growth over the past decade with additional opportunities for participants to compete in a competitive and relaxed environment. Darvin's investigation serves as one of the first to investigate the gaming experience of esports participants, with a specific focus on the presence of discrimination and hostility in the gaming environment for male and female competitors (Darvin et al., 2020). Therefore, it is important to examine the factors that may contribute to the lower proportion of women in the esports environment, as recent events have suggested that esports may be prone to incidents of hostility towards female participants (Desatoff and Wallenstein, 2019).

In terms of esports, spirituality encompasses important existential questions such as life meaning and purpose, the transcendent (the spiritual world/the Divine) and connectedness (Snodgrass, 2023), and yet it remains an often-neglected topic of conversation with healthcare clients (Hopia et al., 2018). This situation is compounded by the myriad of professional definitions and personal meanings around terms such as 'spirituality', 'religion ', and 'spiritual care' (Canda et al., 2010). Therefore, this study was conducted to find out the spiritual factors related to healthy esports engagement among university students.

## 3. Research Methodology

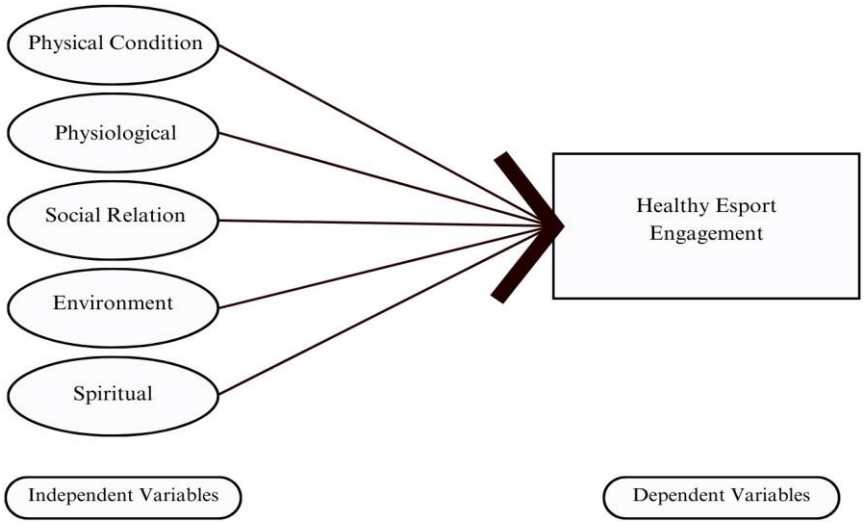
This study utilizes a quantitative, cross-sectional research design aimed at causal research and hypothesis testing regarding the factors influencing healthy esports engagement. The target population consists of university students from the Faculty of Business and Management at Universiti Teknologi MARA (UiTM), Puncak Alam Campus. Employing a convenience sampling technique, the data were successfully collected from a final sample size of 150 students. Data collection was carried out using a survey questionnaire using Google Forms and distributed directly through messaging networks like WhatsApp and Telegram. The structured instrument captured demographic profiles, gaming pattern frequencies, and specific attitude rating scales designed to measure five distinct independent variables, which are physical condition, physiological factors, social relations, environment, and spiritual elements, against the dependent variable of healthy esports engagement.

For the data analysis phase, the gathered responses were checked for completeness using a missing value analysis and standard categorical data cleaning procedures. The finalized dataset was then processed using the Statistical Package for the Social Sciences (SPSS) software. The analytical workflow involved testing data distribution normality via skewness and kurtosis metrics, alongside an internal consistency evaluation using Cronbach's alpha coefficients to guarantee scale reliability. Descriptive statistics, including mean scores and standard deviations, were computed to summarize baseline characteristics and variable ratings. Finally, inferential statistical tools were deployed to evaluate the direction, strength, and statistical significance of the relationships hypothesized between the independent variables and university students' healthy engagement in esports.

**Research Framework**

The research framework of this study investigates the relationship between physical condition, physiological condition, social condition, environment, spiritual and healthy esports engagement among Faculty of Business Management students at UiTM Puncak Alam. The framework investigates how physical condition, physiological condition, social condition, environment, and spiritual condition function as independent variables (IV's) to affect healthy esports engagement as the dependent variable (DV) among university students at UiTM.

**Figure 1: Research Framework**




Based on the above framework, the hypothesis is tested as follows:

**H1:** There is a significant relationship between physical condition and healthy esports engagement among university students in UiTM Puncak Alam.
**H2:** There is a significant relationship between physiological condition and healthy esports engagement among university students in UiTM Puncak Alam.
**H3:** There is a significant relationship between social relationships and healthy esports engagement among university students in UiTM Puncak Alam.
**H4:** There is a significant relationship between environment and healthy esports engagement among university students in UiTM Puncak Alam.
**H5:** There is a significant relationship between spiritual and healthy esports engagement among university students in UiTM Puncak Alam.

**4. Results**

This section provides the demographic profile of the sample (n = 150) consisting of undergraduate students from the Faculty of Business and Management at UiTM Puncak Alam Campus were analyzed using descriptive frequencies. As summarized in Table 1, the sample is predominantly female (**66%**, n = 99) compared to male (**34%**, n = 51). The vast majority of the respondents fall into the 21–25 age bracket (**84%**, n = 126), while students aged 20 and below and 26 and above constitute **8%** each (n = 12 per group). In terms of ethnicity, **96%** (n = 144) are Malay, with the remaining **4%** (n = 6) categorized as others (e.g., Orang Asli, Orang Sungai, and Borneo ethnicities). Regarding educational level, **63.3%** (n = 95) are degree students and **36.7%** (n = 55) are diploma students.

**Table 1: Demographic Profile of Respondents (n = 50)**

| Variables | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| GENDER | Male | 51 | 34% |
| | Female | 99 | 66% |
| AGE | Below 20 years old | 12 | 8% |
| | 21 – 25 years old | 126 | 84% |
| | Above 26 years old | 12 | 8% |
| RACE | Malay | 144 | 96% |
| | Others | 6 | 4% |
| PROGRAM | Diploma | 55 | 36.7% |
| | Degree | 95 | 63.3% |

**Reliability Construct Analysis**

To verify the internal consistency and reliability of the measurement scales deployed, Cronbach's alpha coefficients were calculated for all five independent variables and the single dependent variable. According to the statistical parameters, scales displaying an alpha greater than 0.50 demonstrate sufficient validity and reliability. The results in Table 2 establish that all constructs exceed this threshold, with alpha values ranging from 0.737 to 0.977, thereby proving that the instrumentation is highly reliable for further parametric analyses.

**Table 2: Reliability Analysis of Construct Scales (n = 150)**

| Variables Type | Construct Scale | Number of Items | Cronbach's Alpha | Internal Reliability |
|---|---|---|---|---|
| | Physical Condition | 8 | 0.909 | Reliable |
| Independent | Physiological | 5 | 0.864 | Reliable |
| | Social Relation | 11 | 0.977 | Reliable |
| | Environment | 7 | 0.906 | Reliable |
| | Spiritual | 4 | 0.796 | Reliable |
| Dependent | Healthy Esports Engagement | 7 | 0.737 | Reliable |

**Descriptive Statistics**

Descriptive statistical evaluations, specifically computing metrics for mean scores and standard deviations (SD), were carried out to interpret the central tendency and distribution patterns across all variables based on the 150 responses. The values are summarized below in Table 3.

**Table 3: Descriptive Statistics for Independent and Dependent Variables**

| Variables | Mean | Std. Dev. (SD) |
|---|---|---|
| Physical Condition | 2.43 | 0.857 |
| Physiological | 2.59 | 0.623 |
| Social Relation | 3.25 | 0.686 |
| Environment | 3.21 | 0.507 |
| Spiritual | 3.52 | 0.573 |
| **Healthy Esports Engagement (DV)** | **3.23** | **0.530** |

**Inferential Statistics: Multiple Regression Analysis**

To estimate the collective predictive capacity of the independent factors and isolate which individual attributes yield distinct impacts when evaluated together, a standard multiple linear regression analysis was applied.

The total model summary indicates a strong collective link (R = 0.621), with an R-squared value (R^2) of 0.385. This confirms that the model's five independent variables collectively account for **38.5%** of the variance observed within healthy student esports engagement. The remaining **61.5%** variance implies external contributing components outside these research parameters (e.g., career paths, financial values, personal habits). The model's overall significance is validated by the ANOVA outcome: $F(5, 144) = 18.057$, \quad $p < 0.001$. This demonstrates that the collective regression model reliably predicts structural target variance.

**Table 4: Multiple Linear Regression Coefficients Weights (n = 150)**

| Regression Model Predictor Variables | Unstandardized B | Std. Error | Standardize Beta | t-value | Sig. (p) |
|---|---|---|---|---|---|
| (Constant) | 1.454 | 0.325 | | 4.470 | < 0.001 |
| Physical Condition | 0.132 | 0.049 | 0.214 | 2.716 | 0.007 |
| Physiological | -0.016 | 0.066 | -0.019 | -0.247 | 0.805 |
| Social Relation | 0.440 | 0.058 | 0.569 | 7.564 | < 0.001 |
| Environment | -0.052 | 0.080 | -0.050 | -0.655 | 0.514 |
| Spiritual | 0.068 | 0.063 | 0.074 | 1.078 | 0.283 |

**Discussion**

The statistical results provide selective empirical support for the proposed structural framework, successfully confirming two out of the five core research hypotheses. Hypothesis 1 (H1), stating a significant relationship exists between physical condition and healthy esports engagement, is formally accepted ($p = 0.007$). This conforms to the conclusions of Palanichamy et al. (2020), which highlighted that continuous physical issues like shoulder and back fatigue are active symptoms tracking with long gaming routines, meaning balanced lifestyle integration directly shapes how students engage with esports activities.

Similarly, Hypothesis 3 (H3) is confirmed, establishing that social relations significantly influence healthy esports engagement (beta = 0.569, $p < 0.001$). This outcome demonstrates that competitive electronic sports act as an active bonding landscape, allowing university students to expand peer networks, experience cooperative team support, and enjoy a sense of camaraderie while tracking streaming matches or co-playing together.

Conversely, the remaining hypotheses failed to achieve separate baseline statistical criteria within the full linear regression construct. Hypothesis 2 (H2: Physiological), Hypothesis 4 (H4: Environment), and Hypothesis 5 (H5: Spiritual) are rejected as standalone predictors ($p > 0.05$). Although environmental awareness initially shared a small positive correlation ($r = 0.248$) in standalone pairings, its significance drops when controlled alongside social dynamics within the multiple regression analysis. This indicates that macro-environmental considerations, like electronic waste footprint or console power use, are overshadowed by intermediate social interactions.

Furthermore, the lack of significance for physiological and spiritual parameters suggests that while internal beliefs and health challenges like stress or sleep disorders exist among students, they function separately from how students systematically structure their gaming engagement patterns. These insights suggest that developers and campus administrators looking to foster healthy esports engagement should focus on physical ergonomic support and community-building social architectures.

**5. Conclusion and Recommendations**

The results of this study demonstrate that physiological, environmental, and spiritual factors did not show a statistically significant relationship with university students' ability to manage esports in a healthy manner. According to the study's findings, esports are popular among university students, and many of them participate in it. However, this study does not explore or analyze the precise relationship between the factors that influence university students' involvement. Additional research and analysis will be needed to evaluate how esports participation affects social engagement.

According to the data, there is a weak correlation between environment and healthy esports engagement among university students. The lack of statistical significance, however, raises the possibility that this association is coincidental rather than real. One potential contributing factor to the environment and healthy esports participation among university students is the measurement or evaluation approach. This study is limited to a small percentage of university students from the Faculty of Business and Management, UiTM, and

the findings may not apply to the population or racial category of the whole university. Differences in culture, geography, and individual and psychological practices may have contributed to the absence of significant findings.

The findings of this study suggest that there is an insufficient connection between spirituality and happiness. The observed link could, however, be the product of chance since this correlation was not statistically significant. Spirituality is influenced by a variety of elements, including religion, social support, and living circumstances. It is conceivable that physical activity alone does not have a strong enough impact on spiritual well-being when other elements that influence this are taken into account. It is advised to carry out additional studies in this area using larger sample sizes or different approaches in order to get more definitive conclusions.

In short, the results of this study demonstrate that healthy esports participation among university students is significantly influenced by social relations and physical condition. This outcome is also corroborated by earlier research, including a study by Khir et al. (2022). Students at universities can change their social relations and physical condition by participating in healthy esports activities.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Empowering Micro-Entrepreneurs through Digital Services: A Bibliometric Review of Technology Tools and Future Research Agendas

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**Abstract:** In today's fast-paced digital economy, micro-entrepreneurs increasingly rely on digital tools to keep their businesses running and growing. Despite this urgent digital transition, a comprehensive understanding of how academic research addresses this phenomenon remains fragmented. This paper maps the current literature using a bibliometric analysis of Scopus data to better understand how researchers are studying this trend. We break down what the academic community currently focuses on and what it frequently misses by applying co-citation analysis, keyword co-occurrence, and network mapping. Our results show a significant increase in research on digital tools, mobile applications, and cloud-based services for micro-entrepreneurs. However, this research is geographically skewed toward developing economies. The top three countries with high citations are the UK, India and the United States, while the highest number of publications is dominated by India, South Africa and the United States, respectively. Despite the growing body of work, significant gaps remain. We still know very little about the long-term impact of technology on a micro-enterprise's survival and do not even understand how local ecosystems drive technology adoption in the first place. This study provides a direct roadmap for scholars, policymakers, and industry practitioners looking to build better support systems for microentrepreneurs globally by identifying these blind spots.

**Keywords:** *Micro entrepreneurs, business technology tools, digital services, sustainability, bibliometric analysis*

## 1. Introduction

Digital tools are fundamentally changing how micro-entrepreneurs operate today (Kumar et al., 2026). Because technology evolves so quickly, software built to improve daily productivity is now cheaper and easier to access than ever before (Javaid et al., 2024; Karulkar et al., 2025). We need to track these usage patterns carefully. Understanding exactly which tools business owners choose helps explain how they survive and compete against much larger companies. Currently, micro entrepreneurs rely heavily on these digital services just to manage their basic operations (Corvello et al., 2022; Kolade et al., 2026). Recent data shows a massive jump in the adoption of cloud-based solutions, social media platforms, and mobile applications tailored to small-scale operations (Al Hadwer et al., 2021). These applications handle a bit of everything. Diverse business technology tools and services facilitate everything from customer relationship management (CRM) and inventory management to marketing and sales processes (Naim, 2022). The rise of Software as a Service (SaaS) platforms has particularly enabled micro entrepreneurs to access sophisticated tools without paying massive upfront costs (Mero et al., 2022).

Small business owners no longer use social media just to run ads. They rely on it to talk to buyers and build a recognizable brand identity (Jayasuriya et al., 2026). Research shows that platforms such as Instagram, Facebook and TikTok are pivotal in promoting products, creating community and driving sales (Dzreke & Dzreke, 2025). Micro entrepreneurs often use different social media platforms to tell their stories, showcase their products, and connect with their target audiences, either customers or consumers. This trend underscores the importance of digital presence as a key driver of business growth for micro entrepreneurs. Moreover, the shift toward of e-commerce has fundamentally changed how micro entrepreneurs operate. Studies highlight an increasing trend in the integration of e-commerce solutions with the growing number of online shoppers (Ingriana, 2025). At the same time, the shift toward online shopping forces micro-entrepreneurs to rethink how they sell. Setting up a digital shop used to be technically difficult and expensive. Digital tools and services such as Shopify, WooCommerce, and various payment gateways are enabling micro-entrepreneurs to establish online storefronts with relative ease (Peštek et al., 2026). This transition not only expands their market reach but also allows for 24/7 sales capability, providing a significant advantage in the existing trend of a consumer-driven economy.

Researchers are also noticing a major shift toward data analytics. Micro-entrepreneur owners finally see why tracking data matters. Instead of guessing, they use simple dashboards to monitor customer habits, spot sales peaks, and cut operational waste (Ibeh et al., 2024). Importantly, they do not need a computer science background to do this. Modern platforms are intuitive enough to handle the complex calculations automatically. At the same time, smartphones have completely rewired daily operations. Owners can now run their businesses through mobile apps. They process payments, check inventory, and text suppliers directly from their phones (Schilling & Seuring, 2023). This mobility lets them manage problems on the fly and make fast decisions, no matter where they are.

However, moving everything online introduces real risks. As these digital habits grow, cybersecurity has suddenly become a massive priority (Mhlongo et al., 2023). Fear of hacks and data leaks pushes micro-entrepreneurs to pay for secure payment gateways, data encryption, and basic malware protection. Knowing how to stay safe online is no longer just an Information Technology issue; it is a basic business survival skill that requires immediate education and awareness (Akter et al., 2025). Technology alone is not enough to guarantee success. Micro-entrepreneurs need funding, training, and mentors to actually adopt and use these tools effectively (Marinelli et al., 2023). Governments and non-government organizations (NGOs) are increasingly stepping in to provide this specific, targeted support. Business owners require hands-on exposure to different types of software. They get this through local workshops, online classes, and direct financial grants that help them bypass steep setup costs and use new systems confidently.

Current academic research clearly reflects this massive shift toward digital operations (Zahra et al., 2023). When these very small businesses integrate new tech, their capacity to grow and innovate increases dramatically. Ultimately, this paper outlines exactly how micro-entrepreneurs apply software to solve daily problems, speed up their work, and keep their doors open over the long term. Moving forward, both researchers and policymakers must keep tracking these changes. Continuous, structured support is the only way to ensure these business owners secure the skills they need to compete in a heavily digitized economy.

While academics agree that digital tools matter, we still lack a clear picture of how research on this topic has actually developed over time. Past papers usually look at just one specific app or a single local region. This bibliometric study fixes that problem. By looking at two decades of global data from 2004 to 2024, we map out exactly how this entire academic conversation was built. This paper is organized as follows. Section 2 discusses the trends and patterns of business technology tools and services among micro entrepreneurs. Section 3 presents and discusses the materials and methods used in highlighting the research trends of business technology tools and services among micro entrepreneurs. Section 4 discusses the key findings of this study. Section 5 summarizes the findings, outlines the research gaps, and suggests possible subjects for future research and Section 6 concludes the paper. Specifically, this study addresses the following research questions:

- What are the evolutionary publication trends and patterns concerning business technology tools among micro-entrepreneurs?
- Which authors, journals and countries are the most prolific and influential in this research landscape?
- What are the emerging themes and what future research agendas can be derived to further empower micro-entrepreneurs globally?

## 2. Literature Review

Business technology covers a massive range of daily tasks. Owners use software, cloud platforms, and mobile apps to do everything from finding new market opportunities and registering their company to running marketing campaigns and tracking sales. Fernando et. al. (2023) point out that these solutions frequently include e-commerce setups and customer relationship management (CRM) systems. Large corporations are not the only ones buying this software. Micro-entrepreneurs also rely heavily on these tools, even though they usually work with extremely tight budgets (Joseph et al., 2025). The International Labor Organization (ILO) defines a micro-enterprise as a business with five or fewer workers. Despite their lack of upfront funding, these tiny companies can pivot and grow surprisingly fast (Olarewaju, 2023). Because every industry is moving online, small business owners simply cannot afford to ignore these digital solutions.

Small businesses constantly fight an uphill battle. They lack cash, struggle to reach new buyers, and have to compete directly with massive corporations. Everyday software helps level this playing field. Instead of buying expensive hardware, owners can use affordable cloud systems like Google Workspace or Microsoft 365 to store files and collaborate (Ramya & Rajeswari, 2023). Social media also completely changes how they advertise. Rather than paying for massive ad campaigns, they use these platforms to find and talk to customers directly for almost no cost (Supriyadi & Ramadhan, 2025). Mobile apps are just as important for speeding up daily work (Aryeh-Adjei et al., 2025). A simple smartphone lets an entrepreneur message clients, track sales, and close the apps instantly from anywhere (Athaide et al., 2025). Finally, setting up a digital shop through an e-commerce platform guarantees they stay visible. Without that online footprint, they risk falling entirely out of touch with how modern consumers actually want to shop (Tunio et al., 2023).

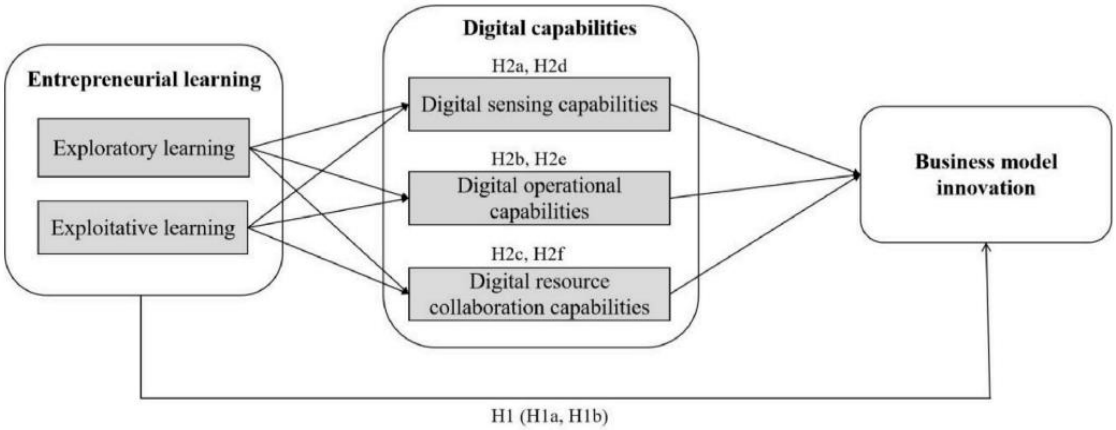
**Trends and Patterns on Business Technology Tools and Services among Micro Entrepreneurs:** Looking at the publication data reveals a few clear patterns. Scholars now care less about whether a small business simply owns technology and more about how they actually use it to survive and stand out. For example, da Silva and Sehnem (2025) point out that merely downloading an app or adopting a tool is not enough. Researchers must evaluate how well these owners apply the software in their daily work. Because of this shift, the number of papers focusing on specific, everyday tools like online stores, Software-as-a-Service (SaaS) platforms, and social media marketing has increased recently (Ruvoletto, 2023). As the broader digital economy grows, academics are paying much closer attention to what this means for the smallest businesses, especially those operating in developing countries (Joseph et al., 2025).

The data also shows that researchers from different fields are teaming up more often. We are now seeing business scholars, sociologists, economists, and computer scientists working together to study this group. This cross-collaboration happens because getting a small business owner to adopt new software is rarely just a technical problem. Mukherjee (2023) argues that academics need better models to capture the messy, real-world social and financial pressures these entrepreneurs actually face. Clearly, digital tools keep these tiny businesses running. Yet, simply acknowledging the benefits of software does not guarantee that owners will use it. Academics still need to figure out exactly what holds micro-entrepreneurs back from pushing these platforms to their full potential. Ultimately, mapping out these publication trends shows us what works and what is missing. If tech developers, researchers and government officials want to truly support small-scale business owners, they have to stop working in silos and start designing solutions that fit the daily realities of the local market.

**Characteristics and Importance of Micro Entrepreneurs:** Micro entrepreneurs essentially hold the global economy together, especially in developing nations where families rely on these small ventures just to survive. Iga et al. (2025) Note that business owners usually share a few common traits. They operate with very little cash, hire few employees and sell strictly to their local neighborhoods. People typically start these companies for one of two reasons. They either desperately need the extra income to get by or they spot a local market gap and want to turn a personal passion into a profit (Tan, 2023). The impact of these tiny businesses is hard to ignore. They create jobs from the ground up, drive local spending and pull families directly out of poverty (Herman, 2026). In fact, micro-enterprises employ millions of people globally who would otherwise struggle to find traditional wage work (Magida et al., 2025). Because they are so small, these owners can pivot instantly when local demands change, building incredible economic resilience. Putro et al., (2022) even found that beyond just making money, micro-entrepreneurs build deep social trust and actively bring their communities closer together.

Technology clearly opens doors for small business owners, though they still face steep financial and technical hurdles. Mobile banking apps, however, completely bypass the need for physical banks, giving owners instant access to financial tools (Agyei-Boapeah et al., 2022). Social media acts in a similar way. Owners use it to build brand loyalty and talk directly to buyers without needing a massive advertising budget (Yosep et al., 2021). Figure 1 maps out how these digital tools actually trigger deeper business model innovation. Entrepreneurs constantly absorb market feedback and learn from daily failures. This continuous learning builds their ability to think strategically and solve problems on the fly (Xiang et al., 2024). When an owner combines this everyday experience with solid digital skills, they can spot new opportunities and completely reinvent how their company operates. Ultimately, upgrading a traditional business today requires both a willingness to learn and the technical know-how to pull the transformation off.

**Figure 1: Business Model Innovation by Xiang et al (2024)**




**Evolution of Research in Business Technology for Micro Entrepreneurs:** Today, research priorities are shifting alongside the global economy. Instead of just asking if a business adopted a new tool, modern studies look at the messy socio-economic reality the owner actually lives in (Grassi & Toschi, 2021). We urgently need to understand how these tiny businesses approach communication tech Amouri et al. (2021) point out that micro-entrepreneurs deal with strict financial limits, a fear of taking risks, and a lack of technical skills. These technical hurdles directly show whether they will actually use a digital platform. Moving forward, tracking these publication trends will help us see exactly how technology impacts not just a single business's performance, but the economic survival of the surrounding community.

Researchers are paying close attention to the impact of online storefronts. Yosep et al. (2021) show that small business owners depend heavily on e-commerce platforms and digital marketing to find new buyers and keep them engaged. Social media plays a massive role in this process. Instead of sticking to traditional advertising, owners actively use these networks to build tight-knit communities and manage client relationships (Son & Niehm, 2021).

Financial technology (FinTech) is another major focus area. These apps give micro-entrepreneurs practical ways to bypass traditional banks for everyday payments and business loans. Using FinTech directly improves their financial literacy and makes securing working capital much easier (Hidayat & Kurniawan, 2024). Bringing all these tools together fundamentally changes how a micro enterprise operates. To explain why some owners still struggle with this digital transition, academics often rely on the Technology-Organization-Environment (TOE) framework (Al-Hadwer et al., 2021). This model proves that adopting new tech involves much more than simply downloading software. Business owners face intense operational and environmental roadblocks that dictate their success. As outlined in Table 1, these specific tools support daily operations and spark local economic growth. Today, going digital is simply a basic requirement for survival. If micro-entrepreneurs want to keep their doors open, they have to adapt.

**Table 1: List of Business Technology Tools and Services Used to Support Business Processes Among Micro Entrepreneurs**

| Business Technology Tools and Services | Business Process Supported | Example of Applications | Sources |
|---|---|---|---|
| Digital Marketing Tools | Social Media Platforms | Facebook, Instagram, TikTok, Twitter, LinkedIn | (Pourazad et al., 2023) |
| | Email Marketing | Mailchimp, Sendinblue, Constant Contact | (Pothuri, 2021) |
| | Content Creation Tools | Canva, Adobe Spark, Buffer | (Tunmise & Amanda, 2024) |
| | Search Engine Optimization (SEO) Tools | Google Analytics, Moz, Ahrefs, Search Engine Marketing (SEMrush) | (Daruka & Damle, 2023) |
| E-commerce Platforms | Online Marketplaces | eBay, Etsy, Shopee, Lazada | (Zabidi et al., 2022) |

| | | | |
|---|---|---|---|
| | Website Builders | Shopify, Wix, Squarespace, WooCommerce | (Blancaflor & Samonte, 2023) |
| | Payment Gateways | PayPal, Stripe, Square, Razorpay | (Stehniei, 2021) |
| Financial Management Tool | Accounting Software | QuickBooks, Xero, Wave, FreshBooks | (Maruschak, 2021) |
| | Expense Tracking Apps | Expensify, Mint, PocketGuard | (Mosteanu & Faccia, 2020) |
| | Invoicing Tools | Zoho, Invoice, Invoice2Go, FreshBooks | (Caclini, 2022) |
| Customer Relationship Management (CRM) Systems | Basic CRM Tools | HubSpot, Zoho CRM, Salesforce, Insightly | (Anbari & Deng, 2022) |
| | Contact Management Apps | Google Contacts, Outlook, Contacually | (Dhanalakshmi et al., 2020) |
| | Customer Feedback Platforms | SurveyMonkey, Typeform, Google Forms | (Bevec & Vehovar, 2021) |
| Project Management Tools | Task Management | Trello, Asana, Monday.com, ClickUp | (Bacbkib & Bepetehhikoba, 2023) (Jackson et al., 2022) |
| | Collaboration Tools | Slack, Microsoft Teams, Google Workspace | (Vasyliuk & Basyuk, 2021) |
| | Time Tracking | Toggl, Clockify, Harvest | |
| Inventory Management Systems | Inventory Tracking | TradeGecko, Zohon Inventory, Ordoro | (Kurdi et al., 2022) |
| | Point of Sale (POS) Systems | Square POS, Vend, Lightspeed | (Petrov, 2023) |
| Communication and Collaboration Tools | Video Conferencing | Zoom, Google Meet, Microsoft Teams | (Sevilla, 2020) |
| | Instant Messaging | WhatsApp Business, Telegram, Signal | (Conde et al., 2021) |
| | File Sharing and Storage | Google Drive, Dropbox, OneDrive | (Marciano & Maynard III, 2023) |
| Supply Chain Management Tools | Logistics Management | ShipStations, Shippo, Easyship | (Gatti, 2023) |
| | Supplier Management | Procurify, SAP Ariba, Tradeshift | (Rutkoski, 2024) |
| Mobile Applications | Mobile Payment Solutions | Google Pay, Apple Pay, Paytm | (Pachabotla & Konka, 2022) |
| | Business Apps | Evernote, Microsoft Office Mobile, Google My Business | (Manko, 2022) |
| Cybersecurity Tools | Basic Security | Norton, McAfee, Kaspersky | (Shaikh et al., 2021) |
| | Password Management | LastPass, 1Password, Dashlane | (Carr & Shahandashti, 2020) |
| | Data Backup Solutions | Carbonite, Acronis, Backblaze | (Marshall, 2023) |
| Artificial Intelligence (AI) Tools | Chatbots | ManyChat, Tars, Drift | (Bahattab, 2024) |
| | AI-based Analytics | Google AI, Microsoft AI, IBM Watson | (Mittal et al., 2021) |
| | Recommendation Engines | Amazon Personalize, Salesforce, Einstein | (Rainsberger, 2022) |
| Cloud Services | Cloud Computing | Amazon Web Services (AWS), Microsoft Azure, Google Cloud | (Gupta et al., 2021) |
| | Software as a Service (SaaS) | Slack, Salesforce, Zoom | (Rrucaj, 2023) |
| Human Resource Management Tools | Recruitment Tools | Indeed, LinkedIn Recruiter, Workable | (Vardarlier & Ozsahin, 2021) |
| | Payroll Systems | Gusto, Paychex, ADP | (Olumoh et al.) |
| | Employee Management | BambooHR, Zenefits, Rippling | (Koulopoulos & Palmer, 2024) |
| Sustainability-Focused Tools | Energy Management Software | GridPoint, EnergyCAP, Schneider Electric | (Lago et al., 2024) |
| | Waste Management Apps | Recycle Coach, TerraCycle, iRecycle | (Ócsai & Ócsai, 2021) |
| Educational and Training Tools | Online Learning Platforms | Coursera, Udemy, LinkedIn Learning | (Alojaiman, 2021) |
| | Skill Development | Skillshare, Khan Academy, edX | (Asante, 2024) |

Table1 shows just how many software options small business owners now have at their disposal. They can choose from a wide variety of platforms, covering everything from basic customer relationship management (CRM) systems to niche sustainability apps. Although not every entrepreneur adopts this entire suite of tools, the research agrees on one main takeaway. Using even a few of these programs actively cuts down on daily operational transactions and helps owners find new buyers.

## 3. Methodology

We used a quantitative, bibliometric approach to review the existing academic literature. Tracking this data lets us map out exactly how publication rates, author collaborations and core themes have shifted over time. Ultimately, this method directly answers our primary research question: What are the current trends and patterns in studies on micro-entrepreneurs and business technology.

To do this, we pulled all of our raw publication data directly from the Scopus database. From there, we fed the records into VOSviewer software. We relied on specific techniques, namely co-citation analysis, keyword co-occurrence and network mapping, to build a clear, visual picture of how different research topics actually connect. A structured search was formulated using keywords that capture the essence of the research focus, which include micro entrepreneurs, business technology tools, technology services for micro entrepreneurs, digital tools for business and small business innovations. Boolean operators such as AND, OR, NOT were employed to refine the search results. The search was limited to articles published in English to ensure standardization for the keyword co-occurrence analysis and to maintain a focus on widely accessible, peer-reviewed international literature and publications from 2004 to 2024 to ensure the relevance of the literature to current trends, as shown in Table 1. A total of 215 articles published in Scopus were considered based on selected filtering as shown in the following Search String:

**Search String:** TITLE-ABS-KEY ( ( ( "micro entrepreneur*" OR "microenterprise*" OR "micro business*" OR "micro enterprise*" ) AND ( "business technology tool*" OR "digital tool*" OR "technology adoption*" OR "digital service*" OR "business technology service*" OR "ICT adopt*" OR "technology solution*" ) OR ( mobile AND app* ) OR ( cloud-based AND service* ) ) ) AND ( LIMIT-TO ( LANGUAGE, "English" ) )

As stated in the Search String, filtering of documents was based on the English language only; the publication year ranges from 2004 to 2024, and document types selected include article, conference review, conference paper, book chapter, review and editorial contributing to 215 documents extracted for the analysis. This volume of articles indicates a substantial body of literature related to this study, suggesting that it is an area of active research and interest. One article was excluded that referred to Spanish document language. The volume of articles published and a comprehensive summary of the criteria used to collect the Scopus data are depicted in Table 2. This ensures that the analysis is focused on recent and relevant literature selected for this study. The exclusion of documents in languages other than English helps maintain the focus on more substantial and comprehensive works.

**Table 2: Data Collection Criteria and Articles Included in Scopus from 2004 to 2024**

| | |
|---|---|
| **Search words** | (“micro entrepreneur*" OR "microenterprise*" OR "micro business*" OR "micro enterprise*" ) AND ( "business technology tool*" OR "digital tool*" OR "technology adoption*" OR "digital service*" OR "business technology service*" OR "ICT adopt*" OR "technology solution*" ) OR ( mobile AND app* ) OR ( cloud-based AND service) |
| **Year published** | 2004 -2024, N=221 |
| **Database** | Scopus |
| **Language** | English only, N=215 (Exclude: Spanish=4, Chinese=2) |
| **Research limitations** | Article (100), Conference Review (18), Conference paper (76), Book chapter (14), Review (6) and Editorial (1), N=215 |
| **Subjects** | Computer Science, Business, Management and Accounting, Social Sciences, Engineering, Economics, Econometrics, and Finance, Decision Sciences, Mathematics, Environmental Science, Energy, Physics and Astronomy, Psychology, Medicine, Arts and Humanities, Multidisciplinary, Agricultural and Biological Science, Nursing, Earth and Planetary Sciences. |

This study applied VOSviewer software version 1.6.20 to analyze the publishing trends and most prolific journals, disciplines, authors, institutions, countries, studies, and subjects. Co-citation analysis to systematize the most fundamental articles published between 2004 and 2024. Co-citation analysis is a popular bibliometric tool for identifying commonalities between cited papers. The most influential subjects were analyzed using the fractional counting approach, with each keyword's number of occurrences corrected for the total number of keywords used in the title, abstract, or keyword list for the same article. This approach is preferable to simple counting since it generates a bibliometric network with each connection assigned a fractional weight, resulting in a tighter association between two terms. The fractional counting approach is more suitable for bibliometric networks involving fewer keywords.

Detailed bibliographic information was extracted including title, authors, publication year, journal name, volume and issue number, keywords, abstract and citation counts. Bibliometric techniques such as descriptive analysis, citation analysis, co-authorship analysis and keyword co-occurrence analysis were conducted using VOSviewer software for creating visualization of the bibliometric analysis and to identify prevalent research themes and emerging trends, and MS Excel for organizing the data and performing preliminary statistical calculations. Visual representations include histograms, network graphs and word clouds.

## 4. Bibliometric Analysis

**Annual Publication Trends:** Figure 2 illustrates the trends displayed by the 215 Scopus-indexed articles in different subject areas from 2004 until 2024.

**Figure 2: Articles Included in Scopus from 2004 Until 2024**

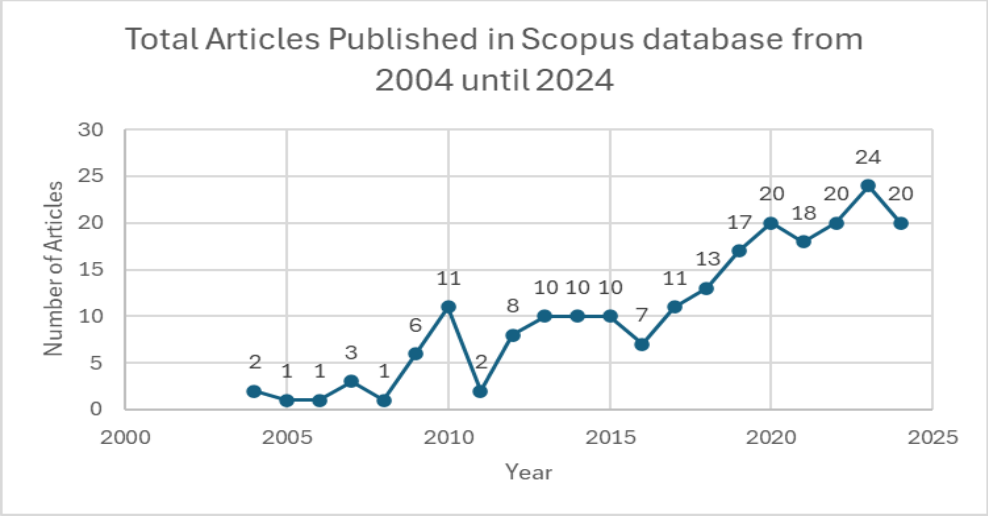



Figure 2 indicates an impressive increase in publications from 2 papers in 2004 to a staggering 215 papers in 2024 published in English. In particular, the sharp increase in publications leading up to 2024 likely reflects the accelerated digital transformation forced by the global COVID-19 pandemic, which forced remote operations and digital commerce for survival. The data clearly shows a massive spike in interest regarding small business technology. More academics are now testing whether these new tools actually help owners cut waste, reach buyers, and work faster. At the same time, this puts micro-entrepreneurs in a tough spot. They have to stay competitive in a digital market while figuring out how to use software that changes almost daily.

The sheer volume of papers published between 2004 and 2024 proves that researchers are paying attention. It shows the academic world finally recognizes that technology dictates whether a micro-enterprise survives over the long term. Part of this publication boom simply comes from how easy it is to share work online today. Open-access journals let a much wider range of researchers jump into the conversation. Naturally, as new software hits the market, scholars want to test if it actually works for small-scale users. Because of this, we are seeing a major shift in who conducts the research. Experts in business, IT, sociology, and economics are teaming up rather than working alone. Bringing all these different viewpoints together leads to far more practical, grounded conclusions.

All this new research directly helps small business owners figure out how to actually use digital tools. In the past, enterprise software was often far too expensive and complex for a one-person shop. Now, as academics and developers pay closer attention to this market, these platforms are being scaled down to fit the exact needs of micro-enterprises. Academic studies also produce practical guides and frameworks. Owners can use these models to cut through the marketing noise and figure out which apps are actually worth their limited budget. Ultimately, when researchers share clear best practices, micro-entrepreneurs stop guessing. They can apply these findings directly to their daily work, keeping their businesses profitable over the long haul.

**Prolific Source Title and Source Area:** Table 3 breaks down exactly where these 215 articles were published. The ACM International Conference Proceedings Series leads the group, accounting for 10 of the papers (4.65%). Right behind it is the Electronic Journal of Information Systems in Developing Countries, which published another 7 articles (3.26%).

**Table 3: Top Twelve Source Titles of Articles Published Related to The Study**

| Source title | Total |
|---|---|
| ACM International Conference Proceeding Series | 10 |
| Electronic Journal of Information Systems in Developing Countries | 7 |
| Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) | 6 |
| Technological Forecasting and Social Change | 6 |
| IFIP Advances in Information and Communication Technology | 6 |
| 16th Americas Conference on Information Systems 2010, AMCIS 2010 | 4 |
| Communications in Computer and Information Science | 3 |
| Lecture Notes in Networks and Systems | 3 |
| Proceedings of the Annual Hawaii International Conference on System Sciences | 3 |
| IEEE Microwave Magazine | 3 |
| Information Technology for Development | 3 |

The ACM series acts as a primary landing spot for researchers and developers to test out brand new ideas, making it a critical resource for anyone trying to build or study tech built specifically for small-scale operations.

The Electronic Journal of Information Systems in Developing Countries takes the second spot with seven papers, making up 3.26% of our sample. This journal zeroes in on how businesses operate under tight resource limits, which fit the exact reality most micro-entrepreneurs face. Instead of just sharing high-level theory, its article offers practical ways for owners to actually adopt accessible tech. These publication trends matter because they prove that academic journals are not just talking to other scholars. They are creating a reliable playbook that small business owners, advisors and tech developers can use to keep up with industry shifts.

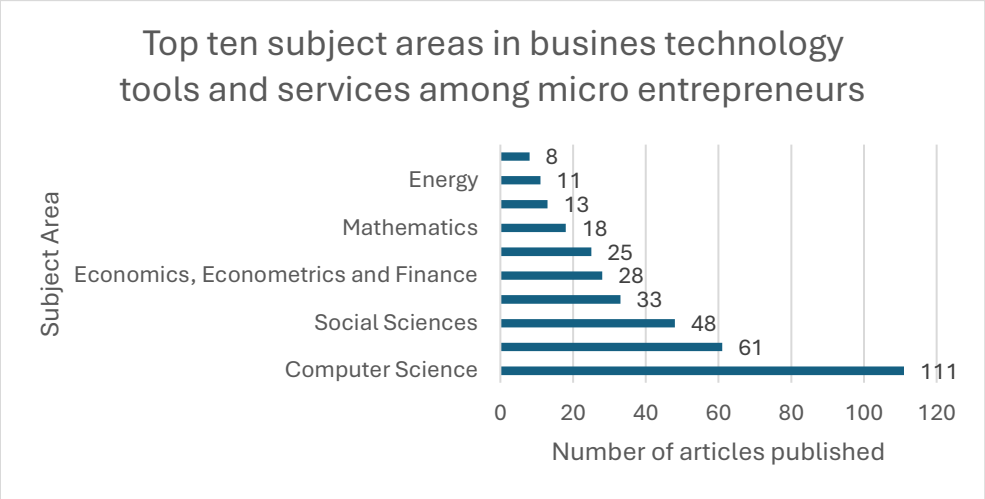
Because micro-enterprises make up such a huge chunk of the economy, especially in developing regions, giving these owners the right tech can trigger massive financial growth. Finding trustworthy, research-backed advice helps them make smart moves that strengthen both their own shops and their local communities. Table 4 and Figure 3 map out the top ten subject areas covering micro-business tech. Computer Science easily takes the top spot with 111 articles, while Business, Management and Accounting (61) and Social Sciences (48) follow behind. This specific mix of disciplines highlights the core trends shaping how these tiny businesses actually operate.

**Table 4: List of Subject Areas for Articles Published Related to Business Technology Tools and Services Among Micro Entrepreneurs.**

| Subject Area | Count |
|---|---|
| Computer Science | 111 |
| Business, Management and Accounting | 61 |
| Social Sciences | 48 |

| | |
|---|---|
| Engineering | 33 |
| Economics, Econometrics and Finance | 28 |
| Decision Sciences | 25 |
| Mathematics | 18 |
| Environmental Science | 13 |
| Energy | 11 |
| Physics and Astronomy | 8 |
| Psychology | 6 |
| Medicine | 6 |
| Arts and Humanities | 6 |
| Multidisciplinary | 2 |
| Agricultural and Biological Sciences | 2 |
| Nursing | 1 |
| Earth and Planetary Sciences | 1 |

**Figure 3: Top Ten Subject Areas for Articles Published Related to Business Technology Tools and Services Among Micro Entrepreneurs**




Having 111 articles in Computer Science shows just how heavily modern business relies on technical software. Small business owners do not just need general advice; they use actual apps, automated programs, and data dashboards to cut waste and handle daily customer messages. The Business, Management, and Accounting field comes next with 61 articles. These studies focus on the practical side of running a shop, like budgeting, long-term planning and streamlining daily tasks. Combining tech tools with sound business management helps these owners make smarter calls and keep their companies profitable over time.

Social Sciences accounts for 48 articles, shifting the focus directly to the human side of going digital. This branch of research looks at how buyers act online, how local social networks operate, and how adopting software changes a community's daily life. Micro-entrepreneurs need these insights just as much as technical tools. Understanding local social habits helps owners design products people actually want, target their social media marketing, and build real trust with local buyers in crowded markets.

**Prolific countries:** Citation by countries with a minimum number of documents of a country is 7 and minimum number of citations of a country is 20. The result generated shows that out of the 58 countries, 9 meet the thresholds as shown in Figure 4 and Figure 5. The top countries contributing to this bibliometric analysis were dominated by India with 24 articles, followed by South Africa with 23 articles and the United States with 22 articles.

**Figure 4: Top Nine Countries That Published More Than Ten Articles or Scientific Production of the Main Countries Related to Trend and Patterns of the Business Technology Tools and Services Among Microentrepreneurs**

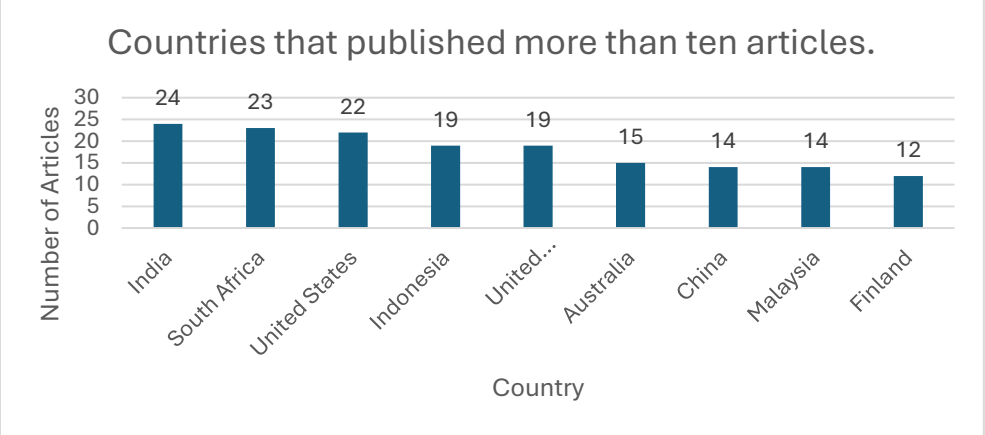
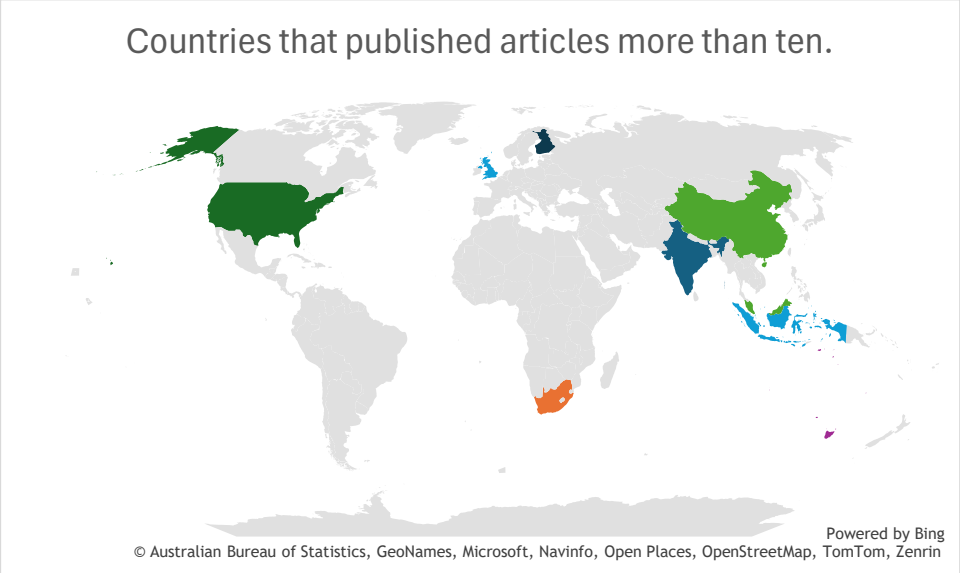



**Figure 5: World Map of the Top 9 Countries Contributing to the Publications in This Study**




Bibliometric analysis plays a crucial role in understanding the impact and contribution of various countries to a specific field of study. This study reveals significant insights into the contribution of 58 countries regarding micro entrepreneurs and the business technology tools and services that support them. Particularly, the analysis establishes a minimum threshold for the number of documents at seven and a minimum citation count of 20, leading to the identification of nine countries that meet the criteria. The bibliometric analysis revealed a clear dominance of certain countries in this are with India leading the pack. Figures 4 and 5 show that India produced 24 articles, leading the research on software for micro-enterprises. South Africa follows closely with 23 papers, while the United States contributed 22. This global spread shows how different countries prioritize small-business technology in distinct ways. These publication numbers directly impact real-world operations. Since tiny companies form the backbone of emerging economies, understanding how to adopt accessible tools helps these owners streamline daily tasks, find new buyers and stay in business over the long run.

Given its huge publication output, India acts as a major testing ground for digital tools built specifically for very small businesses. Research from this region offers clear examples of how micro-enterprises use simple mobile apps, payment networks and online marketplaces to scale up. Meanwhile, studies out of South Africa bring a

different, highly valuable angle. Rather than focusing purely on app features, South African scholars look closely at local socio-economic realities. They highlight the specific daily hurdles these business owners face and evaluate localized software designed to work around poor infrastructure and tight cash flow. As a global leader in technology innovation, the contribution from the United States may focus on cutting-edge business technologies that can be adopted by micro entrepreneurs worldwide. The insights garnered here could revolve around the best practices and tools that have emerged from more developed markets, thus providing a benchmark for emerging economies.

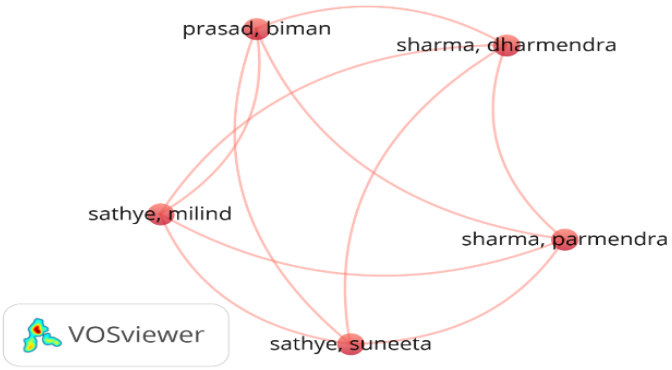
**Prolific Authors:** The minimum number of citations for an author is five, and six of the 532 writers satisfy this requirement. This research determined the overall strength of co-citation relationships with other writers for each of the six authors. Figures 6 and 7 illustrate which writers had the highest overall link strength. In a co-citation analysis, two works are deemed co-cited if they are both cited by the same third work. The number of co-citations between two works determines the strength of the relationship. According to the results shown in Figures 6 and 7, there are five top author works that have a similar number of citations: Biman Prasad, Milind Sathye, Suneeta Sathye, Dharmendra Sharman, and Parmendar Sharma, who contribute 36 citations and are most frequently cited by others with a similar total link strength. Authors such as Prasad, Sathye and Sharma emerge as foundational in this network, frequently co-cited for their early frameworks establishing the baseline constraints and socio-economic factors influencing micro business technology adoption. The result for each of the six writers who met the criterion displays the overall strength of the authors' co-citation linkages with other authors. This shows that his work is regarded as basic in the field of business technology tools and services for micro entrepreneurs, as well as having an impact on the direction of future research.

**Figure 6: Co-Citation Analysis Based on Author List**

| Selected | Author | Documents | Citations | Total link strength |
|---|---|---|---|---|
| ☑ | prasad, biman | 6 | 36 | 24 |
| ☑ | sathye, milind | 6 | 36 | 24 |
| ☑ | sathye, suneeta | 6 | 36 | 24 |
| ☑ | sharma, dharmendra | 6 | 36 | 24 |
| ☑ | sharma, parmendra | 6 | 36 | 24 |

Co-citation analysis maps out how different academic works connect and influence one another. Out of 532 authors in our dataset, Figures 6 and 7 show that only six hit the minimum threshold of five citations. These few scholars form the core foundation of this research domain. Examining their citation strength helps us see who established the key frameworks and built the early models that modern micro-business studies still rely on today.

**Figure 7: Map Of Co-Citation Analysis of The Most Relevant Publications in the Research Field Based on Authors' Names**




These core authors are consistently cited together because they built the initial models for small-business tech adoption. Their early papers outlined the baseline financial, social and operational barriers that micro-entrepreneurs face when adopting new tools. Today, current scholars still rely on these foundational studies

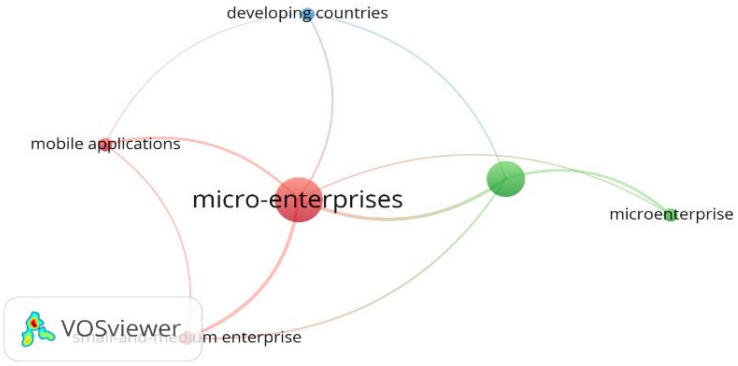
as a baseline when testing newer platforms, such as mobile apps, e-commerce setups, and automated accounting software.

**Key Word Analysis:** Keyword co-occurrence measures how often two terms appear together in an article's title, abstract, or keyword list, revealing strong thematic links across the literature. Tracking these keyword relationships helps show how research on small-business tech is actually structured, especially in emerging economies. To map these themes, we extracted 1,418 keywords from the Scopus dataset using full counting across all keyword fields. Setting a minimum threshold of 15 occurrences narrowed the dataset down to six core terms. These primary keywords represent the most dominant, influential concepts driving current academic discussion in this field.

**Figure 8: Word Tree Map for The Timespan 2014–2018. Source: Scopus**

| Selected | Keyword | Occurrences | Total link strength |
|---|---|---|---|
| ☑ | micro-enterprises | 53 | 49 |
| ☑ | technology adoption | 42 | 34 |
| ☑ | small-and-medium enterprise | 16 | 24 |
| ☑ | mobile applications | 16 | 13 |
| ☑ | microenterprise | 16 | 12 |
| ☑ | developing countries | 15 | 8 |

**Figure 9: Word Tree Map for The Timespan 2014–2018. Source: Scopus**




Figures 8 and 9 highlight the primary terms driving this literature. "Micro-enterprises" leads with 53 occurrences, reflecting the massive academic focus on small, often informal ventures that power local economies. "Technology adoption" follows closely in second with 42 occurrences, capturing how these tiny firms actually shift toward modern digital tools to boost daily productivity and reach buyers. "Small and medium enterprises" ranks third (16 occurrences), providing a broader baseline to compare micro-business strategies against larger corporate operations. Tied for fourth is "mobile apps" (16 occurrences). As smartphone access expands globally, researchers increasingly focus on mobile software as the primary engine for speeding up daily tasks and expanding market access.

"Microenterprise" also appeared 16 times, overlapping heavily with "micro enterprise" to highlight the distinct operational hurdles and community-level economic impact of tiny firms. Finally, "developing nations" rounded out the list with 15 occurrences. This term shows the heavily localized nature of the research, stressing that software must be designed around the specific infrastructure and socio-economic constraints of resource-limited markets.

**Discussion**

While current studies offer a solid start, academics must produce far more accessible, actionable research built explicitly for small business owners. Enterprise software can feel overwhelming, and dense theoretical papers

rarely offer practical help. Closing this gap requires direct collaboration between researchers, software developers and business owners to ensure academic insights actually turn into usable real-world tools. The heavy overlap between Computer Science, Business and Social Sciences provides a clear blueprint of this transition. Small-scale entrepreneurs do not just need raw software; they need to know how digital tools fit into their daily management routines and customer relationships. Combining technical tools with traditional business practices helps these owners make smarter decisions, cut operational waste, and stay competitive despite tight budgets.

Leading countries, India, South Africa and the United States are driving research at the exact point where software meets small-scale entrepreneurship. As more regions contribute to this space, scholars can share cross-border data to build better support systems for small business owners globally. The payoff goes far beyond speeding up daily work. Adopting the right software can reshape entire local markets. Pooling data from both emerging and developed economies gives us a much clearer picture of what actually works, making it easier to design adaptable, scalable tools that fit real-world business needs.

The strong link between our six primary keywords, “micro-enterprise” (53), “technology adoption” (42), “small and medium enterprise” (16), “mobile application” (16), “microenterprise” (16) and “developing countries” (15) proves that tech usage directly dictates micro-business survival. The particularly high link strength between “micro-enterprises” and “technology adoption” points to a clear area for deeper research. More importantly, the tight connection between “mobile applications” and “developing countries” reveals a vital real-world trend. Mobile-first tools allow business owners to jump right over weak traditional infrastructure. In resource-strapped regions, smartphones act as the main gateway to digital tools. Going forward, scholars, developers, and policymakers must keep these patterns in mind when building support programs. Designing tech around these specific local habits is the best way to help small businesses handle market shocks and keep growing over time.

## 5. Implications and Conclusion

**Theoretical Implications:** This study highlights a significant change in the academic focus from basic technology models toward understanding long-term digital sustainability. For example, recent 2026 empirical frameworks evaluating women-led micro-enterprises in Indonesia demonstrate that variables like digital literacy and financial inclusion must be integrated into causal models, as technology access acts as an enabler that directly boosts an entrepreneur’s intrinsic motivation and self-development (Pranitasari et al., 2026). Future theoretical frameworks, such as the Technology-Organization-Environment (TOE) model, must be expanded to include variables like entrepreneurs’ self-efficacy and local digital ecosystem support. Next, the bibliometric data reveals a high concentration of research in specific emerging economies, particularly in India and South Africa. For instance, 2025 studies tracking agribusiness micro-entrepreneurs in rural Uganda emphasize that theoretical focus must shift from not just “adoption” to “agency” which explores how simple digital footprints from mobile money apps create alternative credit scoring models for historically financially excluded populations (Eton et al., 2025). This highlights an urgent need for flexible, cross-cultural models that adjust for varying digital infrastructure, local network effects and regional socio-economic hurdles.

The heavy overlap between Computer Science, Business and Social Sciences proves that future research cannot rely on a single discipline. Theoretical models need to blend these fields. For instance, scholars are now building cross-disciplinary frameworks to test ho wan owner’s local social standing and cultural background affect their decision to ditch cash for e-payments (Bahasoan et al., 2026). To truly understand how micro-enterprises go digital, researchers have to pair software features with human-centered realities like customer trust and fear of new technology.

**Practical Implications:** Simply handing over hardware or software is not enough. Policymakers need to build supportive local ecosystems by funding peer-learning groups, subsidizing mobile internet, and running practical digital training. In Malaysia, for instance, combining subsidized 5G plans and devices with hands-on community workshops helped low-income entrepreneurs move past basic survival to expand their businesses (Chong et al., 2026). At the same time, software developers must create cheaper, far simpler mobile apps and Software-as-a-Service (SaaS) platforms. Tools need to fit the tight budgets and limited technical experience of

small-scale users. A great example comes from India, where inventory apps integrated voice-command AI and image-recognition "smart baskets," allowing women with limited digital skills to track their stock effortlessly (Abbas et al., 2025).

Small business owners need to realize that going digital directly impacts whether their enterprise survives or fails. Swapping paper accounting for a basic ledger app is an easy first step that creates a verifiable transaction history. Fintech firms can then analyze this data to issue working capital loans and seed grants without requiring collateral (Bredice et al., 2025). Beyond using these apps, micro-entrepreneurs should actively seek out local mentors who understand small-business tech, adopt low-cost mobile analytics and make basic cybersecurity a daily operational habit.

**Conclusion**

The growing body of literature on micro-business technology highlights a clear story of adaptation and economic survival. As digital tools become standard across every industry, small-scale owners have to stay flexible and rely on practical, evidence-based strategies to manage new software. Reaching 215 publications by 2024 shows that researchers are actively paying attention to the needs of micro-enterprises. When academics focus on the real-world obstacles these business owners face, they help build better operational strategies that can strengthen entire local economies.

Looking at the key publishing outlets like the ACM International Conference Proceedings Series and the Electronic Journal of Information Systems in Developing Countries shows where the core academic conversation is happening. Making this research easier to read and apply in the real world will help owners make far better software choices. The strong overlap across Computer Science, Business and Social Sciences proves that micro-business tech is never just a technical issue. Owners have to balance software features with daily management routines and customer relationships. Combining insights from all three fields gives entrepreneurs a practical guide to cutting operational waste and keeping their doors open over the long haul.

This bibliometric analysis maps the current academic conversation surrounding micro-enterprises and technology. With India, South Africa and the United States producing the highest volume of research, there is a clear opportunity for cross-border knowledge sharing. The models developed in these leading nations can directly inform the software tools and support programs built for small business owners worldwide. Encouraging international collaboration among scholars speeds up the delivery of practical, field-tested solutions to local entrepreneurs. Furthermore, co-citation analysis demonstrates how these foundational authors built the shared frameworks that continue to drive new research in small-business technology.

Keyword co-occurrence patterns highlight the foundational themes shaping current research on micro-enterprise tech. However, this study has clear limitations. The bibliometric dataset relies exclusively on Scopus. While Scopus offers extensive coverage, future research should incorporate Web of Science, Google Scholar or regional databases to capture a broader selection of non-English and interdisciplinary journals. These limitations point directly to several critical areas for future study. First, long-term tracking is needed to measure how digital tool adoption impacts actual firm survival and revenue over multi-year periods. Second, scholars should combine insights from sociology, marketing, and IT to build cross-disciplinary frameworks for technology adoption. Third, future work must evaluate how policy incentives and digital infrastructure grants directly affect adoption rates in rural areas. Finally, researchers need to develop standardized metrics to test which software features actually drive performance in resource-constrained environments. Building these practical, accessible research pipelines ensures academic studies continue to support real-world micro-business growth in the digital economy.

**Acknowledgement:** This study was funded by the Ministry of Higher Education (MOHE) through the Fundamental Research Grant scheme (FRGS) (FRGS/1/2023/SS01/UITM/02/40).

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Student Perceptions of a National Healthcare Systems Course: Evidence from a Cross-sectional Survey of Undergraduate Students

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**Abstract:** National Healthcare Systems are an important aspect to study for health administration students, as they provide them with the knowledge and skills necessary to comprehend the organization, financing, and delivery of health services in a nation. The understanding of national healthcare systems allows students to examine healthcare policies, assess healthcare systems' performance, and recognize the strengths and weaknesses in the health care delivery system. Hence, the purpose of this study is to gain relevant and reliable data from the respondents to find out their opinions, experiences, and perceptions about the National Healthcare Systems (HSM479) course taken by the Bachelor in Health Administration (BA265) students. Data were gathered from 83 students who had finished the HSM479 course via online surveys on Google Forms. A structured questionnaire was created that focused on different dimensions such as Course Content and Relevance, Course Teaching and Learning, Student Engagement and Participation, Knowledge and Skill Development, Assessment and Feedback, and Perception and Satisfaction. The collected data were analyzed using descriptive statistics and inferential statistics. The results revealed high levels of sense of relevance, student satisfaction, and positive learning outcomes among the respondents. Additionally, the course content, students' participation and skill development were significantly correlated with students' satisfaction in taking this course. The findings are consistent with maintaining continuity of higher education healthcare system education in higher education curricula, especially in health administration and allied health programs.

**Keywords**: *National Healthcare Systems Course, Undergraduate Student, Quality Education, MOOC*

## 1. Introduction and Background

Healthcare systems are extremely important for providing equal access to health services, for enhancing population health outcomes and for contributing to national development. In today's context, the complexity of health systems, resulting from demographic change, policy changes and technological progress, is increasing, and it is crucial for students engaging in healthcare programs to grasp how these systems operate. However, higher education institutions include courses related to the national healthcare system to give students the basics of national health system governance, financing, service delivery, and health policy.

The National Healthcare Systems course (HSM479) aims to introduce undergraduate students to the architecture, organization, and problems of healthcare systems, both nationally and internationally. This course should enable students to gain a comprehensive understanding of healthcare policies, system governance and the relationship between healthcare stakeholders. The course also seeks to enhance students' analytical skills, as they will learn to analyze healthcare policies, discuss the healthcare system in different countries, and assess the issues in the healthcare sector. This not only helps students in their understanding of health policy but also is vital for those who plan to work in healthcare administration or health policy and public health management.

In HE, the attitudes of students towards a course are generally considered to be a significant measure of teaching quality and learning outcomes. The level of students' engagement, motivation, and satisfaction with the learning process can be impacted by experiences and attitudes towards course content, teaching, learning activities, and assessment. Having insight into students' views on these aspects can offer useful feedback for teachers to enhance curriculum design, pedagogical approaches, and evaluation methods.

The importance of several factors affecting students' perception of a course has been reported in previous studies (Jones, Krost, & Jones, 2021). This includes the pertinence and understanding of course material, instruction, student engagement and participation, learning, acquisition of knowledge and skills and assessment and feedback from teachers. When these elements are utilized effectively, they can help to create a more fulfilling learning experience and boost student satisfaction. As for these factors, however, there is limited empirical evidence that investigates how they work together to affect students' perceptions of courses related to health care, especially at the undergraduate level.

In Malaysia, health care is provided within a dual health care system, both public and private, and it is important that students in health care programs have a working conceptual understanding of the organization and delivery of health care. An assessment of students' perceptions of courses dealing with the healthcare system, therefore, can yield valuable information regarding the effectiveness of current teaching strategies and also suggest areas in healthcare education that need improvement.

Thus, this study focuses on a cross-sectional survey to investigate the perceptions of the undergraduate students about HSM479. Specifically, the research examines the students' perceptions of the main dimensions of the course – course content and relevance, teaching and learning processes, engagement and participation, knowledge and skills development, assessment and feedback, and satisfaction. The study aims to use these variables to establish relationships between them, to find out the factors that affect the general satisfaction of students in the course, and to get evidence-based ideas to improve healthcare education.

## 2. Literature Review

### *Importance of Health Systems Education in Healthcare Reform*

Although the Malaysian health care system is relatively advanced in the region, there are several serious issues that necessitate a change in healthcare professional education. The issues that the healthcare education system in Malaysia encounters are unique and require local solutions. In the study, Nair and Webster (2012) focus on the education of healthcare professionals in emerging economies and examine the changes in healthcare systems that have occurred because of economic, political, and social changes. The updating and reformation of education should be accompanied by the updating and reform of the curriculum, which requires needs-oriented, whole-school curriculum planning and a modern teaching method. The analysis highlights issues that need to be addressed, including the increasing number of public and private institutions, standardization of accreditation procedures and quality assurance. The recurring problem is to ensure the harmonization of government and private medical institutions in a single country-wide framework of quality assurance and to promote outcome-based education, especially in Malaysia.

Chua and Cheah (2012) examined the framework of the UHC for Malaysia, and they claim that effective governance and leadership, financial resource allocation and quality of health services are essential to sustain equity in UHC. One of the common problems in the Southeast Asian region, including Malaysia, has been the international migration of skilled healthcare workers, which has led to the development of strategies to remunerate skilled workers and diversify skills. The measures in compensation for healthcare workers in Malaysia seek to close the pay gap among public service workers and boost recruitment and retention efforts through measures like the Rakan KKM. Meanwhile, updates on skill mix focus on training and role optimization in the Ministry of Health (MOH) system. Therefore, the healthcare education system has taken up several steps at the basic level to foster and develop Best Practices in healthcare education at the tertiary level, in accordance with the requirements of healthcare workers in Malaysia.

Interprofessional education, task reallocation, and Technical and Vocational Education and Training (TVET) initiatives have been developed and implemented in Malaysia to support the upskilling of economically disadvantaged B40, with an aim of upskilling 300,000 B40 by 2025, under the 12th Malaysia Plan. TVET contributes to improving health-related quality of life and the skills of the workforce to meet the needs of Industry Revolution 4.0. The MOH efforts include upskilling at the community level based on data and embedding a digital health literacy component in the university and college curricula. Thus, the successful implementation of health systems science (HSS) education requires careful curriculum development and significant faculty capacity development, from which Malaysia can benefit from lessons learned from other

countries in the region. A cooperative approach involving cooperation between governmental bodies, public universities and development partners leads to curriculum changes at both national and institutional levels, which Malaysia could follow. The study illustrates the possibility of Malaysia designing educational schemes to reinforce the health systems and meet the health needs of the region by recognizing the competency gaps and developing education programs to fill these gaps**.**

***Health Policy and Systems Literacy at the Undergraduate Level***

Health policy and systems literacy in undergraduate education in Malaysia is centered on health policy and systems research (HPSR) concepts in medical and health sciences curricula to build an understanding for future health care workers. Health policy and systems literacy is seen as an important competency for undergraduate students in health care; students with this competency know how the health care delivery system works and how policy decisions impact patient care and the outcomes for populations. This literacy is important for the future of other health care professions, not just the clinician's knowledge. Haque et al. (2022) conducted a study among medical students at a public university in Malaysia that asked them about their perceptions of health policy education, finding that 80.9% of respondents were interested in learning more about health policy, and 83.6% felt it should be required for medical education. Students recommended beginning health policy in the early years of medical school so that the building of health policy-related skills could be a gradual process over time. There was a strong association between depth of curricular exposure and depth of health policy involvement, with higher scores being associated with greater involvement in health policy roles. This evidence further emphasizes the critical role of health policy and systems literacy, highlighting its essential contribution to the education of healthcare practitioners in understanding and improving complex healthcare systems.

The development of effective undergraduate curricula for health policy and systems literacy demands intentional pedagogical approaches that are more than just a didactic approach to teaching. Payán (2021) suggested that active learning strategies can help develop policy analysis and communication skills in undergraduate public health. The curriculum comprised individual writing assignments, policy simulation sessions and policy analysis exercises to develop applied skills for students within classroom environments where they could access a variety of institutional resources. Students demonstrated significant improvements in their knowledge (pre-test score of 57%, post-test of 66%, p=0.001), with feedback suggesting a need for teaching on social determinants of health (25%), health systems (25%), policy (17%), and advocacy (15%). This evidence demonstrates that systems-level thinking and policy engagement capacities can be developed and taught in a structured active learning model that is structured. Therefore, incorporating health systems information into clinical programs depends on careful planning and linking to learning and evaluation goals.

***Kirkpatrick Model versus Context, Input, Process and Product (CIPP) Model***

The most used tools for assessing educational programs in today's higher education are the Kirkpatrick Model and the CIPP Model, representing two philosophies about what it means to measure program effectiveness. The Kirkpatrick Model includes four stages: Reaction, Learning, Behavior, and Results, and offers a linear and simple structure that is highly applicable for evaluating training programs (Alsalamah & Callinan, 2021). It is simple, versatile, and has proven to be useful in various training environments, especially in medicine, computer science, business and social studies. On the other hand, Afriadi and Fitri (2025) provide a detailed analysis of the different models of curriculum evaluation proposed by Daniel Stufflebeam, which span from planning to outcomes, and examine all the aspects of the curriculum evaluation models. The CIPP model emphasizes the notion that there is no single model of evaluation that is best in every situation, but rather that the choice of model should be flexible to the goals of the evaluation, the institutional situation, and the philosophy behind the evaluation. For example, Goel et al. (2026) used the competency-based nursing education (CBNE) model to train senior nursing educators in India and applied the Kirkpatrick model with Kern's 6-step curriculum development model for evaluation. The results showed a significant improvement in the participants in their understanding of adult learning principles, management, and leadership, as well as a high level of satisfaction from the participants.

The CIPP Model has also been useful for evaluating comprehensive healthcare education initiatives, which have many contextual elements and implementation issues that affect the outcomes of initiatives. The evaluation process consists of determining the educational needs via a survey and expert feedback (input evaluation), tracking implementation of the programs (process evaluation), and assessing impact through the use of

baseline data (product evaluation), and then selecting the best program alternatives during the input evaluation phase, monitoring implementation progress during the process evaluation phase, and measuring impact against baseline data during the product evaluation phase.

***The Determinants of the Kirkpatrick Model on Healthcare Education***

The Kirkpatrick Model primarily assesses reaction, learning, behaviour, and results within the framework of training programmes (Alsalamah & Callinan, 2021). The determinants are: Course material and relevance; Teaching and learning processes; Engagement and participation of the students; Knowledge development and skills; Assessment and feedback. Lastly, it measures students' perception and satisfaction after learning the course. The following:

- Content of the course is the topic that is covered in the syllabus, and each topic should be related to the learning outcome, which is what students will be able to achieve when they have learnt the topic (Faraz et al., 2024). The course provides the students with current clinical skills and evidence-based practices to translate into the real world. The content of the course matches the reaction level as one of the components in Kirkpatrick model, a student's reaction to the topic.
- Teaching and learning comprises the teaching method and delivery of the topic to ensure the knowledge transfer is meaningful and understandable to the students (Khanom et al., 2026). These determinants are in line with ways to involve students and encourage active class participation. It includes several practices like case studies, simulations, problem-based learning, and interactive lectures. The evaluation and assessment are apparent in students' performance/practical activities (Miranda et al., 2025).
- Student engagement and participation are defined as students' involvement in the activities in class alongside the lecturer. In the process of discussion and sharing of knowledge, there is interaction and communication between students and the lecturer with the aim of learning the topic or subject effectively. The determinants are congruent with the reaction level of the Kirkpatrick model. Liu et al. (2025) noted that students' active involvement enhances their engagement in class activities.
- Knowledge and skill development involves assessing the competencies and knowledge that the student has learned after learning the subject. Assessment can be made by creating a test, quiz, practical test, simulation, or presentation that students can use to demonstrate their knowledge of the subject and topic (Liu et al., 2025). The lecturer's assessment can reveal the students' knowledge and skills related to the subject (Faraz et al., 2024).
- Assessment and feedback are lastly employed to measure learning objectives. Measurement can be seen by assessing the gaps in knowledge and skills, which are obtained by re-evaluating students (Fatmawati et al., 2024). Lecturers need to provide timely and constructive feedback which can inform student improvement and students' efforts to adjust to learning. The importance of effective feedback in effective communication between lecturer and student is that students learn and change to become more effective (Miranda et al., 2025).

The overall perception and satisfaction of students with the learning outcomes of the course are based on their experiences and the perceived achievement of learning outcomes (Santoso et al., 2024). This includes satisfaction with the quality, relevance, delivery, and impact of the program on professional development. While student satisfaction at the Reaction level (Level 1) should not be the only indicator of program effectiveness, it is an important factor in influencing student motivation and engagement, which in turn can affect their learning. The component that matters most is linking satisfaction to actual learning outcomes, meaning that when students feel satisfied, it is because they have achieved course objectives and have seen the value of the practical applications (Liu et al., 2025).

## 3. Research Methodology

***Research Design***

A cross-sectional survey research design was used to evaluate the attitudes of the students towards the course named National Healthcare Systems (HSM479). This design is appropriate for the study as it captures data related to a participant's perceptions and experiences within a specified time frame (in this case, the time period immediately after the course was finished). This approach is widespread in educational practice to analyze the course design tailored to enhance the learning process and to consider the students' level of

satisfaction and learning outcomes.

***Participants and Sampling***

The participants of this study were the undergraduate students of the National Healthcare Systems course (HSM479) from Semester 2 at Universiti Teknologi MARA (UiTM). These students have recently completed the course and were selected for their holistic evaluation of the course content, pedagogy, learning outcomes and learning experience as a whole. Convenience sampling of the subjects was used for the study. This sampling method not only guarantees that students attending the class in the semester are available, but also guarantees that all students will be included in the sampling and not just a select few. This sampling method is frequently used in educational research, particularly when the researcher is studying a specific subpopulation of students in a specific course or program. The students were informed that the survey was voluntary, their responses would be kept confidential and their responses would be used only for research and academic purposes.

***Data Collection Procedure***

Prior to collecting data, a briefing was held by the course instructors. The study objectives, along with the survey and the questions posed in the survey, were explained. Students were also reminded that they had the right not to participate and that they could leave the survey at any time with no academic penalties. An online survey was conducted as data collection immediately after the class ended. This was to allow students time to think about their learning and reflect on the experience in order to provide the most accurate answers to the questions about their perceptions of the course.

***Research Instrument***

To collect data, the research instrument was a structured questionnaire designed by the course instructors. The questionnaire aimed to evaluate the course and the students' overall learning experience. The evaluation has six sections. These include course content and relevance (assessing how appropriate, clear, and relevant the course material was), teaching and learning approaches (assessing how effective the course teaching approach was), student engagement and participation (assessing how much the students were involved and interacted during the learning), knowledge and skills development (assessing how well the course provided the students with relevant knowledge and skills), evaluation and feedback (assessing how relevant the evaluations and feedback provided by the lecturer are), and the overall impression and satisfaction (assessing the students' perception and satisfaction related to the course learning outcomes). A five-point Likert scale was used, where 1 means Strongly Disagree and 5 means Strongly Agree. A Likert scale is a good choice because it allows respondents to express their level of agreement, and it is widely used in education and social sciences research to understand people's attitudes and perceptions.

***Data Analysis***

The data have been analyzed using the Statistical Package for the Social Sciences (SPSS) version 29. Both types of statistical techniques were used for the purposes of this study: descriptive and inferential. The mean and the standard deviation were used as statistics to summarize what each of the respondents perceived about each dimension captured by the questionnaire. These statistics summarize a cross-sectional view of the responses of the student body toward the course. Moreover, inferential statistics were used to capture the various relationships that existed among the variables of the study. For course-related variables and overall student satisfaction, Pearson correlation was used to explain the strength and direction of the correlation. In addition, multiple regression was able to find the predictors that were significant to the student's perception and satisfaction of the course. The multiple regression results were used as well to analyze the student's learning experience and satisfaction regarding the National Healthcare Systems course.

## 4. Research Findings

***Descriptive Statistics***

During the data collection process, the researchers analyzed the responses to the open-ended feedback forum for each of the six feedback categories. These categories were feedback on the course content and its relevance, feedback on the teaching and learning methods employed, feedback on the student engagement and participation activities, feedback on the knowledge and skills gained, feedback on assessment and feedback to students, and overall feedback on the course for general satisfaction. The researchers received 75 responses to

the survey questions of interest, and the respondent pool consisted primarily of 91% female participants, whereas only 9% of participants were male.

The participants of this study exhibited remarkable positive evaluations of responses across nearly all categories of feedback and achieved a remarkable average feedback assessment rating of between 4.46 and 4.57 on a 5-point Likert scale. The assessment and feedback constructs, as well as general satisfaction, achieved the highest average feedback assessment rating accompanied by a mean rating of 4.57 and a standard deviation of .602 for assessment and feedback and .611 for general satisfaction, indicating high satisfaction with the course and the evaluations. Therefore, it can be said that the methods of assessment used in this course, HSM479, were effective in helping the students understand and apply the course content.

Once again, course content earned a high mean score (M = 4.55, SD = 0.636), showing that a mean score> 4.5 indicates a high student perception that course content is relevant, comprehensive and aligned with their academic needs. Teaching methods (M = 4.53, SD = 0.613) and knowledge and skills development (M = 4.49, SD = 0.611) also received good mean scores, which show that a great number of students appreciated the practical skills and knowledge development. Among the various factors, the mean score (M = 4.46, SD = 0.643) received by student engagement was the lowest, which still indicates a high agreement on engagement. This means students were engaged during the course and in future iterations of the course, there will be opportunities for further interactive participation and collaboration.

***Skewness and Kurtosis: Assessing Normality***

As part of the preliminary analysis, descriptive statistics, more specifically, skewness and kurtosis, were used to check whether each of the variables follows a normal distribution, since a normal distribution is needed to perform inferential statistics for the analyses, in particular, for multiple regression analysis, which, for this analysis, involves calculating a skewness value. For example, student engagement had a skewness value of -1.430 and course content had a skewness value of -2.276, both indicating a moderate to high negative skew, which implies that student responses were likely highly clustered, meaning a substantial number of students likely chose diploma and/or were likely to respond as high as, or, the highest on the Likert scale. In general, regression estimates are less likely to be influenced by sample skewness, and for this analysis, with a statistical sample size of n = 75, the distribution is 97% and meets all requirements for parametric testing; for skewness, with sample size = 75, it is ballparked by Hair et al. (2021) with a sample size of 75.

Kurtosis values between \textit{student engagement} and \textit{course content} show values between 2.986 and 8.574. This shows that all engagement responses are highly peaked and concentrated around the mean. Since responses provided by the students were of high quantity, this gives the distribution a negative skew. Extreme kurtosis might affect the standard errors and confidence intervals of regression models. However, given the sample size and the more advanced statistical methods used in their study, Field (2022) and Tabachnick and Fidell (2021), justify the presence of extreme kurtosis in social science research.

**Table 1: Descriptive Statistics of HSM479 Course Constructs (N = 75)**

| Construct | Mean | SD | Skewness | Std. Error | Kurtosis | Std. Error |
|---|---|---|---|---|---|---|
| Course Content & Relevance | 4.55 | 0.636 | -2.276 | 0.277 | 8.574 | 0.548 |
| Teaching & Learning Methods | 4.53 | 0.613 | -1.824 | 0.277 | 4.534 | 0.548 |
| Student Engagement & Participation | 4.46 | 0.643 | -1.430 | 0.277 | 2.986 | 0.548 |
| Knowledge & Skills Development | 4.49 | 0.611 | -1.655 | 0.277 | 4.455 | 0.548 |
| Assessments & Feedback | 4.57 | 0.602 | -1.673 | 0.277 | 3.626 | 0.548 |
| Overall Satisfaction | 4.57 | 0.611 | -2.237 | 0.277 | 7.766 | 0.548 |

Note: N = number of respondents; Std. Deviation = standard deviation; Skewness and Kurtosis values indicate the shape of the distribution for normality assessment.

***Correlation Analysis***

The results of the Pearson correlation of the course components, pedagogy, student engagement, enhancement of knowing and doing, evaluation and response, and general satisfaction in the subject HSM479 National Healthcare Systems are shown in Table 2.

All aspects of the course showed significant positive correlations, all at the 0.01 level (2-tailed). Teaching styles and course content ($r=0.930$, $p<0.001$), enhancement of knowledge and skills ($r=0.895$, $p<0.001$), assessment and feedback ($r=0.923$, $p<0.001$), course content, and overall satisfaction ($r=0.923$, $p<0.001$) all show high positive correlations. This means that the evaluations of teaching styles, skill enhancement, assessment, and overall satisfaction are most likely the same as the evaluations of course content. The method of teaching has also shown high positive correlations with student engagement ($r = 0.874$, $p < 0.001$), knowledge and skills development ($r = 0.897$, $p < 0.001$), evaluation ($r = 0.930$, $p < 0.001$), and overall satisfaction ($r = 0.914$, $p < 0.001$). This illustrates that the course teaching styles designed can nurture both student engagement and the perceived academic success of the students. There is sufficient student involvement, academically, when there is strong student involvement and academic success ($r = 0.885$, $p < 0.001$), evaluation ($r = 0.902$, $p < 0.001$), and overall satisfaction ($r = 0.885$, $p < 0.001$). This illustrates that for students to achieve academic success, they need to be engaged.

Additionally, enhancement of knowledge and skills was also positively correlated with assessment ($r = 0.889$, $p < 0.001$) and overall satisfaction ($r = 0.893$, $p < 0.001$), reinforcing the notion that students value the opportunity to enhance and feel capable of utilizing the knowledge. Finally, evaluation and overall satisfaction have the strongest correlation with each other ( $r = 0.954$, $p < 0.001$), indicating that the evaluation processes used in the course correspond well to the students' positive outlook and satisfaction.

The results deepen our understanding of how course content, teaching style and methods, student engagement, knowledge and skills development, and student assessments interrelate to shape students' overall satisfaction with the course. Correlation studies, especially with assessments and overall satisfaction, reinforce studies that say students need to see real learning outcomes coupled with the development of good practical skills as a result of the course content and teaching activities (Becker & Gould, 2023; Garfield & Ben-Zvi, 2021).

**Table 2: Pearson Correlations among HSM479 Course Constructs (N = 75)**

| Construct | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Course Content & Relevance | 1 | .930** | .857** | .895** | .923** | .923** |
| Teaching & Learning Methods | .930** | 1 | .874** | .897** | .930** | .914** |
| Student Engagement & Participation | .857** | .874** | 1 | .885** | .902** | .885** |
| Knowledge & Skills Development | .895** | .897** | .885** | 1 | .889** | .893** |
| Assessments & Feedback | .923** | .930** | .902** | .889** | 1 | .954** |
| Overall Satisfaction | .923** | .914** | .885** | .893** | .954** | 1 |

***Regression Analysis: Predictors of Student Satisfaction***

To see how certain variables affect student satisfaction, multiple regression analyses were conducted to measure the effects of five influencing variables. The variables are course content, teaching methods, student engagement, knowledge and skills development, and assessment. The model summary is displayed in Table 3. Regression modelling is a statistically significant way to measure student satisfaction, and when explaining the variance, the model is a good fit, $F(5, 75) = 173.695$, $p < .001$. A strong relationship is evident in the model, and a value of .962 indicates strong predictive power for student satisfaction. A value of 92.6% is explained by five increasing student satisfaction variables, and a value of .926 is in variance. A value of 921 represents the model's Adjusted R value, which is highly informative. The average value of the 0.172 observed scores standard deviation and the predicted scores standard deviation was calculated to measure the average observed deviation, and the standard error of the estimate is very small.

As shown in Table 3, the regression coefficients correspond to the predictors, in particular, the enhancement of knowledge and skills, student engagement, and assessments, which are the main predictors of student

satisfaction. The model has a large $R^2$, indicating that the course components (content, teaching methodologies, student engagement, skills development, and assessment) assist in clarifying the student satisfaction phenomenon in the HSM479 course.

**Table 3: Results of Multiple Regression Analysis Predicting Student Satisfaction (N = 75)**

| Predictor Variables | B | SE B | Beta | t | p |
|---|---|---|---|---|---|
| (Constant) | 0.074 | 0.156 | — | 0.475 | 0.636 |
| Course Content & Relevance | 0.212 | 0.098 | 0.220 | 2.154 | 0.035* |
| Teaching & Learning Methods | 0.004 | 0.107 | 0.004 | 0.038 | 0.970 |
| Student Engagement & Participation | 0.049 | 0.079 | 0.052 | 0.619 | 0.538 |
| Knowledge & Skills Development | 0.114 | 0.088 | 0.114 | 1.298 | 0.199 |
| Assessments & Feedback | 0.609 | 0.112 | 0.600 | 5.444 | <0.001* |
| R | 0.962 | | | | |
| $R^2$ | 0.926 | | | | |
| Adjusted $R^2$ | 0.921 | | | | |
| F Change | 173.695 | | | | |
| Sig. F Change | 0.000 | | | | |
| Durbin Watson | 1.908 | | | | |

Note: Dependent variable: Overall Satisfaction. *p < 0.05.

Of the five predictors analyzed, assessments & feedback (B = 0.609, β = 0.600, t = 5.444, p < 0.001) and course content & relevance (B = 0.212, β = 0.220, t = 2.154, p = 0.035) were positive and significant predictors. This indicates that well-structured assessments and relevant course content positively impact students' satisfaction. Specifically, keeping other variables constant, the satisfaction score is expected to increase by 0.609 units for each unit increase in assessment quality perceived by students. Content of the course also led to a significant (yet smaller) increase in satisfaction (B = 0.212). Teaching and learning strategies (B = 0.004, β = 0.004, t = 0.038, p = 0.970), engagement and participation (B = 0.049, β = 0.052, t = 0.619, p = 0.538), and knowledge and skills development (B = 0.114, β = 0.114, t = 1.298, p = 0.199) were not posed as predictors of students' satisfaction. These factors were positively correlated with satisfaction in the descriptive analysis; however, when controlling for other factors in the model, their individual contributions remained small. This could happen as a result of the predictors sharing variance, which was reflected in the correlational analysis, where predictor pairs had high averages (r > 0.85 in most factors described), which captures the essence of multicollinearity.

The Beta coefficients (standardized) show the order of significance of the elements in the model. Assessments had the most influence (β = 0.600), followed by course content (β = 0.220), confirming that these two factors had the most influence on the students' overall satisfaction. Other factors in the model were unimportant. Students' dissatisfaction with teaching, student engagement, and the skills students perceive they have developed were not as pertinent as the assessment practices and learning outcomes, with respect to the HSM479 courses. This is in line with the existing research and literature which emphasizes the role of good assessments and relevant information on student satisfaction in higher education (Becker & Gould, 2023; Garfield & Ben-Zvi, 2021).

## 5. Discussions, Conclusions and Implications

The study looked at the factors affecting students' perceptions of the National Healthcare Systems course using multiple regression analysis. Overall, the model had statistically significant results and explained almost all the variance in students' perceptions ($R^2$ = 0.926). This means that the five predictor variables- course content and relevance, teaching and learning methods, student engagement and participation, knowledge and skills development, and assessments and feedback- are the most important in shaping students' perceptions of the course. With a high adjusted $R^2$ value (0.921), it suggests that the model is accurate and valid after factoring in

the number of predictors used in the study. With a Durbin-Watson value of 1.908, the assumption of independence of errors is met, underlying the credibility and appropriateness of the regression analysis.

Course content and relevance, along with assessments and feedback, most impact students' perceptions of the course. Teaching and learning methods, student engagement, knowledge and skill development, and participation did not have the same statistically significant impact. This shows which areas of course design students in healthcare education value the most. One result of this study is the impact that course content and relevance have on how students view the National Healthcare Systems course. Students feel more positively about the course when they feel the content is relevant and meaningful to real-world healthcare problems. Prior studies in higher education show that curriculum relevance and value impact students' learning experiences. Research shows that, especially in technology-enhanced courses, the value and relevance of course content impact students' perceived value of the course (Ucha, 2023).

In healthcare education, relevance and quality of course content are of utmost importance, as students are anticipating very specific professional roles that require comprehension of the healthcare system, the policies, and healthcare service delivery. The closer course content is to the students' intended field of practice and the policies that govern it, the more valid and important students consider that course to be in their professional preparation. Research shows that students' academic motivation is strongest when real-world problems, demands, and challenges are addressed in the curriculum (Jamaludin et al., 2024). Also, course relevance and importance further stress the vital role of curriculum alignment in post-secondary education. The National Healthcare Systems course, for example, is likely to improve student comprehension when it involves case studies, policy frameworks, and real-world healthcare systems. The same goes for discussions on healthcare reforms and systems of health financing and global health. The relevance of course content and professional practice integration focuses on the need for students in healthcare programs to operate at an advanced level of both conceptual and practical integration around health systems.

Another vital result from this study is that among all predictors of the student's perception of the course, assessments and feedback had the most positive outcome. The standardized beta value ($\beta = 0.600$) demonstrates that this variable is the most influential one. This means that the way students learn through assessments and the amount and quality of feedback that instructors provide are the most influential variables affecting students' perception of their learning experience. The value of feedback and assessment has been well established in the field of education. Constructive feedback shows students exactly how they are doing, what they need to do to improve, and what they need to do to develop their skills further. Many researchers have found that feedback that has been well implemented improves student performance through feedback that is specific (Weidlich et al., 2025). Feedback is also essential in formative assessment that allows students to learn continuously and improve. Students are able to change their performance and learning strategies when teachers provide feedback promptly (formative assessment). Many researchers have found that feedback enhances students' self-regulation and motivation (Pereira et al., 2016).

In the National Healthcare Systems course, the theory of assessments that work includes analysis of case studies, group work, presentations, and assessments of health care policies which will help students better understand the theory and apply it to the health care system. These types of assessments gauge use of the course content, but equally foster the development of the students' critical and analytical thinking skills. Along with assessment type of feedback, students will see more value in the course and the course is more likely to help students with their academic goals. The influence assessments and feedback have is evident in the effort being made to implement self-directed learning in adult education. Within the self-directed learning paradigm, feedback is important to assist students within the learning process and to engage them actively in the material. The provision of thoughtful feedback likely contributes to a more comprehensive understanding of the complex policies and systems that comprise the health care system (Carless & Winstone, 2023).

Unlike the other important predictors found in the study, teaching and learning methods did not seem to influence students' views of the course in any substantial way. This finding might seem odd; teaching style is often regarded as a crucial factor of the learning process. There are a number of other explanations for this finding. First, students may have a course-specific expectation in mind when teaching methods are used, resulting in a lack of variation in the response. When other teaching approaches are viewed as sufficient, the

teaching style used in the course may not appear as a crucial factor in students' assessment of the course. Furthermore, students may seem to focus on concrete course components, such as grading and relevance of the course content, rather than the teaching methods.

Students in classes that require extensive theoretical understanding, like health care systems, could concentrate on content accuracy and usefulness as opposed to delivery style. Touching upon theory, as long as the delivery method covers all aspects of the teaching content, it might not be the most important element of the course for the students. Correspondingly, the measure of students' engagement and participation showed no significance in the students' perception of the course. Although student engagement and participation are valued components of productive learning, the absence of significance in the current case might be due to uniformly low participation levels across the board. Alternatively, engagement could influence the participants' perception of the course content through course objectives or evaluation methods. If course objectives, learning content, and assessment methods are aligned, students are likely to show a heightened level of engagement in the learning process. In this case, student engagement is an intervening variable influencing the participants' perception of the course content. The variable course content relating to knowledge and skills growth was not found to influence participants' perception of the course.

This possibly shows that students struggle to see the course's value to their knowledge and skills. An example of this is when students take what they learn from the course and use it during an internship. What students do and don't learn during an internship is true for healthcare education when we examine students' analytical and policy-related skills, they learn them gradually. Thus, at the moment when students take an evaluation of the course, they will not value the skills and knowledge they will learn, and will use factors that are more related to the here and now, such as the assessments and content of the course.

The findings of this study highlight the importance of the careful design of the course and the assessment strategies used to influence students' perceptions of the National Healthcare Systems course. As the findings show, the course instructors need to include current and applicable literature and provide frameworks and challenges to the healthcare system and policies. Aside from understanding the context of the healthcare system, the course assessments and measurement strategies need to be devised to enable the students to undertake higher-order thinking and respond to the feedback provided in a meaningful way. These results are also valuable from the standpoint of healthcare curriculum design. It is critical for universities to ensure that the contents of the course are periodically brought up to date to reflect the current healthcare issues. Part of the contents of the course should include current case studies, issues under discussion in healthcare policies, and variations in the healthcare system at the international level. Moreover, universities should ensure that the course instructors are supported in terms of the assessment and feedback methodologies they utilize. Workshops and training initiatives can be undertaken to empower instructors in generating constructive remarks and, to a great extent, to design assessments that can enhance the intention of the feedback. These make up the elements of effective teaching for learning that can enhance the effectiveness of the learning environment and the elements.

This study adds to understanding student perceptions in higher education by pinpointing what is important in students' evaluations of the National Healthcare Systems course. The data suggest that feedback, course content and relevance assess students' perceptions, with feedback being the most powerful predictor. These findings emphasize what is important in assessment and curriculum relevance for students' learning experience. The importance of assessment and curriculum relevance can be a stepping stone for future research and, assessment and curriculum relevance can be utilized in future research to understand student perceptions and academic outcomes in healthcare education, as influenced by teaching and learning, to understand more of student perceptions and academic outcomes in healthcare education.

**Adaptation of MOOC in Teaching and Learning for Content Development in a National Healthcare Systems Course**

Due to the fast-growing digital learning technologies, the higher education sector has started to include Massive Open Online Courses (MOOCs) in their teaching methodologies. MOOCs provide learning opportunities in a flexible, accessible, and scalable manner. This allows both the instructor and students to improve their learning experience. Regarding the education of healthcare professionals, MOOCs can be a game changer for both the

development and delivery of educational materials. This is especially beneficial for the National Healthcare Systems course, which requires students to grasp complicated policies, governance, and models of health care delivery.

Instructor-led MOOCs with a clear curriculum, supplemented by a variety of tools including videos, reading materials, quizzes, and forums, allow for full engagement of participants, as educators offer multiple channels for delivering educational materials. In comparison with courses designed for instructing participants using passively received instruction through lectures, MOOCs provide educators the opportunity to restructure the material to offer variety and engage participants at a more sophisticated level. In relation to a specific course, educators can combine a multitude of different formats, including policies, case studies, and comparative analysis of health systems, and, using MOOCs, educators can offer modular health financing, health system governance, and service delivery teaching units. This approach creates opportunities for the development of specific healthcare systems models and allows participants to progress at their own pace (Zhu et al., 2018). MOOCs are also highly valuable in the development of course content due to the use of multimedia and resources (including tools) designed for active engagement. The use of passively received instructional lectures and accompanying written materials tends to limit the level of engagement and understanding the participants have of complicated issues. In contrast to such a model, MOOC programmers are allowed to utilize and integrate videos, simulations, and real-world case studies in a variety of formats and cases. This approach also enhances the development of instructional materials (or resources) and subsequently the participants' educational experience.

Video-based case studies, for example, put into perspective the implementation of policies in healthcare and the framework of various countries' healthcare systems. It helps students grasp the ways theory is operationalized. In the case of collaterals, it is recorded that the use of a multimedia learning environment considerably increases the students' comprehension and knowledge retention in the context of higher education (Hew & Cheung, 2023).

Collectively, MOOCs also help educators bring different perspectives when educating students in the field of health care. Because MOOCs are usually created by top-tier universities and global organizations, the content and resources usually cover the different practices and policies of the global health care system. When educators use these resources, they assist students in learning about the different health care systems in various countries. This makes students understand health care policy better and helps them think about the different models of health care systems and the problems and advantages they can bring. This knowledge is necessary for public health and health care management students, as it helps them better understand the health care system around the world (Jordan et al., 2022). MOOCs also provide educators the ability to modify the content of the courses they create to help them keep up with the changes in the health care system. The health care system changes frequently due to social and demographic shifts, new technology, and changing public health needs. MOOCs enable educators to alter the content of their courses by adding new videos, readings, and discussions so that students receive relevant and timely information about the changes that are taking place in the health care system (both globally and nationally). This also ensures students are aware of changes in policies and trends.

Additionally, MOOCs are a great way to promote self-directed learning, an essential skill in higher education. In learning environments based on MOOCs, students are able to access learning materials, participate in online learning communities, and submit assessments at their own pace. Because learning in such an environment is based on the individual learner's activities, it is a great way to promote individual initiative and responsibility. Such an approach to learning helps students develop essential critical thinking and problem-solving skills, especially in the healthcare field. Research shows that increased flexibility and access to learning resources improve the motivation and engagement of learners in MOOC-based learning environments (Zawacki-Richter et al., 2023). Despite the value of a well-designed MOOC, incorporating MOOCs in a National Healthcare Systems course requires intentional course planning and design. To effectively integrate a MOOC, the instructor's role is to ensure that the MOOC activities match the learning objectives for the course and to integrate support, scaffolding, and guidance to assist learners in navigating the online resources. With the right planning, educators can use MOOCs to enhance the variety of learning materials, and help learners to grasp the nuances of complex healthcare systems.

To wrap it up, it seems like there's a lot to gain from using MOOC's for developing and teaching a National Healthcare Systems course. MOOCs offer a variety of ways to present and teach the various aspects of Healthcare Systems and policies, as well as the digital skills to teach them. The various elements offered by MOOCs like videos, podcasts, articles, and global collaborations (to name a few) allow for a more thorough exercise of their National Healthcare Systems and policies digital skills as well as an exercise in critical thinking as they analyze the various aspects of a Healthcare System. It is anticipated that incorporating MOOCs into National Healthcare course systems teaching and learning would improve students' knowledge and understanding of the engaged digital learning the National Healthcare Systems course inspires, and offer a broad area for further research.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Enhancing Occupational Safety Teaching Through OSHE Quest Analogue Gamification: A Cross-Sectional Perception Study

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**Abstract:** Knowledge of occupational safety is essential to ensure the well-being of the entire workforce. Hence, imparting occupational safety knowledge, especially to business and management students, is crucial, as it will prepare the students early before joining the industry. However, the needs of the present generation of higher-learning students transcend the current conventional teaching pedagogy. Therefore, higher learning institutions need to be creative in their teaching and learning approach. In line with this development, gamification has received recognition as a transformative approach in higher education, especially in enhancing learners' participation and inclusiveness towards complex fields like occupational safety, health and environmental (OSHE) management courses. This study examines the pedagogical effectiveness of OSHE Quest gamification, a safety-aligned board game designed to simulate real-world industrial safety scenarios. Sixty-three undergraduate students from one public higher learning institution in Klang Valley, Malaysia, participated to provide insights into their perspectives on the OSHE gamification board game. The study found that factors like personal traits, enjoyment, ease of use, usefulness, and acceptance play an integral part in influencing students' acquiescence to use gamified educational resources. The study also found that well-designed board games like OSHE Quest can serve as innovative tools for transforming OSHE teaching, bridging the gap between conventional classroom learning and interactive professional learning and practices.

**Keywords**: *Business and Management, Higher Learning Institutions, Occupational Safety, Health and Environment, Gamification Educational Resources, Teaching and Learning*

## 1. Introduction and Background

Exposure to occupational safety and health (OSH) knowledge is compulsory for business and management students, especially in today's dynamic and ever-changing sphere of the business and technology era. This knowledge is vital to ensure everyone's safety, particularly for those who are in the service, industrial, construction, and retail sectors, the top industries with occupational injury and fatality rates in Malaysia (Department of Statistics Malaysia, 2023). As such, OSH knowledge needs to be embedded in their studies because understanding the essential elements of safe job practices will prepare the students with the mandatory knowledge and skills (Boucaut & Cusack, 2016; Harun et al., 2024). This approach will provide students with both a theoretical and practical foundation in the aspects of Occupational Safety, Health and Environmental (OSHE) management.

Efficient OSHE management teaching is profoundly dependent on an experience-based education methodology supplemented by traditional and modern learning approaches to address the intricacy of OSHE learning needs that require swift decision-making in crises (Ba et al., 2024). In addressing this issue, the gamification teaching approach has evolved as a transformational instructional method in higher education, particularly in disciplines that demand sophisticated decision-making and analytical skills, such as OSHE management (Kapp, 2012; Shahid et al., 2020). Conventional teaching approaches commonly do not succeed in engaging students in practical learning, which limits their capacity to apply theoretical knowledge in real-world industry settings (Deterding et al., 2011). Consequently, the use of modern gamification learning tools can enhance mission judgement and decision-making capabilities in various contexts, allowing for an enhanced learning experience (Sudan et al., 2024).

In line with this development, the OSHE Quest game board, an analogue gamification tool, is designed to simulate occupational safety and health management teaching. The game board transforms theoretical textbook concepts into interactive, problem-solving tasks that are engaging and exciting. The players progress through the board by answering challenge questions and making choices that simulate real-life consequences in the workplace, reinforcing essential OSHE principles such as hazard identification, safe behaviour, and accident prevention. The game board is designed to be highly versatile, allowing adaptation across different industries, age groups, and literacy levels.

Therefore, to evaluate the educational efficacy of the OSHE Quest game board, this study utilises the extended Technology Acceptance Model (Davis, 1989) to assess its pedagogical effectiveness. The conventional model is supplemented with intrinsic motivation (Venkatesh, 2000) and receptiveness to experience (Costa & McCrae, 1992). Thus, the study assesses user acceptance through five core determinants, which are perceived usefulness, perceived ease of use, perceived enjoyment, acceptance and personal traits. This cross-sectional perception study empirically assesses the multidimensional feasibility and student receptiveness of analogue gamification in OSHE education.

## 2. Literature Review

Education is undoubtedly an essential component in developing, nurturing, and crafting the future workforce in progressing Malaysia as a sustainable high-income nation. It has also been acknowledged as one of the primary forces behind societal development and a key component in educating young talent to address present and future economic challenges (Bikfalvi et al., 2024). This finding is in line with the World Bank trajectory statistics that Malaysia is on the right path to surpassing the high-income level threshold of US$14,005 gross national income (GNI) per capita (Malaysian Investment Development Authority, 2024). This achievement is strongly supported by Malaysia's National Industrial Master Plan 2030 and the New Semiconductor Strategy (NSS), which firmly back the government's efforts in strengthening technical and vocational education and training (TVET) in producing high-skilled workforces (Malaysian Investment Development Authority, 2024).

In line with this progress, the development of a safety mindset and a preventive culture among the younger generations before joining the workforce has been among the objectives of successive iterations of Malaysia's strategies on health and safety at work (International Labour Organization, 2026). Unfortunately, despite considerable efforts and initiatives in the areas of research and training, the integration of Occupational Safety, Health and Environmental (OSHE) education is currently limited and dispersed. This limitation is due to the unappealing conventional learning approach for learners, which hinders its successful delivery (Bikfalvi et al., 2024). In resolving this issue, integrating gamification in learning is one of the recommended learning strategies that has garnered positive feedback and has shown enhanced learning results, motivation and engagement (Sundram et al., 2025).

Unfortunately, although gamification has gained popularity in higher education, there is still a lack of understanding regarding its usefulness in Occupational Safety, Health and Environmental (OSHE) education at Malaysian universities. Conventional lecture-based methodologies still dominate present teaching and learning strategies, despite studies indicating their limitations in developing practical competence and engaging students (Kasdi et al., 2025). Subsequently, although gamification has been widely explored in science, technology and mathematics education, its applicability to OSHE teaching is still lacking, especially in the Asian educational context. Therefore, in light of this pedagogical gap and the growing complexity of industries, a strategic approach that can accommodate graduates with the right OSHE analytical and decision-making skills is required (Kamal et al., 2021).

To overcome this gap, an innovative and interactive board game called OSHE Quest was introduced as a learning solution designed to transform conventional OSHE management education into an engaging, interactive experience. The board game promotes strategic thinking and problem-solving abilities, which are highly appreciated when tackling safety issues in business operations. OSHE Quest serves as an ideal platform for organisational OSHE development, advancing its potential to become a transformative force in safety education. Therefore, this study aims to assess students' perceptions of the OSHE Quest board game's usability, gameplay, and outcome as an innovative OSHE learning tool.

Henceforth, to assess the pedagogical effectiveness and student acceptance of the OSHE Quest board game, this study utilises the extended Technology Acceptance Model (TAM) introduced by Davis (1989). To address the unique aspects of gamified learning, the conventional TAM framework is enhanced with elements that assess intrinsic motivation, particularly perceived enjoyment. (Venkatesh, 2000) and psychological readiness, defined as openness to experience (Costa & McCrae, 1992). Using these multifaceted perspectives, the study examines five fundamental factors: perceived usefulness to assess academic productivity, perceived ease of use to evaluate operational intuitiveness, perceived enjoyment to capture hedonic engagement, acceptance to assess the perceived advantage of the interactive game board compared to conventional teaching approaches, and personal traits to determine baseline learner receptiveness. This cross-sectional study seeks to determine the empirical feasibility and multifaceted user acceptance of analogue gamification in workplace safety and health education by examining these parameters in conjunction with demographic factors like gender.

## 3. Research Methodology

This study adopted a quantitative research design, specifically the cross-sectional procedure, to gauge the effectiveness and user perception of the OSHE Quest game that uses gamification. The target population comprised undergraduate students enrolled in the Occupational Safety, Health and Environmental Management course at one public higher education institution in Klang Valley, Malaysia. The non-probability purposive sampling technique was used because the respondents were specifically chosen due to their direct exposure to the subject syllabus and the game board tool. The students were immediately invited to complete a digital questionnaire right after finishing a standardised session of the OSHE Quest gameplay, ensuring that the recorded perceptions accurately reflected their immediate experiential feedback. The digital questionnaire was used to ensure standardised administration and reduce data entry errors.

A 5-point Likert scale recommended by Zikmund et al. (2000) was adopted because the Likert scale is a good measuring instrument that can be used to gauge the respondent's level of acceptance pertaining to the subject under study. The scale used was 1 - *strongly disagree*, 2 - *disagree,* 3 - *neutral,* 4 - *agree, and* 5 - *strongly agree.* The instrument was adapted from a validated framework to ensure construct validity. Items measuring perceived usefulness and ease of use were adapted from the Technology Acceptance Model (Davis, 1989). Intrinsic motivation, operationalised as perceived enjoyment, was adapted from Venkatesh (2000)and items assessing the students' acceptance of the board game were adapted from the Big Five personality framework (Costa & McCrae, 1992). The collected data were subsequently analysed using SPSS statistical software to determine the board game's educational impact, ease of use and overall students' enjoyment. The 18 questionnaire items were grouped into five thematic constructs as listed in Table 1.

**Table 1: The thematic constructs analysis**

| Constructs | Items | Measure |
|---|---|---|
| Personal Traits | 3 | Openness to adventure and new experiences |
| Acceptance | 4 | Perceived advantages of the interactive game board vs. conventional teaching |
| Usefulness | 5 | Impact of the game board on OSHE pedagogical effectiveness and efficiency |
| Enjoyment | 3 | Entertainment and fun aspects of the game board |
| Ease of Use | 3 | Interface, rules and usability |

## 4. Results

The analysis of data from 63 undergraduate students who participated in the OSHE Quest intervention revealed significant positive inferences across all measured constructs. The demographic data of the students are tabulated in Table 2 below.

**Table 2: The respondents' demographic profiles.**

| No. | Categories of Demographic Variables | Frequencies | % |
|---|---|---|---|
| 1. | Gender | | |
| | Male | 21 | 33.3 |
| | Female | 42 | 66.7 |
| 2. | Age | | |
| | 20 – 22 | 36 | 57.2 |
| | 23 – 25 | 21 | 33.3 |
| | 26 – 28 | 6 | 9.5 |

To ensure the credibility of the constructs, the variables underwent a reliability test to determine their internal consistency. To measure the reliability, this study adopted Zikmund et al. (2000) measurement scale, whereby when a Cronbach's alpha measure is between $0.90 < \alpha < 1.0$, it indicates an *Excellent* reliability; if the Cronbach's alpha is between $0.80 < \alpha < 0.89$, it indicates a *Very Good* reliability; the reliability is *Good* when the value is between $0.70 < \alpha < 0.79$; it is having a *Fair* reliability when the measure is between $0.60 < \alpha < 0.69$; and the reliability is *Poor* when the Cronbach's alpha is < 0.60. Table 3 below explains the Cronbach's alpha measure of each construct.

**Table 3: Cronbach's alpha measure**

| Variables | Items | Cronbach's Alpha | Indicator |
|---|---|---|---|
| Personal Traits | 3 | .88 | Very Good Reliability |
| Acceptance | 4 | .92 | Excellent Reliability |
| Usefulness | 5 | .96 | Excellent Reliability |
| Enjoyment | 3 | .98 | Excellent Reliability |
| Ease of Use | 3 | .92 | Excellent Reliability |

The reliability analyses indicate that the Cronbach's Alpha for all the variables ranges from .98 (excellent reliability) to 0.88 (very good reliability), signifying that the measures exhibited significant internal consistency and stability. It can be concluded that the measurements used in this study are very dependable and suitable for subsequent investigations. The mean averages and standard deviations of each construct are tabulated in Table 4 below.

**Table 4: Mean averages and standard deviations**

| Variables | Mean | Standard Deviation |
|---|---|---|
| Enjoyment | 4.49 | 0.68 |
| Ease of Use | 4.41 | 0.68 |
| Usefulness | 4.37 | 0.69 |
| Personal Traits | 4.26 | 0.65 |
| Acceptance | 4.26 | 0.71 |

The descriptive analyses showed that all mean values were above 4.00, indicating the students' overwhelmingly positive general perceptions of the OSHE Quest game board. The highest-rated aspect of the OSHE board game is enjoyment (M=4.49), indicating that the board game successfully made OSHE learning highly entertaining and fun. The second highest aspect is the ease of use (M=4.41), highlighting the user-friendliness of the board game interface, allowing users to be engaged in OSHE learning.

To evaluate any significant perception differences, as well as to ensure that the OSHE Quest game board is universally effective, engaging and accessible across diverse student demographics and genders, the independent-samples t-test for each construct was also analysed. The results showed no statistically significant differences between male and female students across all constructs ($p > .05$). The reported findings for each construct are enjoyment ($t(61) = .523$, $p = .603$), personal traits ($t(61) = .090$, $p = .928$), usefulness ($t(61) = .000$, $p = 1.000$), ease of use ($t(61) = .653$, $p = .516$), and acceptance ($t(61) = -.093$, $p = .926$). It can be clearly concluded that students, regardless of gender, found that the board game is equally enjoyable, useful and

simple to use. The study verifies that the OSHE board game is inclusive and that its design mechanics do not inadvertently favour or eliminate a particular gender.

## 5. Discussion and Recommendations

The need to impart Occupational Safety, Health and Environmental (OSHE) knowledge among Malaysian higher learning students is not an effortless task. The current generation of higher learning students is technology-savvy; therefore, using conventional teaching methods alone is no longer practical in today's modern era. Therefore, it is essential to equip the students with an interactive and innovative learning environment. New innovative learning pedagogies and resources, such as analogue or digital gamification, are needed to ensure the successful delivery of OSHE knowledge to today's higher learning student generations. Therefore, the integration of the OSHE Quest gamification game board in OSHE learning is practical and timely. The analyses and findings of this study indicated that OSHE Quest has managed to achieve its pedagogical effectiveness objectives and is useful for students undertaking the OSHE course. The findings of this study corroborate the results of Sundram et al. (2025), who found that game-based techniques significantly enhance student engagement and academic outcomes.

Subsequently, this study significantly enhances the understanding of the acceptability and adoption of the OSHE Quest gamification board game among higher learning institution students, particularly given the scarcity of research in the Malaysian education sector. The findings have significant consequences, enhancing the discourse on imparting gamification learning resources as important instructional tools in OSH management education in Malaysia. This research aimed to clarify how factors such as personal traits, enjoyment, ease of use, usefulness, and acceptance significantly influence students' willingness to use gamification educational resources. This study's findings provide an insightful understanding of the elements affecting Malaysian students' intention to embrace gamification educational resources. This is consistent with Kasdi et al. (2025) study, which found that analogue gamification effectively elevated pedagogical effectiveness and conceptual understanding in university settings.

This study faced several limitations that must be considered when determining the direction of future research. Among others, the study focuses on a single university with a public higher education status; thus, it may limit generalisability, as private higher education institutions may face different sets of students and different educational environments. Future research could address these limitations by integrating the same study with a different scope of higher education institutions and sets of students. Nevertheless, the current findings strongly suggest that well-designed board games like OSHE Quest can serve as innovative tools for transforming OSHE education, bridging the gap between conventional classroom learning and interactive professional learning and practices.

**Acknowledgement:** The financial support provided by the Faculty of Business and Management, Universiti Teknologi MARA (UiTM), Malaysia, in publishing this article is gratefully acknowledged.

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**Information Management and Business Review (IMBR**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Between Survival and Choice: A Conceptual Framework of Informal Employment Participation in Malaysia

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**Abstract:** Informal employment remains a significant feature of Malaysia's labour market, yet its participation is often explained through a simplified distinction between survivalist necessity and voluntarist choice. This conceptual paper argues that such a binary explanation is insufficient for understanding the diverse realities of informal workers in Malaysia. Drawing on informal employment literature, recent DOSM statistics, Malaysian evidence on informal entrepreneurship, gig work, women micro-entrepreneurship, caregiving, youth employment challenges, and platform labour protection, a continuum-based conceptual framework of informal employment participation is proposed. Three broad positions are identified: survivalist informality, constrained voluntarism, and voluntarist informality. The concept of constrained voluntarism is introduced to explain workers who appear to choose informal employment for flexibility, autonomy, or income opportunity, but whose choices are bounded by economic insecurity, household responsibilities, weak social protection, limited formal employment opportunities, skills mismatch, financial constraints, platform dependency, migrant status, or institutional barriers. The paper also considers recent policy developments, including the Gig Workers Act 2025, and highlights the need to recognise non-citizen and migrant workers within discussions of informal employment protection. It is argued that this framework provides a clearer understanding of informal employment by recognising both workers' choices and the structural constraints they face. The paper contributes by offering a Malaysia-focused conceptual framework that may guide future empirical research and inform more targeted labour market policies.

**Keywords**: *Informal employment; survivalist informality; voluntarist informality; constrained voluntarism; gig workers; social protection; formalisation.*

## 1. Introduction

Despite continued economic development and policy efforts to strengthen labour protection, informal employment remains an important feature of Malaysia's labour market. Traditionally, informal work has often been associated with small-scale trading, casual work, unpaid family work, own-account activities, and low-income work outside standard labour regulations. However, the nature of informality has become increasingly complex. Informal employment may now be observed not only among traditional informal workers, but also among platform workers, freelancers, home-based workers, online sellers, part-time workers, and individuals who combine formal and informal sources of income. Informality should therefore not be understood only as a sign of labour market vulnerability, but also as a changing form of work shaped by digitalisation, flexibility, income insecurity, household responsibilities, and diverse worker motivations.

The concept of informal employment has also shifted from a narrow focus on the informal sector to a broader concern with workers' employment conditions. Traditional perspectives linked informality to small, unregistered, or unincorporated businesses. However, a job-centred approach has increasingly been used to capture informal jobs that may exist within formal sector enterprises, informal sector enterprises, or households. Informal employment is therefore not limited to unregistered businesses, but may also include workers in formal enterprises who lack social protection, employment benefits, or legal protection (Williams & Lansky, 2013). For Malaysia, this perspective is important because informal employment should not be analysed only through business registration or enterprise status, but also through workers' access to protection and employment security.

Recent statistics from the Department of Statistics Malaysia (DOSM) indicate that informal employment remains a sizeable component of the Malaysian labour market. In 2025, informal employment was recorded at 3.28 million persons, or 19.8 per cent of overall employment. Of this total, 1.90 million persons were employed in the informal sector, 1.36 million persons were located in the formal sector, and 18.3 thousand persons were

recorded in households (DOSM, 2026). Although informal employment declined from 3.45 million persons in 2023 (DOSM, 2024) to 3.28 million persons in 2025 (DOSM, 2026), its continued presence across both formal and informal production units suggests that informality should not be treated as a marginal labour market issue. More importantly, the presence of informal employment within the formal sector indicates that informality is not only an enterprise-based issue, but also a worker-protection issue.

The distribution of informal employment also suggests that informality is strongly connected to urban and non-agricultural labour market activities. In 2025, informal employment remained concentrated in urban areas, accounting for 72.9 per cent, or 2.39 million persons, while rural areas accounted for 27.1 per cent, or 888.3 thousand persons (DOSM, 2026). In terms of gender, men accounted for 61.8 per cent of informal employment, or 2.03 million persons, while women accounted for 38.2 per cent, or 1.25 million persons (DOSM, 2026). These figures indicate that informal employment should not be viewed only as a rural, agricultural, or traditional livelihood issue. Rather, it should also be understood in relation to urban services, flexible work arrangements, self-employment, online business, and platform-mediated income generation. The continued participation of women in informal work also suggests the need to examine household responsibilities, care constraints, and flexible work preferences as part of informal employment participation.

Beyond aggregate labour market data, Malaysian studies also link informal and non-standard work to wider socioeconomic shifts. The growth of the gig economy has created new income opportunities, but it has also raised concerns about social protection, employment status, bargaining power, and labour rights. Malaysian studies on gig workers show that platform work may provide flexibility and income access, yet workers remain exposed to unstable income, weak legal recognition, limited social security coverage, and restricted collective representation (Abd Razak & Abdul Shukor, 2025; Ahamad Nawawi et al., 2023; Mohamad Amin, 2023; Uchiyama et al., 2022). At the same time, studies on informal entrepreneurs, online sellers, women micro-entrepreneurs, housewives, single mothers, and informal caregivers suggest that informal participation may also be shaped by income needs, skills, finance, household responsibilities, care work, and restricted access to formal employment (Hamidi et al., 2023; Kong et al., 2021; Mohamed@Jaafar & Nik Mat, 2023; Md Nor, 2022; Othman et al., 2022; Zainol & Al Mamun, 2018).

Recent policy developments have further increased the relevance of this discussion. The Gig Workers Act 2025, also known as Act 872, provides a specific legal framework for gig work in Malaysia. The Act regulates the duties of contracting entities, terms and conditions of service agreements, dispute resolution mechanisms, the Consultative Council, and the Gig Workers Tribunal. It also defines a gig worker as an individual who is a citizen or permanent resident of Malaysia, enters into a service agreement with a contracting entity, and receives earnings for the service performed. This development is important because it shows that Malaysia's policy response to platform work has moved beyond voluntary social protection schemes alone. However, the definition also raises questions about workers who may participate in informal or platform-mediated work but are not citizens or permanent residents.

Non-citizen and migrant labour should therefore be acknowledged in the Malaysian informal employment context, even though the 2025 DOSM informal employment report is primarily presented according to demographic and socioeconomic characteristics such as sex, age group, strata, educational attainment, occupational category, economic activity, and state (DOSM, 2026). Migrant and non-citizen workers may face different forms of constraint because their labour market position may be shaped by immigration status, recruitment arrangements, employer dependence, limited mobility, and restricted access to protection or complaint mechanisms. Therefore, foreign worker status should not be treated merely as an additional worker category, but as a structural condition that may intensify labour market vulnerability and constrain workers' choices.

Malaysia therefore provides a useful context for examining informal employment participation because its labour market is neither fully characterised by subsistence informality nor fully protected by standard employment institutions. The combination of informal jobs in the formal sector, urban informal work, self-employment, women-led home-based work, youth employability challenges, migrant and non-citizen labour concerns, and platform-mediated income activities suggests that informal employment participation may reflect both worker preference and structural limitation. In this context, the Malaysian case is theoretically

useful for examining how survival, constraint, and choice may coexist within informal employment.

The persistence of informal employment raises an important conceptual question: is informal employment participation mainly driven by survival, or is it shaped by voluntary choice? In the literature, this question is commonly discussed through the survivalist and voluntarist perspectives. The survivalist perspective views informal employment as a response to limited formal employment opportunities, poverty, unemployment, weak social protection, and labour market exclusion. From this perspective, informal work is interpreted as a survival strategy through which income is generated when secure and protected employment cannot be obtained. In contrast, the voluntarist perspective suggests that some workers may enter informal employment by choice, particularly when flexibility, autonomy, supplementary income, lower entry barriers, or entrepreneurial opportunity are valued (Temkin, 2009; Williams et al., 2011).

The survivalist–voluntarist distinction should not be treated as a strict dichotomy. Studies on informal employment have increasingly shown that informality is heterogeneous. Informal workers may range from lower-tier workers in vulnerable and survival-based activities to upper-tier entrepreneurs, professionals, or skilled workers who may voluntarily remain informal (Fields et al., 2023; Williams et al., 2017). Rosaldo (2021) also warns that the informal sector concept may become problematic when it homogenises diverse workers, reinforces an either/or fallacy, or assumes that formalisation is always the main solution. These critiques are relevant to Malaysia because informal workers may differ in their motivations, income dependence, skills, household responsibilities, citizenship or migrant status, digital access, and exposure to social protection gaps. Although informal employment is increasingly recognised as a heterogeneous phenomenon, much of the debate still relies on a simple distinction between necessity-driven and opportunity-driven informal employment. This distinction is useful, but it may overlook workers whose participation appears voluntary while still being shaped by economic insecurity, household responsibilities, weak social protection, skills mismatch, financial constraints, platform dependency, migrant status, or limited formal employment options. In Malaysia, where informal employment exists across both formal and informal sectors and is increasingly concentrated in urban labour markets, this middle position requires clearer conceptual attention.

It is therefore argued in this paper that informal employment participation in Malaysia should not be understood through a simple binary between survivalist necessity and voluntarist choice. Instead, informality should be conceptualised as a continuum in which workers may occupy different positions between survival, constraint, and choice. To develop this argument, the concept of constrained voluntarism is proposed. Constrained voluntarism refers to a form of informal employment participation in which workers exercise agency in choosing informal work, but this agency is bounded by limited formal employment opportunities, weak social protection, household responsibilities, income insecurity, platform dependence, migrant status, or institutional barriers to formalisation. The concept therefore differs from pure survivalist informality, where participation is primarily necessity-driven, and from pure voluntarist informality, where participation is mainly opportunity-driven.

The aim of this paper is to develop a conceptual framework for understanding informal employment participation in Malaysia by integrating survivalist and voluntarist perspectives. Specifically, the paper seeks to review survivalist and voluntarist explanations of informal employment, discuss their relevance to Malaysia's informal labour market using DOSM data, Malaysian empirical studies, and recent policy developments, and propose a continuum-based framework consisting of survivalist informality, constrained voluntarism, and voluntarist informality. This paper contributes to the literature by offering a Malaysia-focused conceptual framework that recognises informal workers as a diverse group whose participation may be shaped by both agency and structural constraint. It also provides a policy-relevant basis for developing differentiated responses, including social protection, flexible formalisation, platform-related protection, collective representation, legal recognition, skills support, childcare support, migrant-sensitive protection, and worker-centred policy design.

## 2. Literature Review

### Informal Employment and Its Heterogeneity

Informal employment is better understood through a worker-centred rather than purely enterprise-centred lens. While earlier discussions associated informality with small, unregistered enterprises, recent approaches emphasise whether workers are covered by legal protection, social security, employment benefits, and labour rights (Williams & Lansky, 2013). A worker-centred approach is useful because it allows informality to be analysed through workers' employment conditions rather than only through the legal status of enterprises. Routh (2011) argues that the concept of informal employment provides a broader basis for analysing workers who lack protection, even when they are not located within informal enterprises. Similarly, Rosaldo (2021) cautions that the term informal sector may homogenise diverse workers and obscure the different forms of vulnerability, agency, and exclusion experienced by informal workers. Therefore, informal employment should not be treated as a single labour market category.

The heterogeneity of informal employment has also been shown in studies on self-employment, informal enterprises, and labour market transitions. Santiago and Vasconcelos (2017) show that self-employment may include both vulnerable workers and skilled professionals, while Ulyssea (2018) demonstrates that informality varies across workers, firms, wages, skills, and firm size. Williams et al. (2020) further argue that enterprises may operate at different degrees of informalisation, rather than being fully formal or fully informal. These studies suggest that informal employment should be understood as a continuum of work arrangements with different levels of protection, vulnerability, and opportunity.

Malaysian evidence also supports the heterogeneous nature of informal and non-standard work. Othman et al. (2022) show that informal entrepreneurship in Klang Valley is driven by both necessity and opportunity, while Harun et al. (2020) demonstrate that gig work in Malaysia includes a wide range of occupations with flexible working hours, flexible workplaces, and varying degrees of digital presence. Ahamad Nawawi et al. (2023) further show that the Malaysian gig economy expanded alongside the growth of digital platforms, with physical gig activities dominating the market compared to digital gig activities. Similarly, studies on online sellers, housewives, women micro-entrepreneurs, and night market workers suggest that informal work may involve income survival, entrepreneurial opportunity, household responsibilities, digital participation, and crisis-related vulnerability (Hamidi et al., 2023; Lim et al., 2024; Mohamed@Jaafar & Nik Mat, 2023; Zainol & Al Mamun, 2018).

The Malaysian SME and entrepreneurship literature also provides useful background for understanding informal entrepreneurship. SMEs have been described as an important source of employment and economic activity in Malaysia, but business development may be constrained by finance, skills, competitiveness, and governance challenges (Abdullah et al., 2011; Adan et al., 2020; Sulaiman & Mohd Fauzi, 2017; Umrani & Johl, 2016). Although not all SMEs are informal, this literature is relevant because it shows that entrepreneurship in Malaysia is shaped by both opportunity and constraint. For informal entrepreneurs, the decision to remain informal may therefore be influenced not only by preference, but also by limited capacity to comply with formal business requirements or to access finance, markets, and institutional support.

### Survivalist and Voluntarist Perspectives

The survivalist perspective views informal employment as a response to economic necessity. From this perspective, workers are pushed into informality because of poverty, unemployment, limited formal job opportunities, weak social protection, and exclusion from the formal labour market. Informal work is therefore interpreted as a survival strategy rather than a preferred form of employment. Temkin (2009) frames this debate by asking whether informal self-employment in developing countries should be viewed as entrepreneurship or as a survivalist strategy. Similarly, Sahoo and Neog (2015) show that informal employment in India is shaped by poverty, education, gender, social group, rural-urban location and work quality.

The survivalist perspective is also supported by studies that link informality to vulnerability and weak protection. Gössling and Schumacher (2012) conceptualise a survival sector shaped by marginality and limited mobility, while Masha et al. (2024) describe survivalist microenterprises as activities created mainly in

response to unemployment, poverty, and limited income opportunities. In addition, Cavalcanti Prestes et al. (2026) show that informal employment may be associated with poorer mental health outcomes, job insecurity, and low income. These studies suggest that for many workers, informality is closely connected to vulnerability, insecurity and the absence of adequate social protection.

In Malaysia, survivalist explanations are relevant to workers who enter informal employment because formal labour market access is restricted. Youth unemployment, skills mismatch, and limited employability skills may narrow access to formal jobs, especially for younger workers and graduates (Nasreen et al., 2022; Zain et al., 2024). Low-income single mothers may also enter informal employment or self-employment because their employment choices are restricted by education, locality, mobility, and childcare responsibilities (Md Nor, 2022). These forms of participation suggest that informal employment may be used as an income strategy when formal employment is unavailable, unsuitable, or incompatible with household responsibilities.

In contrast, the voluntarist perspective suggests that some workers and entrepreneurs may choose informal employment because it provides flexibility, autonomy, independence, supplementary income, or entrepreneurial opportunity. This view is often linked to the idea of exit, where workers choose to leave formal institutions because formal employment or regulation is perceived as restrictive, costly, or unattractive. Williams et al. (2011), in their study of Ukraine, show that informal employment is not universally driven by either exclusion or exit; rather, some workers participate due to exclusion, some due to exit and others due to both.

Evidence of voluntary participation has also been found in studies of upper-tier informality and informal entrepreneurship. Williams et al. (2017) identify a dual informal labour market consisting of an exclusion-driven lower tier and an exit-driven upper tier. Fields et al. (2023) similarly distinguish lower-tier informal workers, who are commonly vulnerable and survival-driven, from upper-tier informal workers, who may include entrepreneurs, professionals, and skilled workers who voluntarily remain informal. Informal entrepreneurship may also be treated as a seedbed for enterprise creation, although policy support is still needed to encourage movement into formality (Williams, 2015). Therefore, the voluntarist perspective remains useful for explaining cases where informal work is associated with flexibility, autonomy, and opportunity.

Malaysian studies also provide evidence that voluntarist motives may be present in informal and gig work. Othman et al. (2022) identify necessity and opportunity as two primary drivers of informal entrepreneurship, where the inability to find formal employment reflects necessity, while the preference to work independently reflects opportunity. Mohamed@Jaafar and Nik Mat (2023) show that online sellers associate gig work performance with income generation, skills, flexible time, sales volume, fast interaction, knowledge, effort, and innovation. Similarly, women informal micro-entrepreneurs in Kelantan were found to benefit from competencies that support competitive advantage and business performance (Zainol & Al Mamun, 2018). These studies suggest that informal participation may involve entrepreneurial behaviour and opportunity seeking, although such behaviour may still be embedded within wider constraints.

However, voluntarist motives should not be interpreted as the absence of vulnerability. Flexibility may be valued, but it may still be embedded within insecure work arrangements. For example, Wijayaningtyas et al. (2017) find that informal construction workers in Indonesia preferred unit-based wage arrangements because these allowed flexibility in working hours, although the work remained project-based and weakly protected. Similarly, Kabir et al. (2024) show that survival intent may coexist with entrepreneurial orientation among informal enterprises. This suggests that survivalist and voluntarist explanations often overlap rather than operate separately.

**Constrained Voluntarism**

The literature increasingly suggests that informal employment cannot be fully explained by either survivalist or voluntarist perspectives alone. The survivalist perspective is useful for explaining informal employment driven by poverty, unemployment, exclusion, and weak protection. The voluntarist perspective is useful for explaining informal work chosen for flexibility, autonomy, entrepreneurship, or supplementary income. However, many workers are likely to occupy a middle position where informal employment is both chosen and

constrained.

This middle position has been reflected in several strands of the literature. Williams et al. (2011) show that exit and exclusion may coexist in informal employment. Beccaria et al. (2022) find that transitions into informal employment are generally not desirable, although some employer-based informal transitions may reflect voluntariness. Rani (2020) also argues that old and new forms of informal employment now coexist, including traditional informal labour, temporary work, disguised employment, and platform-based work. These findings indicate that informality is increasingly shaped by both labour market insecurity and changing work preferences.

The concept of constrained voluntarism is therefore proposed in this paper to capture informal employment participation that appears voluntary but is shaped by economic, institutional, household, or labour market constraints. This concept builds on the exit–exclusion framework of Williams et al. (2011), the upper-tier/lower-tier distinction discussed by Williams et al. (2017) and Fields et al. (2023), and the critique of binary thinking advanced by Rosaldo (2021). It also reflects Routh's (2011) worker-centred approach, where informal employment is understood through workers' conditions and protection gaps rather than only through enterprise status.

In the Malaysian context, constrained voluntarism may be especially useful for understanding workers who value flexibility but remain exposed to insecurity. Platform workers may enter gig work because of flexible time and income opportunities, but their employment status often places them outside conventional labour protection, social security, and collective bargaining arrangements (Abd Razak & Abdul Shukor, 2025; Mohamad Amin, 2023; Uchiyama et al., 2022). Women in home-based informal work may value income independence and flexible working arrangements, but their choices may be shaped by care responsibilities, financial constraints, and limited access to formal work (Hamidi et al., 2023; Kong et al., 2021; Md Nor, 2022; You et al., 2025). Low-income single mothers may also enter informal or self-employment not because it is fully preferred, but because education, locality, mobility, and childcare responsibilities restrict their work choices (Md Nor, 2022). These cases reflect constrained voluntarism because agency exists, but it is exercised under unequal structural conditions.

Migrant and non-citizen workers may also be understood through the lens of constrained voluntarism, although they require careful treatment. Their work choices may be shaped not only by income needs and employment opportunities, but also by immigration status, recruitment arrangements, employer dependence, limited mobility, and restricted access to complaint or protection mechanisms. In this sense, foreign workers should not be treated simply as another category of informal worker. Rather, migrant status may operate as an additional structural condition that intensifies constraint. This is relevant to the proposed framework because constrained voluntarism is concerned not only with whether workers appear to choose informal or non-standard work, but also with the institutional and legal conditions under which such choices are made.

Crisis conditions further highlight the relevance of constrained voluntarism. During the COVID-19 period, informal workers and night market vendors were affected by movement restrictions, lower customer turnout, financial strain, and limited crisis preparedness (Lim et al., 2024). Wider pandemic governance also exposed tensions between public health measures, socioeconomic support, and the position of marginalised communities (Tayeb & Hong, 2021). These experiences suggest that informal workers may appear to operate independently, yet their livelihood security remains vulnerable to shocks, regulatory decisions, and limited institutional protection.

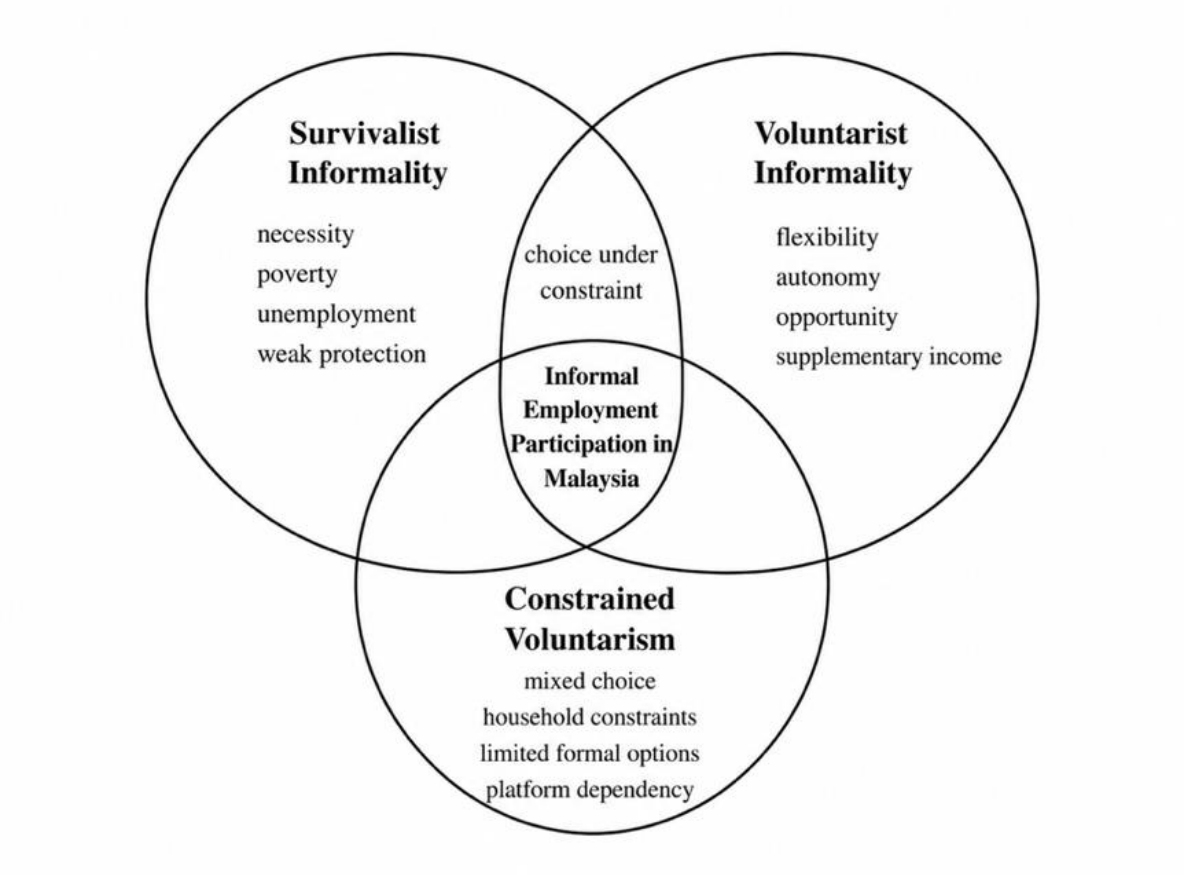
Constrained voluntarism is therefore not simply a middle category between survivalist and voluntarist informality. Rather, it is a conceptual lens for understanding bounded agency. It recognises that workers may exercise preference, strategy, and entrepreneurship, but that these choices are made within unequal labour market conditions, household responsibilities, migrant status, weak legal recognition, limited social protection, and restricted access to formalisation support.

## 3. Proposed Conceptual Framework

### Informal Employment as a Continuum

Based on the literature reviewed, informal employment participation should not be understood through a single explanation. While the survivalist perspective emphasises necessity, exclusion, and vulnerability, the voluntarist perspective highlights flexibility, autonomy, and opportunity. However, many informal workers may fall between these two perspectives. This paper therefore proposes that informal employment participation in Malaysia should be conceptualised as a continuum of survival, constraint, and choice, as shown in Figure 1.

**Figure 1: Overlap Between Survivalist, Voluntarist and Constrained Voluntarism Perspectives**




*Source:* Author's conceptualisation

At one end of the continuum is survivalist informality, where informal employment is mainly driven by necessity. Workers in this category may enter informal work because formal employment is unavailable, inaccessible, or unsuitable. Their participation may be shaped by low income, unemployment, weak bargaining power, limited education, skills mismatch, or lack of social protection. In this case, informal employment functions primarily as a survival strategy.

At the other end is voluntarist informality, where informal employment is mainly driven by preference or opportunity. Workers in this category may choose informal work because it offers flexibility, autonomy, control over working time, entrepreneurial opportunity, supplementary income, or business independence. These workers may have stronger skills, wider networks, better bargaining power, or alternative income sources.

Between these two positions is constrained voluntarism. This refers to informal employment participation that appears voluntary but is shaped by structural, institutional, household, or labour market constraints. For

example, a platform worker may value flexible working hours, but such participation may also be influenced by low formal wages, household income pressure, limited stable employment, or weak legal recognition. Similarly, a home-based seller or housewife entrepreneur may prefer working from home, but this preference may be shaped by caregiving responsibilities, mobility constraints, or limited access to finance. Thus, constrained voluntarism captures the coexistence of agency and vulnerability in informal employment participation.

The contribution of this framework lies in its attempt to move beyond a binary interpretation of informal employment. Rather than classifying workers as either survivalist or voluntarist, the framework recognises that informal employment participation may involve different degrees of agency and constraint. This is particularly important for analysing workers whose informal participation is not entirely forced, but also not fully voluntary.

**Typology of Informal Employment Participation**

**Table 1: Typology of Informal Employment Participation in Malaysia**

| Type of informality | Main driver | Examples in Malaysia | Policy focus |
|---|---|---|---|
| Survivalist informality | Necessity and income survival | Casual workers, unpaid family workers, low-income own-account workers, small traders, unemployed youth entering informal work | Social protection, income support, basic labour protection, skills training |
| Constrained voluntarism | Mixed choice and constraint | Platform workers, online sellers, home-based sellers, caregivers, single mothers, housewives, part-time informal workers, informal micro-entrepreneurs, migrant workers facing institutional constraints | Portable benefits, flexible formalisation, platform protection, childcare and caregiver support, simplified enrolment, legal recognition, safe complaint channels |
| Voluntarist informality | Flexibility, autonomy, and opportunity | Skilled freelancers, online entrepreneurs, professional side-income earners, growth-oriented informal entrepreneurs | Business support, simplified registration, digital skills, financing access, productivity support |

The proposed typology is summarised in Table 1. It is intended to show that different informal workers may have different motivations, constraints, and policy needs. The typology should not be interpreted as a fixed classification. Rather, it is proposed as an analytical device for understanding how informal workers may be positioned differently across the survival-constraint-choice continuum.

This typology is useful because it links worker motivation to policy response. Survivalist informal workers may require stronger protection and poverty-related support. Constrained voluntarist workers may require policies that protect them without removing the flexibility they value. Voluntarist informal workers may benefit more from business development, digital skills, financing support, and simplified registration procedures.

**Conceptual Model**

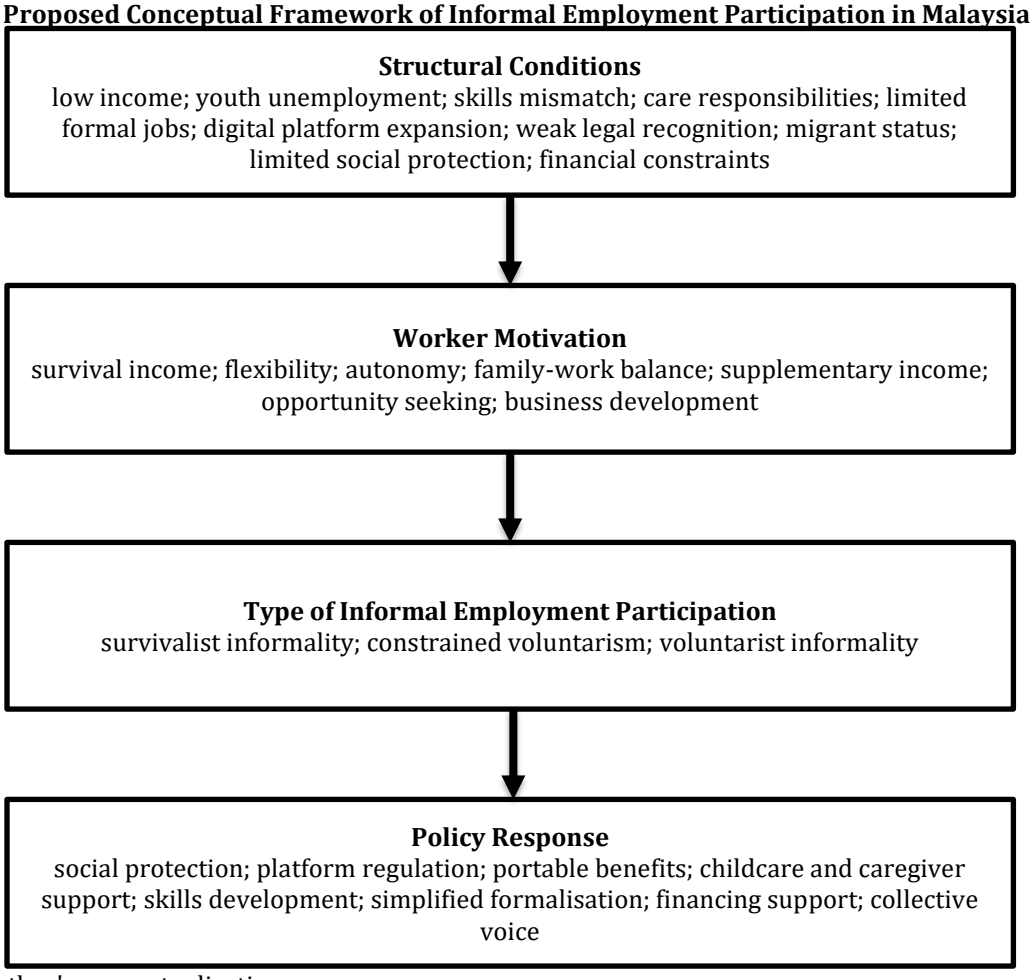
The proposed framework suggests that informal employment participation is shaped by the interaction between structural conditions, worker motivations, and institutional context (Figure 2). Structural conditions may include low income, youth unemployment, skills mismatch, care responsibilities, limited formal job opportunities, digital platform expansion, weak legal recognition, migrant status, limited social protection coverage, and financial constraints. Worker motivations may include survival income, flexibility, autonomy, family-work balance, supplementary income, opportunity seeking, and business development. These factors influence whether participation is more survivalist, voluntarist, or constrained voluntarist.

This framework is relevant to Malaysia because informal employment has been shown to exist across both informal and formal sectors. DOSM data indicate that informality is not only an issue of enterprise registration,

but also a question of whether workers are protected, covered by benefits, and included in social security systems. The urban concentration of informal employment also suggests that informality may increasingly be associated with urban services, self-employment, online business, platform work, and flexible income-generating activities. Therefore, the continuum approach provides a more nuanced basis for understanding Malaysia's informal labour market.

As this paper is conceptual in nature, the proposed framework is not intended to test formal hypotheses. Instead, it clarifies how different forms of informal employment participation may be understood along the survival–constraint–choice continuum. Informal employment participation is more likely to reflect survivalist informality when workers experience high economic insecurity, limited access to formal employment, and weak social protection coverage. It is more likely to reflect voluntarist informality when workers possess stronger skills, greater income security, higher autonomy, and access to entrepreneurial or digital opportunities. Between these two positions, constrained voluntarism may be observed when workers value flexibility or income opportunity, but their choices remain bounded by structural, institutional, or household constraints.

**Figure 2: Proposed Conceptual Framework of Informal Employment Participation in Malaysia**




*Source:* Author's conceptualisation

## 4. Policy Implications

### Differentiated Policy Responses

The proposed framework suggests that informal workers in Malaysia should not be treated as a homogeneous group. Since informal employment may be shaped by survival, constrained choice, or voluntary preference, a single formalisation policy may not be sufficient. Workers who enter informality due to poverty, exclusion, and weak labour protection may require different support from those who participate because of flexibility, autonomy or business opportunity.

Therefore, policy responses should be differentiated according to workers' motivations and constraints. For survivalist informal workers, priority should be given to social protection, income support, basic labour protection, and skills training. For workers located within constrained voluntarism, policy should focus on portable benefits, flexible formalisation, childcare support, caregiver support, platform-related protection, and simplified access to protection schemes. For voluntarist informal workers, support may be directed towards simplified business registration, digital skills, financing access, and productivity improvement.

The differentiated approach is important because formalisation should not be treated as a purely administrative exercise. If formalisation is perceived only as registration, taxation, or compliance, it may be unattractive to workers with low or unstable income. However, when formalisation is linked to protection, financing, training, market access, and clear worker benefits, it may become more supportive and inclusive.

### Social Protection, Flexible Formalisation and Current Schemes

Formalisation should not be understood only as business registration or tax compliance. Instead, it should be linked to better protection and livelihood security. Since DOSM's definition of informal employment is closely related to the absence of social security schemes or employment benefits, social protection should be placed at the centre of informal employment policy in Malaysia.

For low-income and survivalist informal workers, voluntary contribution schemes may be insufficient if income is unstable. Subsidised contributions, matching schemes, simplified enrolment, and wider awareness of social protection programmes may therefore be needed. Meanwhile, for informal entrepreneurs, online sellers, freelancers, and platform workers, formalisation should be made flexible and gradual. Registration should provide clear benefits, such as access to financing, training, social protection, and market support. This would allow formalisation to be viewed as supportive rather than punitive.

In Malaysia, several schemes have been introduced to extend protection to informal, self-employed, and gig workers. For example, the Employees Provident Fund's i-Saraan provides a voluntary retirement savings channel for self-employed persons and those without fixed income, with a government matching incentive of 20 per cent up to RM500 annually (Employees Provident Fund, n.d.-a). The newer i-Saraan Plus initiative has been designed for e-hailing and p-hailing drivers, with a higher matching incentive of up to RM600 annually (Employees Provident Fund, n.d.-b). PERKESO's Self-Employment Social Security Scheme, also known as Lindung Kendiri, provides employment injury protection for self-employed persons (Social Security Organisation, 2026a). These schemes are important because they recognise that non-standard workers require access to social protection beyond the conventional employer-employee model.

However, the voluntary nature of these schemes may limit coverage among survivalist informal workers with irregular or low income. From the perspective of constrained voluntarism, workers may value flexibility but still remain exposed to income insecurity, work injury, and retirement vulnerability. Therefore, existing schemes may be strengthened through simplified enrolment, matching contributions, platform-based contribution mechanisms, wider awareness, and stronger links between formalisation and tangible worker benefits.

### Platform Work, Collective Representation and Worker Voice

The rise of platform and digital work has made the boundary between survivalist and voluntarist informality more complex. Platform workers may value flexibility, autonomy, and income opportunity, yet they may also face unstable earnings, weak bargaining power, algorithmic control, work injury risks, and limited employment

protection. For this reason, platform work should not be understood only as opportunity-driven employment. It may also represent a form of constrained voluntarism, where workers exercise choice but remain exposed to institutional and labour market vulnerabilities.

The enactment of the Gig Workers Act 2025 (Act 872) represents an important development in Malaysia's regulatory response to platform and gig work. The Act was introduced to protect the rights of gig workers, provide for the duties of contracting entities, regulate the terms and conditions of service agreements, establish dispute resolution mechanisms, and provide for the establishment of the Consultative Council and the Gig Workers Tribunal (Ministry of Human Resources Malaysia, 2025). This indicates that Malaysia's policy response has moved beyond voluntary savings and employment injury protection schemes towards a more specific legal framework for gig work.

However, the Act should also be examined within the survival–constraint–choice continuum. On the one hand, it may strengthen the position of gig workers by recognising matters related to service agreements, earnings, dispute resolution, internal grievance mechanisms, and representation through gig workers' associations. These provisions may reduce some forms of constrained voluntarism by improving legal recognition and providing clearer mechanisms for addressing disputes between gig workers and contracting entities. On the other hand, the Act defines a gig worker as an individual who is a citizen or permanent resident of Malaysia, enters into a service agreement with a contracting entity, and receives earnings for the service performed (Ministry of Human Resources Malaysia, 2025). This definition raises an important question regarding the position of non-citizen and migrant workers who may participate in informal or platform-mediated work but fall outside this legal definition.

Therefore, while the Gig Workers Act 2025 is an important policy development, it does not remove the need to examine wider informal labour protection gaps. In particular, migrant and non-citizen workers may remain exposed to constraints related to immigration status, employer dependence, recruitment arrangements, limited mobility, and restricted access to complaint mechanisms. From the perspective of constrained voluntarism, legal recognition should therefore be considered together with social protection, platform accountability, portable benefits, and migrant-sensitive protection.

Worker voice is also important. Informal workers, especially platform workers, women home-based workers, migrant workers, and low-income informal entrepreneurs, should be included in policy discussions so that their actual needs and constraints are recognised. This is consistent with worker-centred approaches that emphasise visibility, voice, and validity in informal worker policy design (Tellado et al., 2020). A more inclusive approach to platform work should therefore combine legal recognition, fair dispute mechanisms, social protection, collective representation, and protection for workers who may remain outside the formal scope of the Gig Workers Act 2025.

**Gender, Care Responsibilities and Skills Support**

Gender and care responsibilities are important dimensions of constrained voluntarism in Malaysia. Women's participation in informal and home-based work may reflect a preference for flexibility, but such preference is often shaped by domestic responsibilities, childcare, caregiving, and limited access to suitable formal employment. Studies on informal caregivers, single mothers, housewives, and women micro-entrepreneurs in Malaysia show that women's work choices are frequently negotiated around household responsibilities, financial pressure, and restricted mobility (Hamidi et al., 2023; Kong et al., 2021; Md Nor, 2022; You et al., 2025; Zainol & Al Mamun, 2018). Therefore, flexible informal work should not automatically be interpreted as purely voluntary, as it may reflect a constrained response to gendered labour market and household conditions.

At the same time, informal employment policy should also include skills and productivity support. Digital skills, financial literacy, business training, and market access may help informal workers move towards more secure and productive work. This is especially relevant because youth unemployment and skills mismatch have been identified as challenges affecting formal labour market entry in Malaysia (Nasreen et al., 2022; Zain et al., 2024). For informal entrepreneurs and online sellers, skills support may also increase the ability to use digital platforms more productively and to transition into more sustainable business activities.

Policy should therefore recognise both protection and productivity. Protection is needed because informal workers may lack security, benefits, and bargaining power. Productivity support is needed because some informal workers may have entrepreneurial potential but lack finance, skills, market access, or formalisation pathways. A balanced approach would help reduce vulnerability while supporting workers' capacity to improve their livelihoods.

**Table 2: Policy Implications Based on the Survival-Constraint-Choice Continuum**

| Informality type | Main risk | Current policy relevance | Policy improvement |
|---|---|---|---|
| Survivalist informality | Low income, unstable work, weak protection | PERKESO Lindung Kendiri, EPF i-Saraan, income and skills programmes | Subsidised contributions, income support, simplified enrolment, basic labour protection |
| Constrained voluntarism | Flexibility with insecurity, care constraints, platform dependency | i-Saraan Plus, Gig Workers Act 2025, platform-related protection discussions, caregiver and childcare support | Portable benefits, platform-based contributions, childcare/caregiver support, clearer legal recognition, collective voice |
| Voluntarist informality | Business informality, limited scaling, productivity constraints | Business registration, entrepreneurship programmes, digital skills support | Simplified formalisation, financing access, tax incentives, productivity and digital support |

Overall, informal employment policy in Malaysia should move beyond a narrow focus on formalisation, registration, or voluntary participation in protection schemes. A more effective approach would combine protection, flexibility, skills development, legal recognition, platform accountability, financing support, and worker participation. This would allow informal workers to be supported according to their different positions along the survival-constraint-choice continuum

## 5. Conclusion

This paper has proposed a conceptual framework for understanding informal employment participation in Malaysia by integrating survivalist and voluntarist perspectives. It has been argued that informal employment should not be viewed only as a result of poverty and exclusion, nor should it be interpreted entirely as a voluntary choice for flexibility, autonomy, or entrepreneurship. Instead, informal employment participation should be understood as a continuum shaped by survival, constraint, and choice.

Using Malaysia as the context, it has been shown that informal employment remains an important labour market issue. DOSM data indicate that informal employment exists not only in the informal sector, but also within the formal sector. Malaysian studies further show that informal and non-standard work is connected to platform work, online selling, women's micro-entrepreneurship, housewives' home-based businesses, single mothers' precarious employment, informal caregiving, youth employability challenges, and SME-related constraints. These patterns suggest that informality should not be examined only through enterprise registration, but also through workers' access to social protection, legal recognition, household support, skills, employment benefits, and labour security.

The main contribution of this paper is the concept of constrained voluntarism, which captures the middle position between survivalist and voluntarist informality. Some workers may appear to choose informal employment because of flexibility or income opportunity, yet their choices may still be bounded by low wages, limited formal job opportunities, household responsibilities, weak social protection, skills mismatch, financial constraints, or platform dependency. Therefore, informal workers should not be treated as a homogeneous group. Rather, they should be understood as occupying different labour market positions with different degrees of vulnerability, autonomy, and institutional protection.

The proposed framework holds significance for policymakers. A one-size-fits-all approach to formalisation may be insufficient. Survivalist informal workers may require stronger social protection and income support, while constrained voluntarist workers may require portable benefits, flexible formalisation, platform-related protection, childcare support, caregiver support, and clearer legal recognition. Business support, access to finance and digital skills, and streamlined registration processes might benefit voluntarist informal workers more.

The inclusion of the Gig Workers Act 2025 and non-citizen labour also shows that informal employment policy in Malaysia is evolving. While the Act provides a stronger legal basis for gig worker protection, its definition of gig workers as citizens or permanent residents suggests that migrant and non-citizen workers may require separate policy attention. Therefore, future discussions of informal employment in Malaysia should distinguish between citizen informal workers, protected gig workers, and migrant workers whose vulnerability may be shaped by both labour market conditions and legal status.

As a conceptual paper, this study does not empirically test the proposed framework. However, it offers a foundation for future studies to analyse whether informal workers in Malaysia can be empirically differentiated into the categories of survivalist, constrained voluntarist, and voluntarist. Future studies may apply survey analysis, qualitative interviews, mixed-method approaches, or latent class analysis to identify different informal worker profiles and examine how these profiles relate to income security, social protection participation, platform dependency, gender, caregiving, skills, and household responsibilities. Such research would be useful in designing more targeted policies for worker protection, productivity, and inclusion.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Entrepreneurial Resilience among Persons with Disabilities: A Narrative Review of Entrepreneurship Education, Self-Efficacy and Inclusive Support Mechanisms

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**Abstract**: This narrative review examines entrepreneurship education, entrepreneurial self-efficacy, and inclusive support in relation to entrepreneurial resilience among persons with disabilities (PWDs). Sources were drawn from a study literature matrix and related publications, with relevance assessed against these topics. The review considered empirical studies alongside conceptual work and policy guidance, while research involving other populations provided supplementary perspectives. The synthesis suggests that accessible education and support may contribute to entrepreneurial confidence and competence. However, these outcomes do not establish sustained business activity, venture survival, or improved income. The review distinguishes psychological and educational gains from longer-term business outcomes and considers coping and adaptation alongside external support conditions. Differences between sources and the lack of a detailed search and selection record limit its conclusions. Future research should track business outcomes over time using accessible measures. Programme providers should address participants' learning and support needs and evaluate whether provision supports continued entrepreneurial participation.

**Keywords:** *Entrepreneurship education, entrepreneurial self-efficacy, entrepreneurial resilience, inclusive entrepreneurship, persons with disabilities*

## 1. Introduction

Persons with disabilities (PWDs) face barriers to starting and sustaining businesses, including inaccessible services, limited access to finance and markets, and fragmented support. These difficulties can restrict entrepreneurial participation even when individuals have the interest and skills to pursue self-employment. Research on disability inclusion in Malaysia highlights the importance of social entrepreneurship and coordinated support in addressing barriers to workforce participation (Rahim & Osman, 2024). International guidance similarly emphasises accessible training and business support as components of inclusive entrepreneurship (Organisation for Economic Co-operation and Development, 2023).

Entrepreneurship education (EE) offers one means of developing the skills and confidence needed to pursue business opportunities. Inclusive approaches may combine practical business activities, mentoring, accessible learning materials, and assistive technologies to accommodate different learning and participation needs (Krüger & David, 2020). A review by Shan et al. (2025) examines the contribution of inclusive EE to entrepreneurial competence development among students with disabilities. Entrepreneurial self-efficacy (ESE), or confidence in performing entrepreneurial tasks, is also relevant: broader entrepreneurship research links ESE to the relationship between learning experiences and entrepreneurial intention (Zhao et al., 2005). However, greater confidence or intention should not be treated as evidence of sustained business activity.

Understanding entrepreneurial resilience therefore requires attention to both individual capabilities and the conditions in which businesses operate. Research on EE for PWDs highlights gendered experiences and differences in personal and professional development (Habib & Cooney, 2025). Studies involving other populations offer additional perspectives on self-efficacy and resilience, including research on prison entrepreneurship programmes and SMEs operating during crises (Ciptono et al., 2023; Naba Boukari, 2025). These findings may help explain relevant relationships, but their applicability to PWD entrepreneurs requires careful consideration. Evidence concerning entrepreneurial intention, readiness and competence also needs to be distinguished from evidence concerning venture survival and sustained income.

This narrative review brings together literature on EE, ESE and inclusive support mechanisms to examine their relevance to entrepreneurial resilience among PWDs. It considers how learning opportunities and psychological resources relate to social, technological and institutional support, while distinguishing evidence

directly involving PWDs from supplementary research involving other populations. The review contributes an integrated interpretation of these relationships and identifies gaps in the evidence connecting educational and psychological outcomes with sustained entrepreneurial participation.

## 2. Literature Review

### Theoretical Foundations

The Theory of Planned Behavior (TPB) provides a useful starting point for understanding entrepreneurial intention. It explains intention in terms of attitudes towards a behaviour, subjective norms and perceived behavioural control (Ajzen, 1991). In entrepreneurship, these concepts help explain whether individuals view starting a business favourably, perceive support from others, and believe they can undertake the tasks involved. Perceived behavioural control overlaps with self-efficacy, although the two constructs should not be treated as identical. For this review, TPB helps frame how entrepreneurship education may relate to perceived capability and intention; it does not, by itself, establish whether an individual will sustain a business through adversity.

Social Cognitive Career Theory (SCCT) offers a complementary perspective by considering self-efficacy, outcome expectations, and goals alongside contextual supports and barriers (Lent et al., 1994). Applied to entrepreneurship, it provides a basis for examining how learning experiences and perceived opportunities relate to confidence in pursuing self-employment. This perspective is relevant to PWDs because entrepreneurial choices may depend on both perceived capability and access to suitable learning and support. Research examining entrepreneurial self-efficacy as a mediator between education and startup readiness illustrates a related relationship, although such findings do not establish that readiness leads to sustained entrepreneurial activity (Adeniyi, 2023).

Resilience adds a different focus: how entrepreneurs respond to setbacks and changing conditions. At the individual level, psychological resilience concerns coping and recovery, whereas resilience at the venture level concerns adaptation and continuity of business activity. Social networks and institutional support may provide resources that assist these responses. Stewart and Winston (2025), for example, propose a framework connecting entrepreneurial development with university and stakeholder networks. Such conceptual work helps frame resilience as involving both personal resources and external support, but should be distinguished from empirical evidence that particular interventions improve resilience.

Together, these perspectives guide the interpretation of the literature in this review. TPB helps explain entrepreneurial intention, while SCCT draws attention to learning, self-efficacy and contextual conditions. Resilience perspectives extend the discussion to coping, adaptation and business continuity. Their combined use allows the review to consider how education and support may relate to entrepreneurial participation without assuming that greater confidence or stronger intention necessarily results in sustained ventures.

### Entrepreneurship Education and Entrepreneurial Self-Efficacy

Entrepreneurship education for PWDs can take different forms, depending on participants' needs and the organisations delivering it. Inclusive curricula place emphasis on accessible materials, flexible learning activities and appropriate assistive technologies (Krüger & David, 2020). Community initiatives offer another route, connecting entrepreneurship support with local organisations and opportunities for participation (Rahim & Osman, 2024). The OECD also discusses tailored business advice and support for persons with disabilities, recognising that training is one component of a broader support system (Organisation for Economic Co-operation and Development, 2023). These approaches vary in delivery, but share a concern with making entrepreneurial learning and services accessible.

Practical activities and mentoring are important considerations in the design of these programmes. Business planning, market testing and small projects give learners opportunities to practise entrepreneurial tasks, while feedback can help them assess their progress and identify areas requiring further support. Digital learning may offer additional flexibility, particularly where travel or mobility presents difficulties, although its usefulness depends on accessible platforms and participants' digital skills. Involving PWDs in programme design can help providers identify barriers that would otherwise be overlooked (Krüger & David, 2020; Organisation for

Economic Co-operation and Development, 2023). These features provide a basis for inclusive delivery; their effects on business outcomes still require evaluation.

Entrepreneurial self-efficacy helps explain why educational experiences may relate to entrepreneurial intention and readiness. Zhao et al. (2005) reported a mediating role for self-efficacy in the relationships between perceived learning, prior experience, and entrepreneurial intention. Subsequent research has examined similar relationships in educational settings, including the mediating role of ESE between entrepreneurship education and startup readiness (Adeniyi, 2023; Liu et al., 2019). Reviews also identify self-efficacy among the factors considered in studies of entrepreneurship education and intention (Prasetyowati et al., 2025; Rauf & Jones, 2025). This literature supports examining ESE as a possible link between learning and entrepreneurial aspirations, while recognising that the relationships may differ across settings.

The relevance of these findings to PWDs requires attention to the populations and outcomes studied. Evidence from general student samples can inform the discussion of learning and confidence, but does not establish that the same relationships hold for PWD entrepreneurs. Disability-focused work offers a more direct basis for understanding inclusive education and competence development (Shan et al., 2025), alongside differences in participants' experiences and support needs (Habib & Cooney, 2025). For this review, increased self-efficacy is therefore considered an educational and psychological outcome, distinct from business formation, venture survival and sustained income.

**Entrepreneurial Resilience among Persons with Disabilities**

In this review, entrepreneurial resilience refers to the capacity of PWD entrepreneurs to respond to setbacks, adapt their business activities, and sustain entrepreneurial participation over time. It includes psychological responses, such as managing stress and recovering from difficulties, as well as business responses, such as adjusting operations or finding alternative sources of revenue. Psychological resilience is relevant to this understanding but measures of individual coping do not, on their own, establish whether a venture can survive or adapt (Connor & Davidson, 2003). Confidence, coping and business continuity therefore need to be considered as related but distinct aspects of entrepreneurial experience.

The conditions surrounding an entrepreneur also matter. Access to advice, finance, markets and accessible services may affect the options available when difficulties arise. Conceptual work on entrepreneurial resilience networks draws attention to the role of universities and other stakeholders in supporting entrepreneurial development (Stewart & Winston, 2025). For PWD entrepreneurs, this review consequently considers personal and business responses alongside the social and institutional conditions that may support them. It treats inclusion and external support as conditions relevant to resilience, rather than assuming that their presence demonstrates resilience or guarantees venture survival.

**Inclusive Support Mechanisms**

Inclusive support mechanisms address the practical and social conditions surrounding entrepreneurial participation. Family, mentors, and peer networks may provide encouragement, advice, and connections to business resources. Research on SMEs in crisis settings examines social networks alongside entrepreneurial self-efficacy and resilience (Naba Boukari, 2025). Although this offers a useful perspective, it should not be assumed to describe PWD entrepreneurs' experiences directly. Disability-focused literature provides a more relevant basis for considering differences in support needs and access to entrepreneurial opportunities (Habib & Cooney, 2025; Rahim & Osman, 2024).

Institutional support includes accessible training and business advice, financial assistance and links to markets (Organisation for Economic Co-operation and Development, 2023). These provisions may help address barriers that individual confidence or business skills alone cannot resolve. Inclusive procurement is another potential route to market access, but arrangements supporting disability-inclusive employment should not automatically be treated as support for PWD-owned businesses. Their relevance depends on eligibility rules and implementation, and their effects on venture continuity require evaluation.

Digital services offer further possibilities for accessing information, learning, and customers. Research on digital entrepreneurship education and social media considers their relationships with self-efficacy and

entrepreneurial readiness, although these findings are not necessarily specific to PWDs (Adininggar et al., 2025; Rafiah et al., 2025). For PWD entrepreneurs, the usefulness of digital services also depends on accessible design, suitable technologies, and opportunities to develop digital skills. Digital inclusion is therefore considered a potential support for participation, rather than evidence of improved resilience or sustained income.

## 3. Methodology

### Narrative Review Design

This study used a narrative review to examine the relationships among entrepreneurship education, entrepreneurial self-efficacy, inclusive support mechanisms, and entrepreneurial resilience among persons with disabilities (PWDs). This approach suited the review because the literature includes studies from different disciplines and settings, using varied research designs and outcome measures. It allowed empirical findings to be considered alongside conceptual work and policy guidance. The aim was to identify relevant patterns, differences and gaps in the literature, rather than calculate a pooled effect or provide an exhaustive account of all available studies.

### Literature Identification and Selection

The review was based on the literature matrix prepared for this study, together with related research and guidance on disability-inclusive entrepreneurship. The sources included empirical studies, review papers, conceptual publications, programme reports and international guidance. Their relevance was considered in relation to entrepreneurship education, entrepreneurial self-efficacy, resilience and support for entrepreneurial participation. Studies involving PWDs provided the main basis for disability-specific discussion. Research involving other populations was considered for its relevance to these topics, although its findings cannot be assumed to apply directly to PWD entrepreneurs. Conceptual and policy sources informed the discussion of accessibility, programme design and institutional support. A detailed search and selection record was not maintained, which limits the reproducibility of the review and its coverage of the available literature.

### Review and Synthesis Procedure

The literature was compared and discussed under themes reflecting the review's focus: entrepreneurship education, entrepreneurial self-efficacy, entrepreneurial resilience and inclusive support. Accessibility, digital inclusion and methodological limitations were also considered within these themes. The synthesis examined similarities and differences in the reported findings, with attention to the populations studied, research settings and types of outcomes. In particular, gains in confidence, competence and entrepreneurial intention were distinguished from outcomes such as business formation, venture survival and sustained income. Findings from other populations were treated as supplementary evidence, while policy recommendations were distinguished from empirical results. The resulting synthesis offers an interpretation of the literature rather than a causal estimate of the relationships examined.

## 4. Results and Discussion

### Inclusive Entrepreneurship Education and Entrepreneurial Self-Efficacy

The reviewed literature suggests that inclusive entrepreneurship education may support entrepreneurial confidence and competence among PWDs. Shan et al. (2025) examine competence development among students with disabilities, while OECD guidance discusses accessible training alongside tailored business support (Organisation for Economic Co-operation and Development, 2023). These sources contribute different types of evidence: educational findings concern participants' capabilities, whereas policy guidance identifies approaches to programme delivery. Neither should be taken as sufficient evidence that training produces sustained income or venture survival. The distinction matters because confidence and readiness are closer to the learning experience than longer-term business outcomes.

Practical learning offers a plausible explanation for the relationship between education and entrepreneurial self-efficacy. Business projects allow learners to practise tasks and assess their progress, while feedback and exposure to entrepreneurial experiences may help them judge their capabilities. In a survey of 289 final-year

TVET students in Nigeria, Adeniyi (2023) found that the searching, planning, and implementing dimensions of ESE partially mediated the relationship between entrepreneurship education and startup readiness, whereas the marshalling dimension did not. This suggests that the relationship may differ across entrepreneurial tasks rather than operate uniformly.

Overall, the literature provides a clearer basis for discussing self-efficacy and competence than for concluding that inclusive education improves entrepreneurial resilience over time. Research on prison entrepreneurship programmes offers supplementary evidence concerning education, self-efficacy, resilience and intention in a constrained setting (Ciptono et al., 2023), but it cannot establish the same relationships among PWD entrepreneurs. This review therefore interprets educational gains as potentially relevant to entrepreneurial participation, while recognising that their connection with business continuity and livelihoods requires further evidence.

**Entrepreneurial Self-Efficacy and Entrepreneurial Resilience**

Entrepreneurial self-efficacy may help explain how learning relates to entrepreneurial action, but its relationship with resilience requires separate consideration. Confidence in planning, recognising opportunities and mobilising resources does not necessarily mean that an entrepreneur can sustain a business through setbacks. Research on prison entrepreneurship programmes examines self-efficacy and resilience in relation to entrepreneurial intention, while research on SMEs considers these constructs alongside social networks in a crisis context (Ciptono et al., 2023; Naba Boukari, 2025). These studies offer relevant perspectives, although they do not establish the same relationships among PWD entrepreneurs. A contrasting result comes from Pratama et al. (2025), whose study of 120 university entrepreneurship association members found that ESE neither predicted nascent entrepreneurial behaviour nor mediated the relationships examined. Although this was not a disability-focused sample, the finding illustrates why confidence should not be treated as equivalent to entrepreneurial action. This review therefore considers self-efficacy as a potentially relevant psychological resource, while distinguishing it from demonstrated coping, business adaptation and venture continuity.

**Inclusive Support, Accessibility and Digital Inclusion**

Universal Design for Learning provides a basis for making course materials, activities and assessments accessible. Practical options include written transcripts, captioning, accessible slides and alternative assessment formats, depending on participants' needs (Career and Technical Education Technical Assistance Center, n.d.). These options should be considered alongside suitable assistive technologies and flexible schedules. Accessibility also matters in digital delivery: online materials and activities can introduce barriers if participants cannot navigate or use them. Inclusive programme design therefore needs to consider how learners access and complete entrepreneurial tasks, as well as the content being taught (Krüger & David, 2020).

Participants' experiences may differ by gender, disability type and socioeconomic circumstances. Habib and Cooney (2025) discuss gendered pathways in entrepreneurship education for PWDs, drawing attention to differences that a uniform approach may overlook. Accessible formats and support arrangements therefore need to reflect participants' learning and communication needs (Krüger & David, 2020). Involving PWDs in programme design may help identify these needs, but better alignment should not be assumed to produce sustained business outcomes. Follow-up evaluation is needed to examine whether accessible learning and support are associated with continued entrepreneurial participation.

**Methodological Limitations and Research Gaps**

The reviewed literature includes quantitative studies examining relationships among entrepreneurship education, self-efficacy and entrepreneurial intention or behaviour, alongside reviews synthesising these relationships (Prasetyowati et al., 2025; Pratama et al., 2025; Rauf & Jones, 2025; Ye & Kang, 2025). Structural equation modelling allows researchers to examine proposed relationships and estimate indirect effects. However, an indirect effect estimated from cross-sectional data does not establish that education preceded changes in self-efficacy or entrepreneurial outcomes. Studies using different populations, measures, and settings also need to be compared cautiously.

These design and sampling choices affect how the findings can be interpreted. Cross-sectional studies cannot readily distinguish the proposed direction of a relationship from reverse causality or unmeasured influences. Findings from a single institution or a narrowly selected group may also have limited applicability to other populations, particularly PWD entrepreneurs with different support needs. Qualitative research can add detail about participants' experiences and contextual barriers, but serves a different purpose from estimating intervention effects. Together, these approaches provide useful perspectives while leaving questions about change over time and sustained business outcomes unresolved.

**Measurement Validity, Cultural Adaptation and Accessibility in Data Collection**

Measurement requires attention because entrepreneurial self-efficacy can refer to confidence in different tasks, including planning, recognising opportunities and mobilising resources. Established measures provide a starting point (Chen et al., 1998; McGee et al., 2009), but their suitability for a particular language, setting or disability group requires assessment. Differences between studies may reflect the instruments used as well as participants' experiences. Clear reporting of scale items, adaptations, and reliability and validity evidence would make findings easier to interpret and compare.

Accessibility also affects who can participate and how responses are collected. Appropriate options may include accessible online forms, large-print or audio materials and assisted interviews where needed. Piloting these formats with intended participants can help identify difficulties before data collection (United Nations Statistics Division, 2026). Assistance should support participation without directing responses. Accessible consent procedures and protection of sensitive disability-related information are equally important.

An important research gap concerns the connection between educational outcomes and subsequent business activity. Findings about self-efficacy, competence, or intention do not establish whether participants later start businesses, maintain operations, or earn sustained income. Future evaluations should therefore track these outcomes over time and distinguish changes associated with training from other influences. Comparisons across gender, disability groups and socioeconomic settings would also help identify differences that overall programme results may conceal.

This narrative review has limitations of its own. A detailed search and selection record was not maintained, so its coverage cannot be considered exhaustive or readily reproduced. It also draws on research involving populations other than PWDs and combines empirical studies with conceptual and policy sources. These sources offer different forms of evidence and cannot support equivalent conclusions. The synthesis should therefore be read as an interpretation of the selected literature, rather than proof of causal relationships or programme effectiveness.

**Integrated Discussion**

Taken together, the literature suggests that education, self-efficacy and inclusive support should be considered alongside one another. Broader entrepreneurship research links learning experiences with self-efficacy and entrepreneurial intention (Zhao et al., 2005), while disability-focused literature examines accessible education and participants' differing experiences (Habib & Cooney, 2025; Krüger & David, 2020). These perspectives help frame how learning and support may relate to entrepreneurial participation, but do not establish a continuous pathway from training to venture survival. The contribution of this review is to distinguish confidence and readiness from sustained business outcomes, while considering the support conditions relevant to that transition. For PWD entrepreneurs, resilience therefore requires attention to coping and business adaptation as well as the opportunities and constraints surrounding entrepreneurial activity.

## 5. Conclusion and Recommendations

This narrative review brings together perspectives on entrepreneurship education, entrepreneurial self-efficacy, and inclusive support to consider entrepreneurial resilience among PWDs. The literature suggests that accessible learning and support may contribute to entrepreneurial confidence and competence, but these outcomes should be distinguished from venture survival and sustained income. The review's contribution is to make this distinction explicit and consider personal coping and business adaptation alongside the conditions surrounding entrepreneurial participation. Improved confidence alone is insufficient evidence of resilience.

The conclusions remain provisional because the review combines different forms of evidence, includes research involving other populations, and lacks a detailed search and selection record. Further research should examine how educational outcomes relate to business activity over time, using accessible measures suited to the groups involved. For practitioners, the findings support attention to learning accessibility and participants' support needs, alongside evaluation of whether programmes contribute to continued entrepreneurial participation.

## Recommendations

### Recommendations for Future Research

Future research should examine which combinations of practical learning, mentoring and accessible support help PWD participants develop entrepreneurial self-efficacy and sustain business activity. Studies should distinguish confidence and intention from business formation, survival and income, and explore how these relationships differ by gender, disability type and socioeconomic circumstances. Digital government services, procurement opportunities and targeted finance also warrant evaluation, including whether eligible PWD entrepreneurs can access them. Cost-effectiveness analysis would help assess the resources required to maintain and extend promising programmes.

Longitudinal studies with baseline and follow-up assessments could track changes in self-efficacy alongside subsequent business outcomes. Where feasible and ethical, randomised or suitable quasi-experimental designs could strengthen causal inference. Banks et al. (2023) provide a published protocol for evaluating a disability-targeted micro-entrepreneurship programme; the protocol describes a planned evaluation rather than evidence of programme effectiveness. Qualitative interviews and process evaluations could complement outcome measures by examining participants' experiences, accessibility barriers and reasons for continuing or leaving a programme.

### Recommendations for Entrepreneurship Education, Practice and Policy

Education providers should involve PWD participants and disability organisations in identifying learning needs and barriers. Universal Design for Learning can guide accessible materials and assessment options, while practical business tasks and mentoring can give participants opportunities to apply their learning (Krüger & David, 2020; Organisation for Economic Co-operation and Development, 2023). Programme budgets should account for appropriate accessibility support, such as captioning, assistive technologies or alternative formats, according to participants' needs. Partnerships with local business advisers and support organisations may also help participants access advice after training.

Practitioners and policymakers should assess whether business registration, finance and market-access services are usable by PWD entrepreneurs. Digital services and procurement initiatives could be piloted where relevant, with clear eligibility criteria and evaluation of their reach and outcomes. Follow-up plans should extend beyond immediate confidence and intention measures to examine business activity, income and continuity. The duration of follow-up should reflect the programme objectives and allow sufficient time to observe business development.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# ServeSmart: Bridging Theory and Practice in Customer Service Education through AI-Supported Experiential Learning

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**Abstract:** Artificial Intelligence (AI) is increasingly used in higher education to support experiential learning in customer service training, where applying theoretical frameworks such as the SERVQUAL model can be challenging. Students frequently struggle with emotional recognition, immediate decision-making, and applying SERVQUAL dimensions during role-play. To address these gaps, this study introduces ServeSmart, an AI-supported learning system that provides real-time guidance during customer service scenario role-play. Using a preliminary exploratory quantitative survey design, this study evaluated students' perceived learning experiences and the platform's usability. Using a non-probability purposive sampling strategy, 30 undergraduate students participated in individual scenario-based simulations followed by a validated post-evaluation questionnaire. Baseline findings indicated that a majority of participants had difficulty with emotional recognition and lacked immediate instructional feedback during simulations. Post-simulation results revealed that all participants reported higher perceived confidence in executing customer service tasks, a clearer perceived understanding of SERVQUAL concepts, and strong interest in future platform utilization. Overall, the findings demonstrate positive student perceptions of ServeSmart as a supportive experiential learning tool, highlighting its potential to offer an immediate instructional platform in service management education.

**Keywords**: *Artificial Intelligence, Experiential Learning, Customer Service Education, Decision Support System, SERVQUAL, Higher Education*

## 1. Introduction and Background

Intelligent tutoring systems, adaptive learning platforms, and generative artificial intelligence are being increasingly introduced into teaching and learning. Instead of remaining merely digital tools, these technologies are able to offer extra support in areas such as student engagement, personalized learning, and problem-solving. The employment of such technologies is especially relevant in professional education, since students are expected not only to understand concepts but also to show how they can be applied in work situations. Examples of subjects include customer service and hospitality management, since it is difficult to make the shift from knowledge to practice. Providing effective customer service requires more than just technical knowledge; students also need emotional awareness, good communication skills, and the ability to make decisions when situations change rapidly. Because of this, role-play, case studies, and simulations are frequently used to give students the chance to develop these skills in a controlled learning environment (Humpherys et al., 2022). Yet students may still find these activities difficult, especially when they have to deal with different customer behaviors within a short time frame.

The problem becomes more apparent when students are doing their practical training, as they come across customers who have different expectations, emotions, and problems requiring service. In such situations, they have to make use of their theoretical knowledge while at the same time managing their emotions, communicating in the right way, and deciding on their next move. A difficult interaction can therefore impose a number of demands on a student at one and the same time. For certain students, this kind of pressure makes it hard for them to apply frameworks like SERVQUAL consistently and can have an effect on their confidence when dealing with customers.

The same sorts of problems can arise in classroom role-plays. Even if students know the principles of good service, they may find it difficult to apply them when facing an emotionally demanding situation. A second limitation concerns the timing of the feedback. In a great many role-plays, the instructor gives their comments only after the activity has finished. As a result, students do not realize until after the interaction has taken place

that they have missed a cue or given an ineffective response. This means that they lose the chance to make an immediate adjustment and attempt a different approach while the situation is still going on (Tosterud et al., 2020).

AI-supported learning represents one way to address this gap. It is able to examine a situation, propose possible responses, and give instant feedback as students are engaged in practice (Coskun & Er, 2026). In the context of customer service education, this kind of assistance could help students work with the SERVQUAL dimensions—such as empathy, responsiveness, reliability, assurance, and tangibles—in various service situations (Lyu et al., 2020). ServeSmart was designed with that aim in mind. Rather than delaying guidance until the simulation has finished, the system gives advice as the interaction takes place and adjusts its assistance according to the customer's behavior and the context of the situation. Students are therefore able to apply service concepts as they respond, review their decisions, and keep on practicing in the same activity. In this respect, the system is meant to supplement classroom teaching rather than take the place of the lecturer. The study, which is exploratory in nature, looks at how students see their learning experience and the usability of ServeSmart in the context of customer service education. The study is based on two questions: first, what are the students' views regarding the way in which the SERVQUAL dimensions are used through ServeSmart? Second, in what way does ServeSmart help to promote students' engagement in hands-on learning?

## 2. Literature Review

### Artificial Intelligence in Higher Education

The use of artificial intelligence in higher education has developed a great deal, extending from routine administrative tasks to more interactive kinds of learning support (Hoogers et al., 2025). AI applications nowadays can work with teachers by giving them extra aid instead of taking the place of the relationship between student and teacher. By means of natural language processing and adaptive recommendations, AI systems are able to respond to a student's progress, modify the learning activities, and offer support that is more in line with individual needs (Tan et al., 2022). Moreover, some AI agents are also capable of maintaining conversations and imitating real-world personalities, so that students can interact with customer-like scenarios in a relevant context (Lewandowski et al., 2023).

At the same time, there are significant concerns regarding the use of AI in education. Things like student data privacy, possible algorithmic bias in assessments, and an overreliance on automated assistance should all be taken into account. If students place too much trust in AI-generated advice, they will have fewer chances to build up their ability to make independent judgements and to develop critical decision-making skills (Townsend, 2026). Because of this, AI-based learning support is more suitable when it supplements rather than replaces the judgement of both students and educators.

Learning analytics can further enhance learning supported by AI by offering data on student performance, the way they respond, and the decisions they make. This kind of information can enable teachers to detect the areas in which students need extra support and allow classroom simulations to become more purposeful and structured.

### Customer Service Competencies and the SERVQUAL Framework

To prepare students for jobs in the field of services, it is necessary to carry out learning activities that link up the existing concepts of service quality with real-life customer interactions. A framework that is among the most widely recognized is SERVQUAL, which was developed by Parasuraman, Zeithaml, and Berry. This framework specifies five dimensions of service quality: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). Even though these dimensions are easy to describe, putting them into practice when dealing with a difficult customer situation can be a great deal more challenging.

For students whose customer-handling abilities are still being developed, an annoyed customer might require them to show empathy and assurance at the same time as identifying the service problem and then deciding on a suitable solution. Although traditional role-play can be of some use in this regard, it does not always manage to replicate the emotional pressure and complexity found in real service situations (Schaefer & Palanski, 2014). It is therefore necessary for learning activities to include opportunities for students to practice these behaviors

in scenarios that mirror the demands of working in the workplace.

Even though there has been growing attention given to AI-supported learning, relatively little research has looked at how it can be specifically incorporated into customer service role-play. Most simulation exercises still depend mainly on instructor supervision, with feedback being given only after the exercise is completed. As a result, students often receive very little instructional support at the moment when they are making decisions during a customer interaction (Chernikova et al., 2020). This situation offers a good opportunity to investigate whether AI-assisted tools could provide timely and adaptive guidance within experiential learning. To deal with this problem, ServeSmart provides support to students as they deal with various customer situations. The system is intended to help learners identify service needs, apply the SERVQUAL principles, and build up more confidence in their communication and problem-solving during the simulation.

**SERVQUAL Operationalization in ServeSmart**

ServeSmart converts the five SERVQUAL dimensions into components that can be used in its scenarios, evaluation procedures, and feedback systems (Parasuraman et al., 1988), the aim being to link the existing service quality framework and the students' real responses in the simulated customer interactions more apparent. The physical, visual, and digital elements of the service environment—such as cleanliness, the professional appearance, the design of the digital interface, and other types of physical evidence—are all included within the concept of tangibles. When developing a service response, ServeSmart takes into account the way students perceive and react to these cues (Parasuraman et al., 1988; Bitner, 1992).

Concerns about reliability pertain to whether the student's suggested solution is accurate, consistent, and dependable; the system examines if the student has identified the fundamental service problem, suggests a realistic remedy, and sticks to the commitment made to the simulated customer (Parasuraman et al., 1988; Ladhari, 2009). Responsiveness refers to the speed and willingness with which a student responds to a customer's request or complaint. In the interactive situation, ServeSmart takes into account both how quickly the response is given and the degree to which the student shows that they are ready to help (Parasuraman et al., 1988; Johnston, 1995).

Assurance is connected with knowledge, courtesy, competence, and the capacity to earn customer trust. ServeSmart employs language-related clues to determine if students display the right level of politeness, confidence, and credibility, especially in situations involving anxious or dissatisfied customers (Parasuraman et al., 1988; Bowen & Lawler, 1995). Empathy means recognizing the customer's feelings and giving them individual attention. By using cues from natural language processing, the system looks at the ways in which students show that they are frustrated, indicate that they understand, and then proposes an appropriate response for service recovery (Parasuraman et al., 1988; Stock & Hoyer, 2005).

When combined, these functions enable ServeSmart to link each dimension of the SERVQUAL model with observable indicators in a customer situation and with feedback that students can use during their learning process. Hence, the system goes beyond a purely theoretical discussion by providing students with opportunities to think about how the dimensions manifest themselves in real service communication.

## 3. Research Methodology

ServeSmart integrates the five SERVQUAL dimensions—tangibles, reliability, responsiveness, assurance, and empathy—into its customer service simulation exercises. The platform analyses customer communications and provides immediate suggestions, step-by-step advice, and feedback on communication and emotional management. These features are designed to enable students to apply the SERVQUAL concepts in a variety of simulated service scenarios. This study employed a non-probability purposive sampling strategy involving 30 upper-level students enrolled in the Bachelor of Business in Service Management (Honours) program. This background was seen as relevant since the participants had already come across customer service situations and could thus make a judgment about the usefulness of ServeSmart in relation to their previous learning experience. The evaluation was conducted individually over a single 45-minute session. After an initial orientation, participants interacted with ServeSmart as an instructional assistant while navigating standardized service-recovery scenarios. Immediately post-simulation, students completed a validated,

structured evaluation questionnaire assessing their baseline learning challenges, system usability, SERVQUAL dimension alignment, and perceived educational benefits. Questionnaire items were adapted from established literature on educational technology and service quality, were based on previous research, and employed a five-point Likert scale going from 1 (Strongly Disagree) to 5 (Strongly Agree). The responses were analyzed with the help of descriptive statistics and agreement percentages in order to look at the students' views following their use of the system.

## 4. Results

The initial assessment included 30 undergraduate students who were studying the Bachelor of Business in Service Management. The survey was filled out by the students after they had used ServeSmart in connection with customer service activities. The results cover the participants' backgrounds, the difficulties they encountered when dealing with customers, their perception of the usefulness of the system, the features they preferred, their intention to continue using the system, and the learning benefits they felt. Table 1 shows the participants' background.

**Table 1: Participants' background**

| Variables | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **Gender** | Female | 22 | 73.3 |
| | Male | 8 | 26.7 |
| **Program** | Bachelor of Business in Service Management | 30 | 100.0 |

The majority of the respondents were women (73.3 per cent), whereas 26.7 per cent were men. Most of them were in their last year, and all the participants had prior experience in customer service role-plays or internships. The fact that they had such experience shows that they were not entirely new to customer service and so were able to assess ServeSmart in light of the experiences they had already had.

Table 2 presents students' reported challenges when dealing with different customer types during practical learning activities.

**Table 2: Students' reported challenges**

| Variables | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Difficulty responding to different customer types | Sometimes | 22 | 73.3 |
| | Yes | 8 | 26.7 |
| | No | 0 | 0.0 |
| Real-time guidance would enhance performance. | Yes | 28 | 93.3 |
| | Not sure | 2 | 6.7 |
| Specific learning challenges (Multi-select) | Difficulty understanding customer emotions | 20 | 66.7 |
| | Limited guidance during activity | 18 | 60.0 |
| | Not sure how to respond | 16 | 53.3 |
| | Lack of confidence | 14 | 46.7 |
| | Do not know the correct approach | 10 | 33.3 |
| | Other challenges | 6 | 20.0 |

All the participants said that dealing with different kinds of customers was difficult. Most of the students (73.3%) mentioned that they had this difficulty at times, while 26.7% said it was more of a challenge. No one stated that they had no difficulty. The challenge most often cited was understanding customer emotions

(66.7%), then coming up with inadequate guidance during the activities (60.0%) and uncertainty about how to react (53.3%). Furthermore, 46.7% expressed a lack of confidence. This pattern indicates that the students' difficulties went beyond just recognizing customer needs to also include deciding how to respond while managing the interaction. The fact that students wanted support was also clear from their response to real-time guidance. 93.3 per cent of them said that immediate guidance would help them to do better in their customer service activities. This shows that there is a great deal of interest in getting assistance while the interaction is happening rather than only after it has finished.

Table 3 presents students' perceptions of the usefulness of ServeSmart and their intention to use the system in future learning activities.

**Table 3: Perceived Usefulness and Intention to Use ServeSmart**

| Variable / Feature | Statistic / Category | Value / Count | Percentage (%) |
|---|---|---|---|
| Perceived Concept Usefulness | Very useful | 22 | 73.3% |
| | Useful | 8 | 26.7% |
| Intention to Use ServeSmart | Rating 5 (Very Likely) | 20 | 66.7% |
| | Rating 4 (Likely) | 10 | 33.3% |

Students had a favorable view of ServeSmart. 73.3 per cent considered the system to be 'Very Useful' and 26.7 per cent called it 'Useful'. None of the participants chose a negative category regarding usefulness. Similarly positive was their intention to use the system again: 66.7 percent said, 'Very Likely' and 33.3 percent said 'Likely'. The average score for the intention to reuse the system was 4.67 out of 5.

Table 4 presents the features that students considered most helpful. Respondents were allowed to select more than one feature.

**Table 4: Student Preferences for ServeSmart Functional Features**

| ServeSmart Feature | Frequency (n) | Percentage (%) |
|---|---|---|
| Emotional handling tips | 26 | 86.7 |
| Quick decision support | 24 | 80.0 |
| Suggested responses | 22 | 73.3 |
| Step-by-step guidance | 18 | 60.0 |
| Scenario-based learning | 18 | 60.0 |

The emotional-handling tips were the feature chosen most often, with 86.7% of participants selecting it. This is in agreement with the previous result, in which it was found that understanding customer emotions was the main challenge. Eighty per cent of the students picked quick decision support, and 73.3% chose suggested responses; step-by-step guidance and scenario-based learning were each selected by 60.0%. In general, the features most preferred were those which offered immediate help when students encountered difficult customer situations.

Table 5 presents students' perceptions of the potential educational impact of ServeSmart.

**Table 5: Perceived Pedagogical Impact of ServeSmart**

| Perceived Learning Outcome | Frequency (n) | Percentage (%) |
|---|---|---|
| Improved confidence in handling customer interactions | 30 | 100.0 |
| Enhanced understanding of customer service principles | 30 | 100.0 |

Every participant (100%) stated that ServeSmart had increased their confidence when dealing with customers and had improved their understanding of the key concepts in customer service. This indicates that the students saw value in the system with regard to both the development of their confidence and their conceptual understanding, especially in cases where learning involved combining knowledge, communication, decision-making, and confidence. It is important to remember that these findings refer to perceptions rather than constituting direct evidence of an improvement in skills. The survey did not objectively assess changes in the students' performance. Yet the participants believed that ServeSmart was useful for use in customer service and said that they had greater confidence and a better understanding of the SERVQUAL-related concepts such as empathy and assurance. Furthermore, all the participants stated that they intended to use the system again.

**Discussion**

The results show that the students had difficulties that were closely linked to the requirements of providing real-time customer service. There is a considerable cognitive and interpersonal demand on learners when they have to manage customers' emotions at the same time as deciding on their response. If immediate guidance is not available, it will be hard for the students to apply what they know to the situation during the interaction. The students' reactions to ServeSmart indicate that having real-time assistance was seen as useful when addressing these problems; the feature most often chosen was emotional-handling support, which is in direct agreement with the major difficulty noted by the participants. Quick decision support and suggested responses were also highly regarded. Taken together, these findings show that the students particularly valued help that could be used at the moment a decision had to be made. This type of support might enable students to pay more attention to understanding the customer while applying service concepts such as the SERVQUAL dimensions (Olivares et al., 2021).

A further important aspect is the connection between experience and reflection in experiential learning. In a traditional role-play, feedback is usually only given after the interaction has finished. Because of this timing, students often find it hard to identify a problem and are unable to immediately try out an alternative response (Henderson, 2021). ServeSmart alters the timing of the support by giving guidance during the interaction. If a suggestion is offered while the student is dealing with a customer, they then have the chance to reconsider their approach and make an adjustment all within the same learning activity. As a result, there are more opportunities for practice, reflection, and improvement as the simulation goes on. The results show that ServeSmart could prove useful as a support tool in competency-based customer service education, since the real-time guidance was seen as beneficial in handling difficult customer situations, in understanding service concepts, and in building confidence. Furthermore, the findings offer initial support for investigating AI-assisted experiential learning in service management education, especially in those cases where students need to put theoretical concepts into practice when interacting with customers (Li et al., 2024).

## 5. Managerial Implications and Recommendations

The study advances the debates regarding educational technology and service management in two closely related respects. On the one hand, it shows that real-time guidance supported by AI can be integrated into experiential learning in such a way that feedback is provided during an activity rather than merely after it has ended; this enables students to revise their responses while the customer interaction is still taking place. On the other hand, the results show how an AI-assisted learning tool can help students go from merely discussing service quality models in a theoretical way to applying these models in their communication and service decisions. Academic leaders and curriculum designers should consider using tools such as ServeSmart in conjunction with traditional teaching methods. Instead of replacing role-play or the lecturer, the system can offer extra support to students as they take part in these activities. This could enable lecturers to focus more on mentoring, discussion, and reflection, while the AI system gives guidance at the point of action. Moreover, AI-assisted tools might provide a means of increasing opportunities for practice without at the same time needing to add more instructor time (Chernikova et al., 2020).

The idea of exposing students to AI-assisted customer service activities also has a bearing on their workplace preparation. Since digital tools and AI are becoming more and more common in service settings, it would be beneficial for students to learn how to use them as they are at the same time developing their own communication and judgement skills. Therefore, becoming familiar with these tools can constitute part of their

preparation for carrying out customer interactions in workplaces that use technology (Echeverria et al., 2023).

When concluding the results, several limitations must be taken into account. The study was based on only 30 students, and as a result, the findings can only be partly applied to larger populations. It also took place within a single academic program at one university, so the results might represent the features of that specific situation. Moreover, the study depended on the students' self-reported opinions rather than on direct measurements of their performance. Lastly, there was no control group, and therefore it is not possible to determine how the students who used ServeSmart compared with those who took part only in traditional role-play.

The initial results point to a number of avenues for further research. Future studies might use experimental or quasi-experimental approaches with treatment and control groups in order to find out if ServeSmart leads to measurable differences in performance, decision-making, response time, and knowledge retention when compared to traditional role-play. Only in this way could stronger evidence of learning effects be obtained than from people's own reports. The system could also be further developed by using more advanced language models in order to enable less predictable and more natural conversations. It might be worthwhile to look into speech-to-text and voice-analysis features so as to go beyond written feedback and give information regarding students' spoken communication. Moreover, a greater variety of customer profiles, service situations, and languages could be included so that the system matches the diversity found in today's service environments. Such developments could increase the usefulness of ServeSmart for students who are preparing for various kinds of customer service jobs.

**Conclusion**

The study looked at how students saw ServeSmart as an AI-assisted learning tool for customer service training. The system was intended to give students guidance while they were carrying out simulations and to assist them in linking service quality theory with actual customer interactions. The initial responses were favorable in that all the participants said that their confidence in customer communication had increased and that their understanding of the main customer service concepts had improved, and all of them expressed an interest in using the system once more. The findings also point to the value students placed on immediate support, particularly when they needed to interpret customer emotions or decide how to respond. Because guidance was available during the interaction, students could reconsider their approach while the scenario was still in progress. This feature may create additional opportunities for reflection and practice while strengthening students' confidence, communication, and application of SERVQUAL concepts. ServeSmart therefore provides an initial example of how AI can be incorporated into competency-based service management education without removing the role of the educator. The findings remain preliminary because they are based on a small sample, a single academic setting, and self-reported responses. Further research using larger samples and objective measures of performance is needed. Nevertheless, the study provides a basis for continued examination of AI-supported experiential learning as a way of making customer service education more practice-oriented and responsive to the situations students may encounter in the workplace.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Demographic Ageing and Macroeconomic Determinants of Public Healthcare Fiscal Sustainability in Malaysia: Evidence from the ARDL Approach

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**Abstract:** Fiscal sustainability in Malaysia's public healthcare system has become increasingly important in the face of unprecedented challenges arising from population ageing and macroeconomic volatility. This study aims to analyse the factors affecting the fiscal sustainability of healthcare in Malaysia over the period from 1975 to 2024 using the Autoregressive Distributed Lag (ARDL) model. The Healthcare Fiscal Sustainability Index (HFSI) is used as the dependent variable, while the old-age dependency ratio, real GDP growth rate, labour force participation rate, life expectancy, healthcare inflation rate, and unemployment rate are included as independent variables. The analytical framework is based on three theories: Demographic Transition Theory, Wagner's Law, and the Fiscal Space Framework. The results indicate that the old-age dependency ratio has the strongest and most statistically significant positive relationship with HFSI in both the long-run and short-run models. The compression of morbidity hypothesis is supported by the significant positive relationship between life expectancy and HFSI. Real GDP growth has a significant positive effect on HFSI in the long run, suggesting that the government should leverage economic growth to strengthen sustainable healthcare financing. Labor force participation is not statistically significant, while the unemployment rate is marginally significant. Overall, the findings indicate that demographic ageing represents a major challenge to the fiscal sustainability of Malaysia's healthcare system and provide important insights for policymakers to implement proactive measures to ensure long-term fiscal sustainability.

**Keywords**: *Healthcare Fiscal Sustainability, Ageing Population, ARDL, Malaysia, Healthcare Expenditure*

## 1. Introduction and Background

Malaysia's healthcare system is undergoing a pivotal transformation from a heavily subsidized public model to one increasingly confronted by rapid demographic shifts and financial variability. The country is expected to be an "aged society" by the year 2040 and the increasing burden of the old-age dependency ratio, combined with the fact that inflation in healthcare services is set to climb to 16% by the year 2026, presents a great challenge to the sustainability of healthcare funding in the long term (Moideen et al., 2025). The government has been effective in the provision of health outcomes in the past, but the volume of services and the complexity of medical needs are challenging the government's fiscal capacity (Nasir et al., 2021).

According to Williams (2005), the concept of fiscal sustainability refers to the ability of governments to sustain spending on their desired purpose for their planned duration. The sustainability of healthcare finance extends beyond medicine; it is a vital component of Malaysia's economic and social sustainability. Government expenditure significantly influences economic expansion, particularly when excessive resources are directed toward the healthcare sector without a corresponding rise in productivity, thereby leading to budgetary pressures and the diversion of funds from other sectors (Azreen et al., 2022). Investment in health is not just an investment; it is also an important contributor to economic development, as a healthy population is an important contributor to a better-growing economy (Atun et al., 2025).

**Figure 1: Healthcare Fiscal Sustainability Index (HFSI) in Malaysia (1975-2024)**

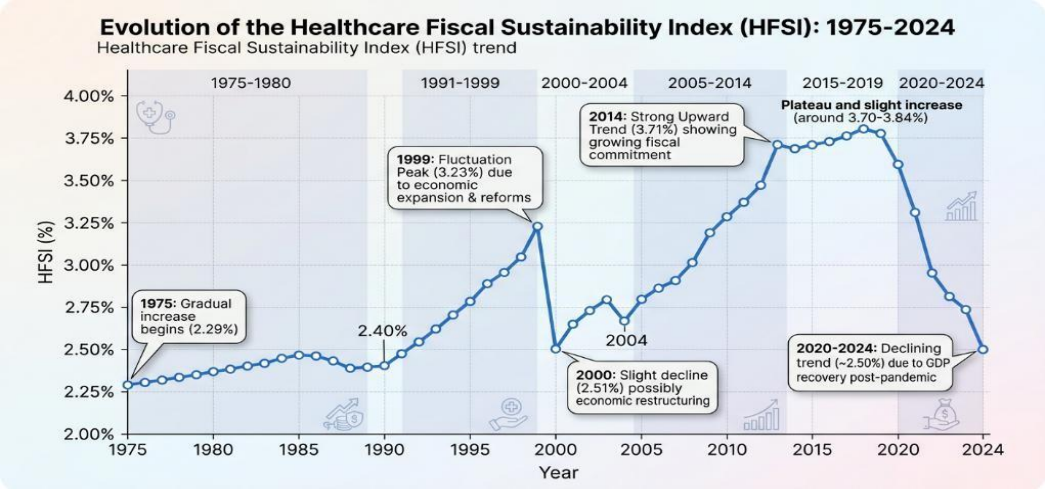



Figure 1 illustrates the trend of Healthcare Fiscal Sustainability Index (HFSI) in Malaysia between the period of 1975 to 2024. Overall, the ratio of HFSI to GDP has risen from around 2.29% in 1975 to a peak of 4.49% in 2014, fluctuated thereafter, and dropped to around 2.50% in 2024. This trend is indicative of the changing healthcare policy landscape in Malaysia, where government expenditure has increased due to various factors such as the increase in healthcare costs, demographic pressure, economic volatility, and fiscal constraints, leading to fluctuations in expenditure in recent years (Mohd et al., 2021).

This study investigates the factors affecting the Healthcare Fiscal Sustainability Index (HFSI) in Malaysia using the Healthcare Fiscal Sustainability Index over the 50 years from 1975 to 2024 and relates it to six important variables: old-age dependency ratio, real GDP growth rate, labor force participation rate, life expectancy, healthcare inflation rate, and unemployment rate. The study uses the Autoregressive Distributed Lag (ARDL) model, which is especially suitable for the time series analysis of variables with mixed orders of integration, and it helps to estimate short-run dynamic and long-run equilibrium relationships (Pesaran et al., 2001).

In spite of growing concerns over population ageing and fiscal pressures, empirical evidence on the determinants of healthcare fiscal sustainability in Malaysia remains limited. Previous literature has focused primarily on healthcare expenditure rather than fiscal sustainability, hardly integrating demographic and macroeconomic factors and their short-run and long-run effects. In addition, limited research has employed a comprehensive Healthcare Fiscal Sustainability Index (HFSI) supported by multiple theoretical viewpoints. This study addresses these gaps by examining the long-run and short-run determinants of healthcare fiscal sustainability in Malaysia using the ARDL model and providing evidence to promote sustainable healthcare financing policies.

The goal of this research is to offer empirical proof that can support proactive policies to gain equitable access to quality healthcare services and limit the stress on the rapidly shrinking working-age population. The rest of this research is organized into the following parts: The literature review and theoretical background are reviewed in part 2. The methodology is reported in part 3. The findings from part 4 are interpreted. The research closes in part 5 and provides suggestions for policy implications.

## 2. Literature Review

**Theoretical Findings:** The three theories on which this study relies are the Demographic Transition Theory, Wagner's Law, and the Fiscal Space Framework. Demographic Transition Theory describes the process of a country moving from high to low fertility and mortality rates and then on to an older population structure (Biase et al., 2022). The change is more evident in Malaysia as the country is transitioning into an aged society (Seah, 2025). The theory holds that an "old-age society" is caused by longevity and declining birth rates,

resulting in an increase in the use of healthcare services by older people compared to younger ones, threatening the fiscal sustainability of the tax-funded healthcare system (Mohd et al., 2021).

Wagner's Law, commonly referred to as the Law of Increasing State Activity, suggests that an increase in national income leads to a more than proportionate rise in public expenditure on social services relative to GDP (Nasir et al., 2021). Increased real GDP in Malaysia will result in higher expectations of quality specialist healthcare services, as healthcare will be regarded as a "superior good". This means that it is likely that the amount spent on health will also surpass the growth of the country's economic output, as in the case of Malaysia, health expenditure has been growing steadily and is projected to reach RM100.5 billion in 2026 (Azreen et al., 2022).

World Bank estimates a government's capacity to spend additional expenditure on a specific sector, e.g., health, without jeopardizing debt sustainability and macroeconomic stability. Fiscal space is not an a priori reality nor pre-ordained but depends on the Government's ability to raise revenues from a fully engaged and productive labor force (Sum & Mansor, 2025). With a shrinking tax base coupled with high public debt, the health system is more vulnerable to external shocks and demographic ageing, as projected healthcare inflation is expected to hit 16% in Malaysia by 2026 (Aon, 2026).

**Empirical Findings:** Fiscal sustainability is the capacity of governments to continue funding for a planned period at the level of spending to achieve the desired purpose (Williams, 2005). The Healthcare Fiscal Sustainability Index (HFSI) links the economy, public policies, and population health, while additional healthcare funding could reduce the resources available for other sectors, such as education and infrastructure (Tang et al., 2025). As per the literature, the increase in elderly citizens in the working population has positive impacts on healthcare expenditure (Biase et al., 2022).

Higher life expectancy is associated with increased healthcare expenditure, as longer-lived populations tend to require greater healthcare services, particularly for chronic conditions and long-term care (Cylus & Al Tayara, 2021). The "compression of morbidity" hypothesis, however, indicates that an increase in the duration of healthy life could be achieved (Atun et al., 2025). The correlation between RGDP and fiscal sustainability of healthcare is not clear-cut. Increased economic growth typically leads to an increase in tax revenues and fiscal capacity (Cornevin et al., 2024); fiscal pressure on health care systems tends to be high when the GDP grows slowly, or even negatively (Iuga et al., 2024). The higher the labor force participation rate, the more people in the workforce directly increasing the tax base of governments, which helps them to finance the cost of healthcare (Riaz et al., 2024).

The steady increase in prices paid for healthcare goods and services, known as healthcare inflation, may contribute to a misalignment of public budgets and healthcare financing. In addition, the positive and significant long-run effect of healthcare inflation indicates that rising healthcare prices contribute to higher healthcare expenditure per capita over the long run (Dunn et al., 2018; Hartman et al., 2026). Unemployment has adverse effects on government revenues as it reduces tax revenues and may increase the demand for publicly funded medical services (Azam & Yusuf, 2024).

Therefore, it is hypothesized that:
**H1:** Real GDP growth rate has a significant impact on HFSI.
**H2:** Labor force participation rate has a significant impact on HFSI
**H3:** Healthcare inflation rate has a significant impact on HFSI
**H4:** Unemployment rate has a significant impact on HFSI
**H5:** Old age dependency ratio has a significant impact on HFSI
**H6:** Life expectancy has a significant impact on HFSI.

**Literature Gap:** Although there is a large body of literature on the economic impact of demographic changes, particularly population aging, there are still gaps in the Malaysian context. While most of the literature deals primarily with the macroeconomic costs of population aging on GDP growth (Mohd et al., 2021) and fiscal decentralization (Yusof et al., 2020), there are few studies that have used an indicator of healthcare fiscal sustainability. In addition, most of the literature from the ASEAN region has researched healthcare financing

needs but not in a single model to analyze the combined effect of demographic factors and macroeconomic indicators on healthcare fiscal sustainability. This article offers a primary contribution to the literature by addressing the gaps identified in Malaysia.

Following the literature reviews summarized, this study aims to investigate the locally specific impact of demographic and macroeconomic determinants on the fiscal sustainability of Malaysian healthcare and to utilize recent data to build a model that estimates Healthcare Fiscal Sustainability in Malaysia.

## 3. Research Methodology

**Model Specification**: The theoretical framework of this study is derived from the Demographic Transition Theory, Wagner's Law, and the Fiscal Space Framework. The model was adopted from Nasir et al. (2021) and Mohd et al. (2021) and extended to comprise all six independent variables as follows:

$$HFSI_t = \propto + \beta_1 RGDP_t + \beta_2 LFPR_t + \beta_3 HCINF_t + \beta_4 UNEMP_t + \beta_5 OADR_t + \beta_6 LE_t + \varepsilon_t \quad (1)$$

where HFSI represents the dependent variable (Healthcare Fiscal Sustainability Index) and RGDP, LFPR, HCINF, UNEMP, OADR and LE represent real GDP growth rate, labor force participation rate, healthcare inflation rate, unemployment rate, old-age dependency ratio and life expectancy, respectively.

**Data Description:** The dataset consists of 50 annual observations for Malaysia covering the period from 1975 to 2024. Data were obtained from the World Bank, Department of Statistics Malaysia (DOSM), Index Mundi, and Trading Economics. Table 1 summarizes the variables, definitions, measurements, and sources.

**Table 1: List of Variables and Measurement**

| Type of Variables | Variables | Source of Data | Measurement |
|---|---|---|---|
| Dependent Variable | Healthcare Fiscal Sustainability Index (HFSI) | MoH, DOSM, World Bank | Percentage (%) |
| Independent Variable | Real GDP Growth Rate (RGDP) | World Bank | Percentage (%) |
| | Labor Force | DOSM | Percentage (%) |
| | Participation Rate (LFPR) | DOSM | Percentage (%) |
| | Healthcare Inflation Rate (HCINF) | DOSM | Percentage (%) |
| | Unemployment | Index Mundi, Trading Economics | Percentage (%) |
| | Rate (UNEMP) | World Bank | Percentage (%) |

**Unit root test:** A unit root analysis was conducted to ensure that the regression results were not affected by spurious relationships or biased inferences (Granger & Newbold, 1974). The Augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979) and the Phillips–Perron (PP) test (Phillips & Perron, 1988) were employed to establish the integration order of each variable. While the ADF test addresses serial correlation through the inclusion of lagged first-difference terms, the PP test applies a non-parametric adjustment to account for both serial correlation and heteroskedasticity.

**Auto-Regressive Distributed Lag (ARDL): The** ARDL approach was adopted to examine the relationships among the variables and address the objectives of the study, owing to several methodological considerations that support its application. First, the ARDL technique offers greater flexibility and eliminates the restriction that all time-series variables must have the same order of integration (Kuri et al., 2024), regardless of whether the regressors are integrated of order I (0) or I (1) (Pesaran & Shin, 1999), reducing uncertainty associated with pre-testing (Narayan & Narayan, 2005). Second, the ARDL approach is suitable for small sample sizes and provides more reliable estimates (Pesaran & Shin, 1999). Third, ARDL estimators produce more efficient and consistent coefficient estimates (Laurenceson & Chai, 2003), and the ARDL framework effectively represents the data-generating process through a general-to-specific modelling approach by employing a sufficient number of lags.

The unrestricted error correction representation (UECM) of the ARDL model is specified as:

$$\Delta HFSI_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta HFSI_{t-i} + \sum_{i=0}^{q} \beta_2 \Delta RGDP_{t-i} + \sum_{i=0}^{q} \beta_3 \Delta LFPR_{t-i} + \sum_{i=0}^{q} \beta_4 \Delta HCINF_{t-i} + \sum_{i=0}^{q} \beta_5 \Delta UNEMP_{t-i} + \sum_{i=0}^{q} \beta_6 \Delta OADR_{t-i} + \sum_{i=0}^{q} \beta_7 \Delta LE_{t-i} + \delta_1 \Delta HFSI_{t-1} + \delta_2 \Delta RGDP_{t-1} + \delta_3 \Delta LFPR_{t-1} + \delta_4 \Delta HCINF_{t-1} + \delta_5 \Delta UNEMP_{t-1} + \delta_6 \Delta OADR_{t-1} + \delta_7 \Delta LE_{t-1} + \varepsilon_t \quad (2)$$

where,

- Δ denotes the first-difference operator.
- $p, q$ captures the optimal lag length.
- The lagged level variables ($X_{t-1}$) capture the long-run relationship and are jointly tested using the Bounds Test for cointegration.
- $\varepsilon_t$ is the white-noise error term.

The calculated F-statistic is used to determine the existence of a long-run relationship by comparing it with the lower and upper bound critical values. If the F-statistic exceeds the upper critical bound, the hypothesis of non-cointegration is rejected (Pesaran et al., 2001). After establishing cointegration, the short-run dynamics are investigated by adding the error correction term (ECT) to the model:

$$\Delta HFSI_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta HFSI_{t-i} + \sum_{i=0}^{q} \beta_2 \Delta RGDP_{t-i} + \sum_{i=0}^{q} \beta_3 \Delta LFPR_{t-i} + \sum_{i=0}^{q} \beta_4 \Delta HCINF_{t-i} + \sum_{i=0}^{q} \beta_5 \Delta UNEMP_{t-i} + \sum_{i=0}^{q} \beta_6 \Delta OADR_{t-i} + \sum_{i=0}^{q} \beta_7 \Delta LE_{t-i} + \propto ECT_{t-1} + \varepsilon_t \quad (3)$$

where,

- $ECT_{t-1}$ represents the error correction term derived from the long-run cointegrating relationship.
- $\propto$ denotes the coefficient of the error correction term

**Diagnostic assessment:** The ARDL model undergoes several diagnostic tests to assess its adequacy and ensure that the estimated specification is reliable. The Jarque–Bera test is employed to determine whether the residuals are normally distributed, while the Breusch–Godfrey LM test is used to detect serial correlation. To test for heteroscedasticity and non-constant variance in the residuals, the Breusch-Pagan-Godfrey test is used. The Ramsey RESET test (Regression Equation Specification Error Test) is employed to check whether the model is correctly specified.

## 4. Result and Discussion

This part clarifies the empirical results on the relationship between macroeconomic and demographic factors and the healthcare fiscal sustainability index (HFSI) in Malaysia. The analysis consists of unit root tests, bound assessment, long-run and short-run cointegration, and diagnostic tests.

**Unit Root Test**: Table 2 displays the results of the ADF and PP unit root tests. The findings show a combination of stationary and non-stationary variables. HFSI, LFPR, OADR, and LE are integrated of order one [I(1)], while RGDP, HCINF, and UNEMP are integrated of order zero [I(0)] and order one [I(1)]. The absence of variables integrated of order two [I(2)] satisfies the main condition for the application of the ARDL bounds assessment approach (Pesaran et al., 2001).

**Table 2: Unit root test results**

| | | ADF | | PP | | Order of Integration |
|---|---|---|---|---|---|---|
| **Variables** | | Level | First Order Difference | Level | First Order Difference | |
| **HFSI** | Intercept | 0.357 | -7.049*** | 0.111 | -7.712*** | I(1) |
| | Intercept with trend | -2.084 | -7.090*** | -1.761 | -8.012*** | I(1) |
| **RGDP** | Intercept | -5.914*** | -9.076*** | -5.920*** | -30.74*** | I(0) |
| | Intercept with trend | -6.523*** | -8.977*** | -6.523*** | -32.58*** | I(0) |
| **LFPR** | Intercept | -0.627 | -2.838* | -0.658 | -7.539*** | I(1) |
| | Intercept with trend | -1.107 | -3.394* | -1.008 | -7.811*** | I(1) |
| **HCINF** | Intercept | -4.659*** | -12.88*** | -4.866*** | -13.22*** | I(0) |
| | Intercept with trend | -4.404*** | -12.74*** | -5.775*** | -13.08*** | I(0) |
| **UNEMP** | Intercept | -2.781* | -4.673*** | -2.085 | -4.276*** | I(0) |
| | Intercept with trend | -2.931 | -4.436*** | -2.204 | -4.208*** | I(1) |
| **OADR** | Intercept | 5.286 | -3.592*** | 4.483 | -3.417*** | I(1) |
| | Intercept with trend | 0.702 | -6.108*** | 0.700 | -6.080*** | I(1) |
| **LE** | Intercept | -2.167 | -1.665 | -5.276*** | -1.665 | I(0) |
| | Intercept with trend | -3.184* | -2.392 | -3.290* | -2.497 | I(0) |

Note: ***,**, * denote the rejection of the null hypothesis at the 1%, 5%, and 10% levels, respectively. The optimal lag length is chosen automatically by applying the Schwarz Information Criterion (SIC) for the ADF test, and the bandwidth is chosen by applying the Newey-West and user-specified methods for the PP unit root test.

**Bound assessment and long-run co-integration:** Table 3 reports the results of the ARDL bounds test for cointegration. The calculated F-statistic for the healthcare fiscal sustainability model is 5.35, which exceeds the upper-bound critical values of 3.22, 3.71, and 4.88 at the 10%, 5%, and 1% significance levels, respectively. Hence, the null hypothesis of no cointegration among the variables is rejected, indicating the existence of a long-run equilibrium relationship between the healthcare fiscal sustainability index (HFSI) and its explanatory variables, namely RGDP, LFPR, HCINF, UNEMP, OADR, and LE, in Malaysia over the period 1975–2024.

**Table 3: Bound assessment**

| Test Statistic | Value | k |
|---|---|---|
| **F-statistic** | 5.35*** | 6 |
| **Significance** | Lower 1(0) | Upper 1(1) |
| **10%** | 2.17 | 3.22 |
| **5%** | 2.55 | 3.71 |
| **1%** | 3.42 | 4.88 |

This finding provides a theoretical foundation for examining both long-run and short-run dynamics and facilitates the development of an Error Correction Model (ECM) to analyze the adjustment process following short-run deviations from long-run equilibrium. Thus, given the significant result of the bound assessment in Table 3, further evaluation was extended to long-run and short-run cointegration, as exhibited in Table 4.

**Table 4: ARDL Long-run and short-run**

| Variables | Long-run | Short-run |
|---|---|---|
| **RGDP** | 0.0358*** (0.0162) | |
| **LFPR** | -0.0183 (0.0356) | |
| **HCINF** | 0.0489* (0.0263) | |
| **UNEMP** | 0.0823* (0.0450) | |
| **OADR** | 0.2481*** (0.0675) | |
| **LE** | 0.0596** (0.0262) | |
| **D (RGDP)** | | -0.0141* (0.0081) |
| **D (LFPR)** | | 0.0136 (0.0267) |
| **D (HCINF)** | | 0.0187 (0.0150) |
| **D (UNEMP)** | | 0.0613* (0.0359) |
| **D (OADR)** | | 0.1849*** (0.0532) |
| **D (LE)** | | 0.0444* (0.0226) |
| **ECT (Speed Adjustment)** | | -0.7452*** (0.1396) |
| **Constant** | | -4.4446 (2.9810) |
| **R-squared** | 0.9137 | |

Note: *, p < 0.1, **, p< 0.05, and *** p < 0.01. Standard errors are presented in parentheses.

**Diagnostic assessment:** Table 5 presents the necessary diagnostic tests for the reliability and accuracy of the dynamic ARDL methods' estimated equation. The diagnostic test results display a normal distribution of residuals; the functional form is linear, proving the absence of serial correlation and heteroskedasticity issues.

**Table 5: Diagnostic assessment results**

| Diagnose tests | Null hypothesis | Chi-Square |
|---|---|---|
| **Jarque-Bera test** | $H_0$: The residuals have a normal distribution | 0.8455 |
| **Lagrange Multiplier test** | $H_0$: There is no autocorrelation | 0.6064 |
| **Breusch-Pagan-Godfrey** | $H_0$: There is no heteroskedasticity | 0.3192 |
| **Ramsey RESET test** | $H_0$: Functional form is linear | 0.8858 |

**Discussion**

The long-run results show that the most relevant positive determinant of the Healthcare Fiscal Sustainability Index (HFSI) at the 1% level is the Old Age Dependency Ratio (OADR), thus demonstrating that the main driver of healthcare expenditure as a percentage of GDP is demographic ageing. This discovery is consistent with the Demographic Transition Theory, which posits that ageing populations create more fiscal stress on healthcare systems (Biase et al., 2022). Both Life Expectancy (LE) and the long-run effect show significant positive effects, and short-run effects are marginally significant, supporting the "compression of morbidity" hypothesis (Atun et al., 2025).

However, Real GDP Growth Rate (RGDP) has a significant positive long-run relationship with HFSI, which is consistent with Wagner's Law, suggesting that economic growth leads to an increase in healthcare expenditure as a proportion of GDP (Nasir et al., 2021). The positive marginal long-run effect of the healthcare inflation rate (HCINF) indicates that the cost-pressure level has a positive impact on healthcare spending per capita in the long run (OECD, 2025). The Fiscal Space Framework (Azam & Yusuf, 2024) is partly supported by the Unemployment Rate (UNEMP), which shows a positive marginal effect both in the long run and the short run. Labor Force Participation Rate (LFPR) is not particularly meaningful in either period, probably because of structural problems like the existence of low-paid or informal workers (Cylus & Al Tayara, 2021).

The results show that the short-run dynamics of the factors involved suggest that demographic ageing has the highest positive and significant impact at the 1% level, thus reinforcing the argument that demographic ageing is a factor that also affects healthcare spending in the short term. D(LE) and D(UNEMP) have a slight positive marginal effect at the 10% level, and D(RGDP) has a negative marginal effect at the 10% level. D(LFPR) and D(HCINF) are negligible, underscoring that the influence of these two parameters on healthcare fiscal sustainability is negligible.

The Error Correction Term (ECT) is negative and statistically significant at the 1% level, which validates the stability of the long-run relationship between the variables (Engle & Granger, 1987). The ECT coefficient shows that around 74.5% of the short-run disequilibrium may be resolved in one year, suggesting a relatively quick rate of correction towards long-run equilibrium. This R-squared of 0.9137 shows that 91.37% of the variation in HFSI is explained by the model, which has high explanatory power (Brooks, 2023). In general, demographic variables, especially OADR and LE, are significant and dominant determinants of the fiscal sustainability of healthcare in Malaysia, whereas the other macroeconomic variables like RGDP and UNEMP play important but less dominant roles.

## 5. Conclusion and Recommendations

The factors affecting healthcare fiscal sustainability in Malaysia are explored in this paper and the Healthcare Fiscal Sustainability Index (HFSI) in Malaysia is analyzed for the years 1975-2024. This study combines the analysis of demographic and macroeconomic determinants in one empirical framework to help better understand the key drivers that affect healthcare fiscal sustainability performance in Malaysia. The empirical results show that the OADR, LE, RGDP, and UNEMP have significant long-run impacts on the HFSI. The results indicate that both demographic and macroeconomic factors are significant, with OADR and LE, and RGDP and UNEMP, being significant in determining the fiscal sustainability of healthcare in Malaysia.

From the policy implication standpoint, the positive relationship between OADR and HFSI implies that the Malaysian government should enhance fiscal space through structural measures such as gradually adopting a hybrid financing system in healthcare to meet the demand for healthcare services resulting from demographic ageing. The association of LE with HFSI suggests that further investments in health outcomes are needed through the public health system and primary healthcare. However, measures to control costs and value-based care plans are vital to ensure sustainability of healthcare spending when life expectancy is being extended.

The positive impact of RGDP on HFSI suggests that the Malaysian government should leverage economic growth to strengthen sustainable healthcare financing and increase investment in preventive and primary healthcare. It should also improve healthcare spending efficiency and cost-effectiveness to ensure that rising healthcare expenditure remains fiscally sustainable. In the meantime, the positive and weakly significant result for UNEMP indicates that better economic policy instruments should be implemented to encourage sustainable economic growth, better labor market performance, and lower structural unemployment, which would also have a positive effect on the fiscal capacity for financing health care.

Although this research study has made contributions, there are some limitations. The analysis is limited to a few macroeconomic and demographic variables and excludes variables like government debt levels, out-of-pocket healthcare expenditure, technological advancements in the healthcare sector, or policy changes in healthcare financing. This study would be continued if more variables were added to the study, and if it were to be compared with other countries in the ASEAN group, it would be possible. This extension would provide a better insight into the interaction between economic conditions, demographic change, and healthcare fiscal sustainability. Overall, this paper can be added to the current literature on health economics as it proves the utmost importance of both macroeconomic and demographic factors in shaping healthcare fiscal sustainability in Malaysia.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Understanding Migrant Workers' Intention to Re-Enter Malaysia for Employment: The Mediating Effect of Acculturation on the Relationship Between Work Conditions, Workplace Discrimination and the Intention to Re-Enter

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**Abstract:** The purpose of this study is to determine the mediating effect of acculturation on the relationship between workplace discrimination and work conditions and migrant workers' intention to re-enter Malaysia for employment. A quantitative cross-sectional survey design was employed using a non-probability sampling approach that combined quota and convenience sampling. Data were collected through a multilingual online questionnaire using LimeSurvey from 432 migrant workers employed in the agriculture, manufacturing, construction, and service sectors in Selangor. The data were analyzed using descriptive statistics, reliability analysis, exploratory factor analysis, Pearson product-moment correlation, multiple regression, and PROCESS Model 4 with percentile bootstrapping. The results showed that favorable work conditions significantly increased migrant workers' intention to re-enter Malaysia for employment, whereas workplace discrimination significantly reduced their intention to return. Acculturation did not significantly predict migrant workers' intention to re-enter Malaysia after controlling for work conditions and workplace discrimination. The indirect effects of work conditions and workplace discrimination through acculturation were also not statistically significant. Therefore, acculturation did not mediate either relationship, suggesting that workplace experiences were more influential than cultural adaptation in explaining migrant workers' future employment intentions. The study contributes to migrant worker retention research and recommends that employers and policymakers prioritize decent work conditions, fair treatment, and effective anti-discrimination practices to strengthen migrant workers' willingness to return to Malaysia for employment.

**Keywords**: *Migrant workers, intention to re-enter, work conditions, workplace discrimination, acculturation, Malaysia.*

## 1. Introduction and Background

Low-skilled foreign workers in Malaysia are mostly migrants with limited formal education and are commonly employed in labor-intensive sectors such as agriculture, construction, manufacturing, and services (A. J. Wei et al., 2018). Malaysia remains an important destination because migrant workers respond to limited economic opportunities in their home countries and to the continuing demand for flexible labor in the host economy (Anggara et al., 2024; A.J. Wei et al., 2018). The present study focuses on workers' intention to re-enter Malaysia for future employment after completing their current employment period or returning to their home countries. This focus reflects the temporary labor-migration cycle in which employment abroad may be followed by return and subsequent re-migration for employment (Sen et al., 2023; Wickramasekara, 2019).

Migrant workers' current employment experiences provide information about the conditions they are likely to encounter if they return. Fair wages, manageable workloads, safe workplaces, suitable accommodation, social protection, and respectful employer treatment may strengthen a favorable evaluation of Malaysia as a future employment destination (Wahab & Hamidi, 2022; Y. Wei et al., 2024). In contrast, workplace discrimination may involve exclusion, stigmatization, unequal treatment, threats, or aggression and can reduce trust, psychological safety, and willingness to maintain future employment ties with the host country (Brondolo et al., 2005; Piccinelli et al., 2024).

Acculturation may also be relevant because migrant workers adapt to the language, media, social relations, and everyday environment of the host country. Positive workplace experiences may provide opportunities for communication, cultural learning, and social interaction, whereas negative experiences may limit these

opportunities (Enh et al., 2024; Zaini et al., 2025). Nevertheless, cultural adaptation should not be assumed to explain future employment decisions, as practical workplace factors may have a more immediate influence on whether workers choose to return to Malaysia.

Acknowledging the complex relationship between these variables, the study sought to determine the influence of work conditions and workplace discrimination on migrant workers' intention to re-enter Malaysia for employment. It also examined whether acculturation mediates the relationship between work conditions and intention to re-enter Malaysia and whether acculturation mediates the relationship between workplace discrimination and intention to re-enter Malaysia.

This study is significant because it examines workplace experiences, cultural adaptation, and future migration intention within one research framework. The findings provide evidence on whether decent work and non-discriminatory employment experiences can influence migrant workers' willingness to choose Malaysia again after the present employment cycle. The study also extends the discussion beyond intention to stay by focusing specifically on future legal re-entry for employment.

## 2. Literature Review

### *Intention to Re-enter Malaysia for Employment*

Intention to re-enter Malaysia refers to migrant workers' conscious willingness, expectation, and plan to return to Malaysia for another period of legal employment after leaving the country or completing their current employment contracts. It is a future behavioral intention rather than an intention to extend the present permit or remain permanently. The Theory of Planned Behavior explains that behavioral intention reflects the motivational readiness to perform a future behavior and may be influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991, 2020). Migrant workers may therefore evaluate employment stability, recruitment expenses, workloads, accommodation, welfare benefits, employer treatment, occupational safety, social relationships, and career opportunities when considering another employment cycle (Y. Wei et al., 2024; Yimsook & Theerakosonphong, 2026).

### *Work Conditions*

Work conditions refer to the physical, economic, psychological, social, legal and organizational circumstances under which employees perform their work. The Decent Work Questionnaire conceptualizes work conditions through seven dimensions: fundamental principles and values at work, adequate working time and workload, fulfilling and productive work, meaningful remuneration, social protection, opportunities, and health and safety (Ferraro et al., 2018; Sbaa et al., 2025). Favorable work conditions may strengthen migrant workers' confidence that another employment period would be safe, manageable, and economically beneficial. Conversely, unpaid wages, excessive working hours, unsafe employment, poor accommodation, or limited access to remedies may discourage future re-entry (Wahab & Hamidi, 2022; Yotwilai, 2025). Based on the findings of these studies, the following hypothesis was developed:

**H1:** Work Conditions have a significant and positive influence on intention to re-enter Malaysia for employment.

### *Workplace Discrimination*

Workplace discrimination may involve cumulative exposure to exclusion or rejection, stigmatization or devaluation, discrimination in formal organizational settings, and threat or aggression (Brondolo et al., 2005; Chin et al., 2020). Migrant workers may be especially vulnerable when income, accommodation, documentation and legal status are linked to employers. Repeated discriminatory experiences can reduce psychological well-being, trust, job satisfaction and a sense of acceptance, and may provide workers with negative information about the risks associated with another migration cycle (Di Napoli et al., 2021; Piccinelli et al., 2024). Based on these relationships, the following hypothesis was developed:

**H2:** Workplace Discrimination has a significant and negative influence on intention to re-enter Malaysia for employment.

### *Acculturation*

Acculturation describes the psychological, social, and cultural adjustment that occurs through sustained

contact with a host society. In this study, acculturation is represented through language use, media use, and ethnic social relations (Park et al., 2021; Zaini et al., 2025). The workplace is one of the main environments in which migrant workers communicate with members of the host society, obtain information, and develop social relationships. Supportive working conditions may therefore facilitate acculturation, whereas discrimination may hinder social interaction and a sense of belonging (Enh et al., 2024; Piccinelli et al., 2024). Because cultural familiarity may reduce uncertainty associated with future employment, the following mediation hypotheses were developed:

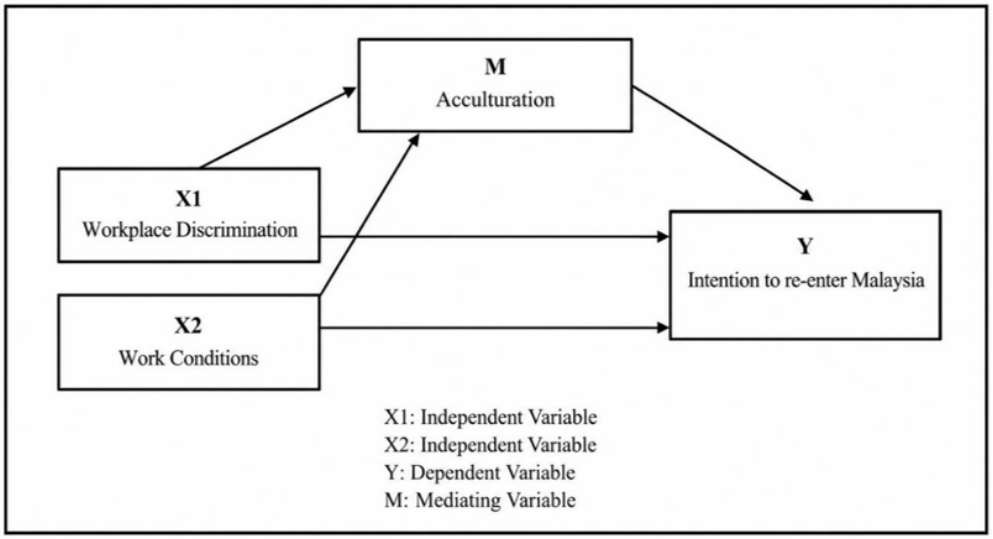
**H3**: Acculturation mediates the relationship between work conditions and intention to re-enter Malaysia for employment.

**H4:** Acculturation mediates the relationship between workplace discrimination and intention to re-enter Malaysia for employment.

**Conceptual Framework**

The current research framework, shown in Figure 1, comprises workplace discrimination and work conditions as independent variables, acculturation as a mediating variable, and intention to re-enter Malaysia as the dependent variable.

**Figure 1: Diagrammatic presentation of the current study's conceptual framework**




## 3. Research Methodology

***Research Design***

This study employed a quantitative, cross-sectional, correlational survey design among legally employed migrant workers in the agriculture, manufacturing, construction, and service sectors in Selangor. The unit of analysis was the individual migrant worker. A non-probability sampling approach combining quota and convenience sampling was used because no complete, accessible sampling frame of low-skilled migrant workers was available and access depended on employers, worker representatives, community contacts, and voluntary participation. Data were collected through a structured multilingual online questionnaire administered using LimeSurvey.

The questionnaire was made available in English, Malay, Bengali, Urdu, Indonesian, Nepali, Hindi, and Burmese to reduce language barriers. Respondents were recruited from the selected sectors based on accessibility, suitability, and willingness to participate. A total of 432 questionnaires were collected, and all were usable for analysis.

***Survey Instrument***

Section A collected socio-demographic information including gender, age, nationality, occupational sector, length of employment in Malaysia, and estimated monthly income. Section B measured work conditions using 31 items from the Decent Work Questionnaire (DWQ) developed by Ferraro et al. (2018), covering seven dimensions of decent work. Section C measured workplace discrimination using 17 items from the Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ-CV) based on Brondolo et al. (2005).

Section D measured acculturation using the Short Acculturation Scale (SAS), comprising language use, media use, and ethnic social relations. The questionnaire contained 27 acculturation items after the sub-items were expanded for administration. Section E measured intention to re-enter Malaysia through a behavioral intention scale consisting of five items assessing intention, planning, willingness, choice, and likelihood of returning for employment. Exploratory factor analysis later supported this five-item unidimensional scale, indicating satisfactory validity.

***Data Analysis***

Descriptive statistics were used to analyze demographic data and the main study variables. Skewness and kurtosis were examined to evaluate normality, and Cronbach's alpha coefficients were calculated to assess reliability. Exploratory factor analysis was conducted for the newly developed intention-to-re-enter measure. Pearson product-moment correlation was used to examine bivariate relationships among the study variables, followed by multiple regression to estimate the unique contribution of work conditions, workplace discrimination, and acculturation to intention to re-enter Malaysia.

Mediation analyses were conducted using the PROCESS macro (Version 5.0) for SPSS, Model 4 (Hayes, 2022), with 10,000 percentile bootstrap samples and 95% confidence intervals. In the work-conditions mediation model, workplace discrimination was controlled as a covariate. In the workplace-discrimination mediation model, work conditions were controlled. An indirect effect was considered statistically significant when its bootstrap confidence interval did not include zero.

## 4. Results

**Demographic Profile Analysis:** A total of 432 respondents participated in this study. Male respondents accounted for 80.6% (n = 348), while female respondents accounted for 19.4% (*n* = 84). The largest age group was 36-40 years old (35.0%), followed by 31-35 years old (31.7%). Bangladesh was the largest country-of-origin group (34.5%), followed by Indonesia (20.6%). Respondents were distributed across construction (27.5%), services (25.2%), manufacturing (24.8%), and agriculture (22.5%). Most respondents had worked in Malaysia for two to five years (46.3%), while the largest salary group earned RM1701-RM2500 (45.4%). Table 1 summarizes the demographic profile of respondents.

**Table 1: Demographic profile of respondents (*N* = 432)**

| Baseline Characteristics | *n* | % |
|---|---|---|
| Gender | | |
| Male | 348 | 80.6 |
| Female | 84 | 19.4 |
| Age | | |
| < 25 | 92 | 21.3 |
| 25-30 | 41 | 9.5 |
| 31-35 | 137 | 31.7 |
| 36-40 | 151 | 35.0 |
| 41-45 | 11 | 2.5 |
| Country of Origin | | |
| Myanmar | 64 | 14.8 |
| Pakistan | 40 | 9.3 |
| Bangladesh | 149 | 34.5 |
| Indonesia | 89 | 20.6 |
| Nepal | 48 | 11.1 |

| Baseline Characteristics | *n* | % |
|---|---|---|
| India | 42 | 9.7 |
| Working Sector | | |
| Agriculture | 97 | 22.5 |
| Manufacturing | 107 | 24.8 |
| Construction | 119 | 27.5 |
| Services | 109 | 25.2 |
| Years working in Malaysia | | |
| < 2 years | 89 | 20.6 |
| 2-5 years | 200 | 46.3 |
| 6-8 years | 106 | 24.5 |
| > 8 years | 37 | 8.6 |
| Salary | | |
| < RM1700 | 99 | 22.9 |
| RM1701-RM2500 | 196 | 45.4 |
| RM2501-RM3300 | 133 | 30.8 |
| RM3301-RM4100 | 4 | 0.9 |

**Descriptive Analysis:** Table 2 shows the mean, standard deviation, skewness, kurtosis, and reliability coefficients for the study variables. Intention to re-enter Malaysia recorded the highest mean ($M$ = 5.78, $SD$ = 1.12). Work conditions recorded $M$ = 3.65 ($SD$ = 0.93), workplace discrimination recorded $M$ = 1.83 ($SD$ = 0.72), and acculturation recorded $M$ = 2.49 ($SD$ = 0.50). All skewness and kurtosis values were within the recommended ranges used in the study, indicating approximate normality. Cronbach's alpha values ranged from .89 to .99, demonstrating good to excellent internal consistency.

**Table 2: Results of descriptive analysis**

| Variable | *M* | *SD* | Skewness | Kurtosis | α |
|---|---|---|---|---|---|
| Intention to re-enter | 5.78 | 1.12 | -0.68 | -0.37 | .97 |
| Work Condition | 3.65 | 0.93 | 0.12 | -1.20 | .99 |
| Work Discrimination | 1.83 | 0.72 | 0.62 | 0.35 | .97 |
| Acculturation | 2.49 | 0.50 | 0.35 | -0.69 | .89 |

*Note: N = 432*

**Correlational Analysis:** Pearson product-moment correlation analysis (Table 3) showed that all relationships were statistically significant at $p < .001$. Intention to re-enter Malaysia was positively associated with work conditions ($r$ = 0.60) and acculturation ($r$ = 0.35), while workplace discrimination was negatively related to intention to re-enter ($r$ = -0.49). Work conditions were negatively related to workplace discrimination ($r$ = -0.61) and positively related to acculturation ($r$ = 0.57). Workplace discrimination was negatively associated with acculturation ($r$ = -0.30).

**Table 3: Correlation analysis results**

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| Intention to re-enter | 5.78 | 1.12 | - | | | |
| Work Condition | 3.65 | 0.93 | 0.60*** | - | | |
| Work Discrimination | 1.83 | 0.72 | -0.49*** | -0.61*** | - | |
| Acculturation | 2.49 | 0.50 | 0.35*** | 0.57*** | -0.30*** | - |

**p<.05; **p<.01; ***p<.001*

**Multiple Linear Regression Analysis**: Table 4 presents the regression results. The overall model was statistically significant, $F$ (3, 428) = 89.73, $p < .001$, and explained approximately 39% of the variance in intention to re-enter Malaysia ($R^2$ = .39; adjusted $R^2$ = .38). Work conditions had a significant positive influence on intention to re-enter Malaysia (B = 0.57, SE = .07, β = .47, $t$ = 8.42, $p < .001$), supporting H1. Workplace discrimination had a significant negative influence (B = -0.30, SE = .07, β = -.19, $t$ = -4.07, $p < .001$), supporting H2. Acculturation did not independently predict intention to re-enter after the workplace variables were

controlled (B = 0.05, SE = .11, β = .02, $t$ = .49, $p$ = .626). Cohen's $f^2$ of .63 indicated a large overall effect size, while Root MSE was .88.

**Table 4**: **Results of the multiple linear regression analysis**

| DV: Intention to re-enter | B | SE | β | *t* | *p* |
|---|---|---|---|---|---|
| (Constant) | 4.13 | .34 | | 12.15 | <.001 |
| Work Condition | 0.57 | .07 | .47 | 8.42 | <.001 |
| Work Discrimination | -0.30 | .07 | -.19 | -4.07 | <.001 |
| Acculturation | 0.05 | .11 | .02 | .49 | .626 |
| Overall model fit | | | | | |
| $F$ (3, 428) | 89.73 | | | | <.001 |
| $R^2$ | .39 | | | | |
| Adjusted $R^2$ | .38 | | | | |
| Cohen $f^2$ | .63 | | | | |
| Root MSE | .88 | | | | |

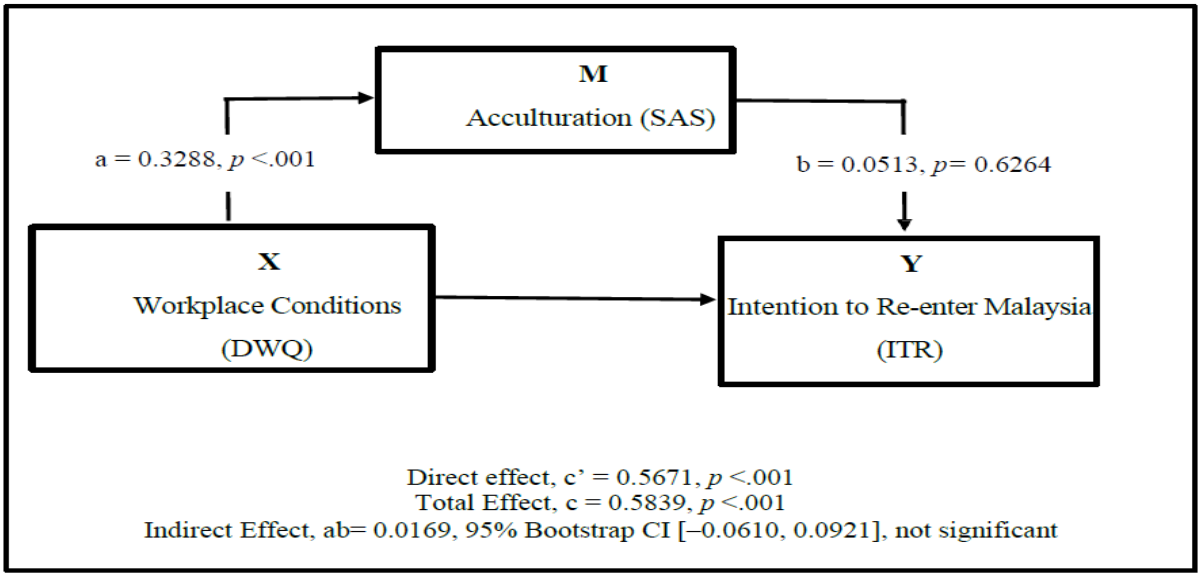
**Mediation Analysis**: The first mediation analysis showed that work conditions significantly predicted acculturation (B = 0.3288, *SE* = 0.0265, β = 0.6180, $t$ = 12.4011, $p$ < .001). As shown in Table 5, Acculturation did not significantly predict intention to re-enter Malaysia (B = 0.0513, *SE* = 0.1052, β = 0.0213, $t$ = 0.4872, $p$ = .6264). Work conditions had a significant total effect (B = 0.5839, $p$ < .001) and a significant direct effect (B = 0.5671, $p$ < .001). The indirect effect through acculturation was 0.0169, BootSE = 0.0390, with a 95% bootstrap CI [-0.0610, 0.0921]. Because the interval included zero, H3 was not supported. Figure 2 illustrates the relationship between and among variables.

**Table 5: Mediation analysis of SAS on the relationship between DWQ and ITR**

| Effect | B | SEB | β | *t* | *p* |
|---|---|---|---|---|---|
| a: DWQ → SAS | 0.3288 | 0.0265 | 0.6180 | 12.401 | <.001 |
| b: SAS → ITR | 0.0513 | 0.1052 | 0.0213 | 0.487 | 0.626 |
| c (total): DWQ → ITR | 0.5839 | 0.0577 | 0.4834 | 10.114 | <.001 |
| c' (direct): DWQ → ITR | 0.5671 | 0.0673 | 0.4694 | 8.419 | <.001 |
| ab (indirect): DWQ → SAS → ITR | 0.0169 | 0.0390 | Bootstrap 95% CI [-0.0610, 0.0921] | | |

*Note: Workplace discrimination was controlled as a covariate.*
*Abbreviations: DWQ = Work Conditions; SAS = Acculturation; ITR = Intention to Re-enter.*

**Figure 2: Diagrammatic presentation of the mediation analysis result depicting Acculturation as a mediator (M) between Work Conditions (X) and Intention to Re-enter Malaysia (Y), while adjusting for**



**workplace discrimination as a covariate**

The second mediation analysis showed that workplace discrimination did not significantly predict acculturation (B = 0.0501, SE = 0.0340, β = 0.0733, $t$ = 1.4714, $p$ = .1419). As summarized in Table 6, Acculturation again did not significantly predict intention to re-enter Malaysia. Workplace discrimination had a significant negative total effect (B = -0.3004, $p$ < .001) and direct effect (B = -0.3030, $p$ < .001). The indirect effect was 0.0026, BootSE = 0.0073, with a 95% bootstrap CI [-0.0125, 0.0187]. Since the interval included zero, H4 was not supported. The relationship of variables is illustrated in Figure 3.

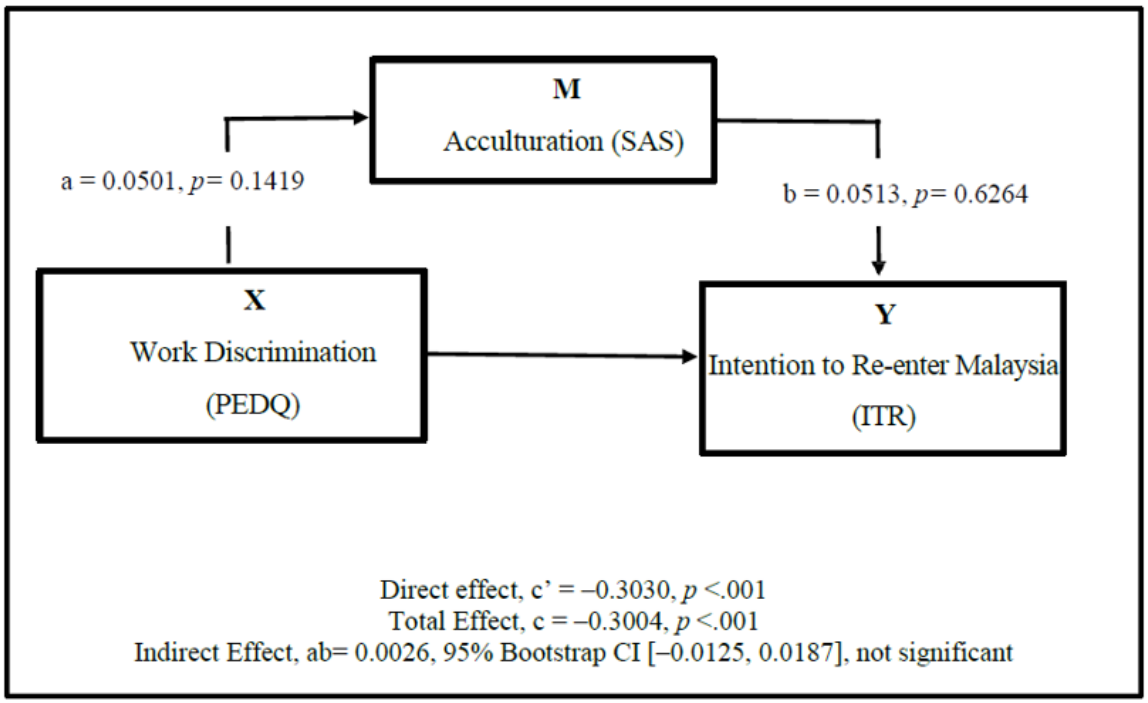
**Table 6: Mediation analysis of SAS on the relationship between PEDQ and ITR**

| Effect | B | SEB | β | *t* | *p* |
|---|---|---|---|---|---|
| a: PEDQ → SAS | 0.0501 | 0.0340 | 0.0733 | 1.471 | 0.1419 |
| b: SAS → ITR | 0.0513 | 0.1052 | 0.0213 | 0.487 | 0.6264 |
| c (total): PEDQ → ITR | -0.3004 | 0.0741 | -0.194 | -4.053 | <.001 |
| c' (direct): PEDQ → ITR | -0.3030 | 0.0744 | -0.195 | -4.074 | <.001 |
| ab (indirect): PEDQ → SAS → ITR | 0.0026 | 0.0073 | Bootstrap 95% CI [-0.0125, 0.0187] | | |

*Note: Work conditions were controlled as a covariate.*

*Abbreviations: PEDQ = Workplace Discrimination; SAS = Acculturation; ITR = Intention to Re-enter.*

**Figure 3: Diagrammatic presentation of mediation analysis results depicting Acculturation as a mediator (M) between Workplace Discrimination (X) and Intention to Re-enter Malaysia (Y), while adjusting for work conditions as a covariate**




**Discussion**

The primary objectives of this study were to examine the influence of work conditions and workplace discrimination on migrant workers' intention to re-enter Malaysia for employment and to determine whether acculturation mediates these relationships. The study was conducted among 432 migrant workers employed in agriculture, manufacturing, construction, and services in Selangor.

The findings showed a significant and positive influence of work conditions on intention to re-enter Malaysia (β = .47, $p$ < .001), supporting H1. This means that when migrant workers perceive their work conditions as better, their willingness to choose Malaysia again for employment increases. The result is consistent with the multidimensional concept of decent work, in which workers evaluate fundamental principles and values at

work, working time and workload, productive work, remuneration, social protection, opportunities, and health and safety (Ferraro et al., 2018; Sbaa et al., 2025). It also supports the Theory of Planned Behavior because favorable employment experiences may contribute to a positive evaluation of returning to Malaysia and increase confidence that another employment period would be manageable (Ajzen, 1991).

The result is consistent with previous research showing that employment quality, stability, income, housing, work experiences and social integration are relevant to future mobility decisions (Wahab & Hamidi, 2022; Y. Wei et al., 2024). For migrant workers, acceptable salary alone may not be sufficient when employment is associated with excessive workloads, unsafe workplaces, poor accommodation, limited social protection or unfair employer treatment. Therefore, improving the overall quality of work conditions may strengthen Malaysia's attractiveness as a repeat-migration destination.

Workplace discrimination had a significant negative influence on intention to re-enter Malaysia ($\beta = -.19$, $p < .001$), supporting H2. This finding indicates that unfair treatment, exclusion, stigmatization, unequal opportunities, threat, or harassment can discourage migrant workers from returning. The result is aligned with research showing that discrimination can reduce psychological well-being, trust, and a sense of belonging and can shape migrants' future mobility decisions (Di Napoli et al., 2021; Piccinelli et al., 2024; Yimsook & Theerakosonphong, 2026). From the perspective of the Theory of Planned Behavior, discriminatory experiences may make attitudes toward re-entry less favorable and may reduce perceived control when workers believe they cannot protect themselves or obtain effective remedies.

Examining the mediating role of acculturation, H3 and H4 were not supported. For H3, work conditions significantly predicted acculturation, but acculturation did not significantly predict intention to re-enter, and the bootstrap confidence interval for the indirect effect included zero. This suggests that better work conditions may help migrant workers adjust socially and culturally, but the adjustment did not become the mechanism explaining their intention to return. Migrant workers may place greater weight on practical employment considerations such as job security, income, permit arrangements, employer support, and workplace safety than on cultural adaptation alone.

For H4, workplace discrimination did not significantly predict acculturation, and acculturation did not significantly predict re-entry intention. The indirect effect was therefore not significant. Although previous literature suggests that discrimination can affect psychological acculturation (Piccinelli et al., 2024), the current result indicates that workplace discrimination may have a more immediate direct effect on re-entry intention. A migrant worker may continue to use Malaysian languages, access local media, or maintain social relationships while simultaneously experiencing unequal treatment from an employer or supervisor. Thus, discrimination does not necessarily produce a corresponding change across all dimensions of acculturation.

Overall, the findings show that direct workplace experiences were more influential than cultural and social adjustment in explaining migrant workers' future employment intentions. This does not mean that acculturation is unimportant to daily adjustment. Instead, it indicates that when workers decide whether to choose Malaysia again, decent work and non-discriminatory treatment may be more decisive than language use, media use, and ethnic social relations.

## 5. Managerial Implications and Recommendations

Employers and policymakers should place greater emphasis on decent work conditions and anti-discrimination practices. Fair wages, reasonable working hours, occupational safety, adequate accommodation, transparent employment terms, accessible complaint channels, and protection against retaliation can improve the employment experience. Although acculturation did not mediate the tested relationships, orientation programs, multilingual communication and social support remain useful for helping migrant workers adjust to Malaysian workplaces and daily life.

Future researchers could expand the study to migrant workers in other Malaysian states and additional employment settings to improve generalizability. Comparisons by country of origin may also identify whether cultural background, social networks, recruitment systems and previous migration experience shape intention

to re-enter differently. A longitudinal design would provide greater depth by examining whether re-entry intention changes near the end of a work permit, after workers return home, or when employment and immigration conditions change.

Future studies could also adopt mixed-method approaches by combining surveys with interviews or focus groups. Qualitative evidence may help explain why acculturation did not mediate either relationship and how migrant workers balance salary, job security, workplace treatment, accommodation, recruitment costs, family obligations and alternative destinations. Additional variables such as job satisfaction, perceived organizational support, psychological safety, wage fairness, legal protection and accommodation quality may also improve future explanatory models. Acculturation could additionally be examined as a moderator rather than only as a mediator.

## Conclusion

This study examined the influence of work conditions and workplace discrimination on migrant workers' intention to re-enter Malaysia for employment, with acculturation as a mediating variable. Among 432 migrant workers in selected sectors in Selangor, working conditions had a significant positive influence on the intention to re-enter, whereas workplace discrimination had a significant negative influence. Acculturation did not significantly mediate either relationship. The findings therefore highlight the central role of direct workplace experiences in shaping future employment decisions. Better work conditions can strengthen migrant workers' willingness to choose Malaysia again, while discrimination can discourage them from returning even when they are culturally familiar with the host environment. Employers and policymakers should therefore focus on workplace fairness, safety, welfare, dignity, and effective protection if Malaysia is to strengthen legal repeat migration and maintain a more stable migrant workforce.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Beyond Accommodation: Conceptualizing Disability Health Management for Employees with Disabilities in Malaysian Public Universities

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**Abstract:** Employees with disabilities (EWD) may face workplace challenges that go well beyond physical access. These can include difficulties securing reasonable accommodation, risks associated with disclosure, psychosocial strain, inaccessible work systems, occupational health and safety concerns, inconsistent supervisory support, and barriers to career progression. Such challenges can be especially complex in higher education institutions, where academic and non-academic staff work across varied organizational, physical, digital, and professional settings. Although international rights frameworks and Malaysian disability and higher-education policies support disability-inclusive employment, institutional responses may still be fragmented across human resource management, disability support services, occupational safety and health, facilities, information technology, wellness services, and line management. This conceptual paper proposes Disability Health Management (DHM) as an integrated, rights-based organizational approach to supporting the health, functioning, safety, inclusion, and sustainable work participation of EWD in Malaysian public universities. Drawing on the Social Relational Model of Disability, the World Health Organization's International Classification of Functioning, Disability and Health (ICF), and Job Demands–Resources (JD-R) theory, the paper develops a provisional conceptual framework organized around nine interconnected domains: governance and accountability; safe disclosure and confidentiality; reasonable accommodation and assistive technology; accessible physical and digital environments; occupational health, safety and emergency preparedness; psychosocial well-being and anti-ableism; supervisor and workforce capability; career sustainability, retention and progression; and monitoring, evaluation and continuous improvement. In doing so, the framework moves disability management beyond isolated accommodation towards a coordinated university workplace system. It also provides a theoretical foundation for the later empirical development, validation, and implementation testing of a context-specific DHM Model in Malaysian public higher education institutions.

**Keywords:** *Employees with disabilities; disability health management; higher education; disability management*

## 1. Introduction

Employment is a central part of social participation, economic security, identity, and personal development. For persons with disabilities, meaningful and sustainable work is also closely tied to autonomy, social inclusion, and the ability to participate fully in society. The United Nations Convention on the Rights of Persons with Disabilities (CRPD) recognizes the right of persons with disabilities to work on an equal basis with others and explicitly addresses reasonable accommodation, safe and healthy working conditions, career advancement, job retention, and return to work (United Nations, 2006).

Employment inclusion, however, cannot be reduced to recruitment alone. It must extend across the employment life cycle—from entry into work and day-to-day performance to health and safety, workplace accommodation, professional development, career progression, retention, and, where required, rehabilitation and return to work. The International Labour Organization (ILO, 2002), for instance, frames disability management as an employer responsibility that includes recruitment, workplace adjustment, confidentiality, job retention, return to work, and advancement.

Higher education institutions are particularly complex workplaces. Academic staff may be expected to combine

teaching, research, supervision, publication, administration, consultation, fieldwork and community engagement, while professional and administrative staff may work across laboratories, libraries, student services, finance, information technology, security, facilities, technical operations, and university management. These roles involve different combinations of physical, cognitive, sensory, technological, interpersonal, temporal, and emotional demands. A generic institutional disability policy may therefore be unable to respond adequately to the many ways in which disability can interact with university work.

Research on disabled academics and university staff reinforces this concern. In a systematic review of 33 studies involving 1,996 participants across six countries, Lindsay and Fuentes (2022) identified recurring experiences related to disability disclosure, difficulty obtaining workplace accommodation, negative attitudes, stigma, and exclusion. Brown and Leigh (2018) likewise argued that performance-driven academic cultures can reproduce ableist expectations around productivity, availability, and the characteristics associated with the 'ideal' academic worker.

Seen in this light, the issue extends well beyond whether a university is willing to provide an individual accommodation. What is needed is an organizational system capable of coordinating disability-related health, functioning, work design, accessibility, accommodation, psychosocial support, and career sustainability. This paper introduces Disability Health Management (DHM) as a way of addressing that need. DHM is defined here as: a coordinated, rights-based and evidence-informed organizational system that supports the health, safety, functioning, accommodation, psychosocial well-being, career sustainability and meaningful work participation of employees with disabilities.

DHM is neither a clinical treatment model nor an attempt to medicalize disability. Its focus is organizational. It understands health and functioning through the interaction between employees, the work they perform, the environments in which that work takes place, and the institutional resources available to them. Against this background, the paper has three purposes. First, it explains why existing disability-management approaches require broader integration within public higher education institutions. Second, it brings together complementary theoretical perspectives that can explain disability, functioning, and work participation. Third, it proposes a preliminary conceptual framework for DHM that can later be developed and validated empirically within Malaysian public universities.

## 2. Conceptual Development Approach

This paper uses a theory-synthesis and model-development approach to conceptual research. A conceptual article is more than a summary of previous literature: its purpose is to bring existing concepts and theoretical perspectives into conversation to generate new relationships, explanations, or frameworks. Jaakkola (2020) identifies theory synthesis and conceptual model development as legitimate approaches for building theoretically grounded explanations when relevant knowledge remains dispersed or fragmented.

On that basis, the framework developed here brings together three complementary theoretical lenses: the Social Relational Model of Disability, the International Classification of Functioning, Disability and Health (ICF; World Health Organization [WHO], 2001), and Job Demands–Resources theory. These perspectives are considered alongside international principles on disability and employment, selected systematic reviews of disability and work, research involving disabled faculty and staff, and the Malaysian disability and higher-education policy context.

The synthesis is conceptual rather than systematic and does not claim to cover the disability-employment literature exhaustively. Its purpose is explanatory: to clarify what needs to be managed, why those elements matter, and how they may interact within a university employment system. This is consistent with Whetten's (1989) argument that a meaningful theoretical contribution must do more than name relevant concepts; it must also explain the relationships and underlying logic that connect them.

## Disability and Employment in the Higher Education Context

### Moving Beyond an Individualized Understanding of Disability

Traditional medical perspectives tend to locate disability primarily within an individual's impairment or health condition. Although such perspectives may be useful in clinical assessment, they are limited as explanations of workplace participation. An employee may encounter difficulty not simply because of an impairment, but because a digital system is inaccessible, a laboratory procedure has not been adapted, a meeting format excludes particular communication needs, a workload is inflexible, or a supervisor lacks the knowledge or authority to implement an adjustment.

The Social Relational Model offers a stronger lens for understanding these situations because it locates disability in the relationship between impairment effects and socially produced restrictions. Thomas (2004) advances a social-relational understanding that recognizes impairment while also examining the ways in which social arrangements produce disabling restrictions.

This distinction has particular relevance in employment. Employees may encounter barriers to doing, such as inaccessible technology, buildings, work schedules, or procedures, as well as barriers to being, including stigma, devaluation, assumptions of incompetence, and exclusion from professional identities. A university DHM system must therefore be equipped to address both material barriers and the relational forms of disability that can shape an employee's experience of work.

### Functioning and Participation

The WHO's International Classification of Functioning, Disability and Health (ICF) adds a complementary perspective (WHO, 2001). Rather than treating disability as a fixed individual characteristic, the ICF conceptualizes functioning and disability through interactions among health conditions, body functions and structures, activities, participation, environmental factors, and personal circumstances. Environmental conditions may operate either as barriers or as facilitators.

This is especially useful in employment settings because two employees with similar diagnoses may experience very different outcomes at work. Job design, assistive technology, physical accessibility, supervisory support, workplace flexibility, and organizational culture can all alter how a health condition or impairment affects participation. DHM should therefore avoid treating diagnosis as the primary basis for determining support. A more useful question is: What barriers affect the employee's ability to participate safely, effectively and equitably in work, and what environmental changes or resources can improve that participation?

### Reasonable Accommodation is Necessary but Insufficient

Reasonable accommodation is fundamental to disability-inclusive employment. It may involve adjustments to equipment, technology, communication, working hours, work location, the physical environment, job tasks, or the organisation of work itself. The CRPD explicitly recognizes reasonable accommodation in employment, while ILO guidance places workplace adjustment within a wider set of employer responsibilities for disability management (ILO, 2002; United Nations, 2006).

The evidence also makes clear that employer action matters. Jansen et al. (2021), in a systematic review of 50 articles on employer characteristics and work participation among workers with disabilities and chronic conditions, identified work accommodation, supervisor support, organizational culture, and broader organizational characteristics as important employer-level factors. The evidence for work accommodation was particularly strong in relation to continued employment and return to work. Yet accommodation becomes much less effective when it is treated as a one-off transaction. Several practical limitations quickly emerge.

An employee may first need to disclose a need before any accommodation can be considered. Responsibility, funding, and approval then have to be determined. Implementation may require coordination among supervisors, human resource personnel, occupational health professionals, disability support personnel, facilities officers, and information technology staff. Even after an accommodation is put in place, it may need to be reviewed when the employee's condition, job, workplace, or supervisor changes. Accommodation, in other words, is only one part of a larger organizational process.

Even a technically appropriate adjustment can fail when requests move slowly, confidentiality is weak, managerial attitudes are unsupportive, responsibilities are unclear, or later career decisions place the employee at a disadvantage. DHM therefore shifts the focus away from the narrower question:

- What accommodation does this employee need?

and towards a broader organizational question:

- What organizational system is required to enable this employee to participate safely, equitably and sustainably in work?

**Psychosocial Well-being, Disclosure and Ableism**

Disability disclosure is a particularly sensitive part of workplace inclusion. Disclosure may open the way to accommodation, but it can also expose an employee to stigma, unwanted attention, assumptions about capability, or perceived consequences for career progression. For that reason, disclosure is better understood as a process than as a single administrative event. Employees may choose to disclose different information to different people at different points in their employment. Whether they do so may depend on perceived confidentiality, psychological safety, trust in supervisors, and confidence that the organisation will respond fairly.

Lindsay and Fuentes (2022) show how central these issues are. Their systematic review identifies disclosure decisions, accommodation processes, and negative workplace attitudes as recurring themes in the experiences of disabled faculty and staff. Ableism can also be embedded in practices that appear neutral on the surface. Expectations of uninterrupted productivity, long working hours, mobility, rapid communication, physical presence, or constant availability may disproportionately disadvantage employees with chronic, episodic, sensory, cognitive, or physical conditions.

Recent organizational scholarship reaches a similar conclusion, drawing attention to the continuing importance of reasonable accommodation, ableist organizing, invisible disabilities, and the limited representation of Global South perspectives in disability-at-work research (Boehm & Jammaers, 2024). For DHM, this means that psychosocial well-being and anti-ableism must sit alongside physical accessibility rather than being treated as secondary concerns.

**Job Demands and Organizational Resources**

Job Demands–Resources (JD-R) theory provides the third theoretical foundation for DHM. It distinguishes between job demands, which require sustained physical, psychological, cognitive, or emotional effort, and job resources, which help employees carry out their work, achieve goals, sustain motivation, or lessen the impact of demanding conditions (Bakker & Demerouti, 2017). In higher education, job demands may take the form of heavy workloads, tight deadlines, teaching hours, research targets, prolonged standing, sensory pressures, travel, fieldwork, interpersonal demands, or administrative complexity.

Resources, by contrast, may include autonomy, flexible working arrangements, accessible technology, assistive equipment, supportive supervision, role clarity, colleague support, and timely accommodation. For EWD, the balance between demands and resources is especially important. The same work demand can have very different consequences depending on impairment effects and the environmental resources available to the employee.

A rigid teaching timetable, for example, may create considerable difficulty for an employee with an episodic health condition, while flexible scheduling can reduce that demand substantially. In the same way, an inaccessible digital platform can turn an otherwise routine administrative task into a disproportionately demanding activity for someone who relies on assistive technology. The theoretical purpose of DHM, then, is not simply to 'support disabled employees'. It is to reduce disabling demands while strengthening the individual and organizational resources that make sustainable participation possible.

## 3. Conceptualizing Disability Health Management

Each of the three theoretical perspectives explains a different part of the problem, but their contributions are complementary.

| Theoretical perspective | Primary contribution to DHM |
|---|---|
| Social Relational Model of Disability | Explains how organizational and relational barriers produce disability, including barriers to doing and barriers to being. |
| WHO ICF | Explains functioning and participation through the interaction of health, activities, and environmental barriers or facilitators. |
| Job Demands–Resources theory | Explains how workplace demands and resources shape strain, motivation, and sustainable participation in work. |

Taken together, they point to the following conceptual pathway:
**Impairment effects + job demands + organizational/environmental barriers**
↓
**Availability or absence of workplace resources and institutional support**
↓
**Employee health, functioning and work participation**
↓
**Retention, career sustainability and organizational inclusion**
Within this pathway, DHM works by changing environmental conditions, reducing avoidable demands, strengthening workplace resources, and coordinating institutional responses.

**Figure 1: Proposed Conceptual Architecture of Disability Health Management**

**External and Institutional Context**
CRPD • Malaysian disability policy • higher-education policy • university governance
↓
**Employee–Work Interaction**
Health and impairment effects: physical, sensory, cognitive, psychosocial and organizational job demands; environmental and relational barriers
↓
**DISABILITY HEALTH MANAGEMENT SYSTEM**
Governance and accountability

Safe disclosure and confidentiality

Reasonable accommodation and assistive technology

Accessible physical and digital work environments

Occupational health, safety and emergency preparedness

Psychosocial well-being and anti-ableism

Supervisor and workforce capability

Career sustainability, retention and progression

Monitoring, evaluation and continuous improvement
↓
**Core Mechanisms**
Barrier reduction • resource enhancement • coordinated support • inclusive work design • psychological safety • organizational accountability
↓
**Employee and Organizational Outcomes**
Health and well-being • safety • functioning • work participation • job retention • career progression • equitable employment • sustainable inclusion
↺
**Monitoring and employee feedback inform continuous system improvement**

## 4. Proposed Domains of the DHM Framework

### Governance and Accountability

Disability inclusion needs clear organizational ownership. Universities should establish executive responsibility, formal mandates, coordination mechanisms, escalation routes, and meaningful representation of EWD in decision-making. This governance function matters because fragmented responsibilities can leave employees to navigate several offices on their own. A coordinated model should make clear who has decision-making authority, who funds adjustments, who monitors implementation, and where unresolved issues are escalated.

It is also important to distinguish the model's substantive domains from the organizational units that put them into practice. Human Resources, the Registrar, Disability Support Services, Occupational Safety and Health, facilities, and information technology should therefore be understood as implementation actors rather than as the conceptual domains of the DHM Model itself.

### Safe Disclosure and Confidentiality

The framework supports disclosure processes that are voluntary, need-based, and designed to minimize unnecessary collection of diagnostic information. At a minimum, these processes should protect confidentiality, secure informed consent, limit access according to role, minimize data collection, and protect employees from adverse employment consequences. Employees should be able to seek workplace support without having to repeat sensitive disclosures each time they encounter a different office or administrative process.

### Reasonable Accommodation and Assistive Technology

Universities need transparent accommodation pathways with clearly identifiable entry points, needs-based assessment, defined decision timelines, funding arrangements, implementation responsibilities, review mechanisms, and avenues for appeal. Assistive technology should form part of information technology procurement and digital-accessibility planning from the outset, rather than being considered only after an access problem has already occurred.

### Accessible Physical and Digital Work Environments

Accessibility in a university workplace extends across buildings, transportation, laboratories, meeting rooms, teaching facilities, emergency systems, communication platforms, university websites, learning-management systems, documents, and institutional software. DHM therefore carries accessibility principles beyond physical infrastructure and into the everyday systems through which university work is organized and performed.

### Occupational Health, Safety and Emergency Preparedness

EWD should be included within ordinary occupational health and safety processes, not treated as exceptions to them. Within DHM, inclusive risk assessment is considered at the organizational level: the concern is whether appropriate processes exist to identify barriers, consider reasonable modifications, and refer matters for specialist assessment when required, rather than using disability itself as an automatic basis for restricting work. This domain should also connect employees to appropriate arrangements for rehabilitation, return-to-work planning, accessible emergency communication, evacuation procedures, and suitable personal protective equipment where relevant.

The purpose is not for DHM, or the present study, to conduct specialist clinical, occupational hygiene, engineering, ergonomic, or technical safety assessments. Those matters remain within the remit of appropriately qualified professionals. The role of DHM is to ensure that disability-related health and safety needs are recognized, coordinated, and referred appropriately within the university system.

### Psychosocial Well-being and Anti-Ableism

Inclusive employment also depends on psychological safety. Attention must be given to stigma, harassment, exclusion, and the additional emotional and administrative labor that can arise when employees have to request or renegotiate support repeatedly. Universities should therefore integrate mental-health support, accessible employee assistance, disability awareness, anti-harassment mechanisms, and opportunities for peer support within their broader approach to DHM.

**Supervisor and Workforce Capability**
Supervisors often sit at the point where institutional policy either becomes effective workplace practice or fails to do so. Existing evidence suggests that both accommodation and supervisor support can influence continued participation in work (Jansen et al., 2021). Training, however, is unlikely to be enough on its own. To implement inclusive arrangements consistently, supervisors need clear authority, role-specific guidance, access to specialist consultation, practical decision tools, and the organizational resources to act on that guidance.

**Career Sustainability, Retention and Progression**
Disability inclusion should not stop once an employee is able to carry out immediate work tasks. The model should also address equitable access to professional development, performance appraisal, leadership opportunities, promotion, research opportunities, flexible career pathways, and transitions between roles. An accommodation that keeps an employee in work but inadvertently restricts future progression cannot be regarded as a complete inclusion outcome.

**Monitoring, Evaluation and Continuous Improvement**
Institutional commitment becomes meaningful only when implementation can be examined and measured.
Relevant indicators may include accommodation response times, completion of agreed adjustments, accessibility issues, employee experience, supervisor preparedness, retention, participation in professional development, and career progression. At the same time, disability information is highly sensitive. Monitoring systems should collect only what is necessary for improvement, reduce the risk of re-identification, and keep support-service information separate from employment performance processes.

**Conceptual Propositions**
Bringing the three theoretical perspectives together leads to a set of propositions that can guide subsequent empirical investigation.

**Proposition 1:** Work participation among EWD is shaped not by impairment effects alone, but by the interaction between those effects, job demands, and organizational or environmental barriers.
**Proposition 2:** Workplace resources—including accessibility, flexibility, assistive technology, autonomy, accommodation, and supervisor support—will reduce the negative consequences of mismatches between employee functioning and job demands.
**Proposition 3:** Coordinated governance and clearly defined disability-management pathways will reduce administrative burden, delay, and inconsistency in obtaining workplace support.
**Proposition 4:** Greater confidentiality, psychological safety, and perceived organizational support around disability disclosure will facilitate earlier and more appropriate access to workplace support.
**Proposition 5:** Supervisor capability and organizational accountability will influence the extent to which formal disability policies are translated into effective day-to-day workplace practice.
**Proposition 6:** Sustainable disability inclusion requires workplace support to extend beyond immediate accommodation to career development, equitable appraisal, retention, and progression.
**Proposition 7:** Meaningful participation of EWD in governance and continuous monitoring will strengthen the responsiveness, legitimacy, and sustainability of institutional disability-management systems.
These are theoretically derived propositions. They are intended to guide empirical inquiry and should not be read as relationships that have already been confirmed.

**Malaysian Public Higher Education Context**
Malaysia provides a particularly important setting in which to develop DHM. The Persons with Disabilities Act 2008 (Act 685) establishes a national disability-rights framework, while the Ministry of Education Malaysia issued guidelines on inclusive disability policy in higher education institutions (Ministry of Education Malaysia, 2019; Persons with Disabilities Act 2008, 2008).

The growing visibility of persons with disabilities within Malaysia further underscores the relevance of this issue. According to the Department of Statistics Malaysia (DOSM, 2024), 674,548 persons with disabilities were registered in Malaysia in 2022, representing approximately 2.0% of the national population. Within the public service, 3,724 civil servants with disabilities were recorded in 2022, an increase from 3,694 in 2021. Of these employees, 2,462 (66.1%) were in the implementation service group, 1,258 (33.8%) were in the management

and professional group, and four (0.1%) were in top management (DOSM, 2024).

These figures confirm the presence of EWD within Malaysia's public-sector workforce, but they also expose a sector-specific information gap. The same DOSM publication separately reports the enrolment of students with disabilities in public universities, including 792 students in 2022, with data disaggregated by field of study. By contrast, employment statistics group EWD within the wider civil service and do not identify public-university employees as a distinct category (DOSM, 2024). Consequently, the published statistics do not show how many EWD work specifically in Malaysian public universities, what workplace barriers they experience, how their health and accommodation needs are managed, or what institutional support arrangements are available to them. Malaysia's Thirteenth Malaysia Plan covers 2026-2030 and continues the national development agenda around inclusive development, improved well-being, and stronger public-service delivery (Ministry of Economy Malaysia, 2025).

Policy and legislation nonetheless do not, by themselves, determine how well inclusion is implemented within institutions. The existence of national commitments therefore needs to be considered alongside the organizational processes through which employees seek accommodation, workplace accessibility, health and safety support, supervisory assistance, and opportunities for sustainable career participation. A context-sensitive DHM Model must also accommodate variation in the way public universities organize and deliver these functions. Responsibilities relevant to EWD may be distributed across Human Resources or Registrar offices, Disability Support Services, Occupational Safety and Health units, health or wellness services, facilities management, information technology, supervisors, and university management rather than being located within a single institutional structure. The central issue is therefore not only whether disability-related services exist, but whether these functions are coordinated in ways that EWD can access consistently, confidentially, and effectively.

For this reason, a Malaysian DHM Model must be designed around the realities of the local public-university system rather than imported wholesale from a different employment or healthcare context.

## 5. Theoretical Contributions and Implications

### Theoretical Contribution

The proposed framework makes three main conceptual contributions. First, it reframes disability management. Rather than treating disability as an individual accommodation problem, it positions it within a wider organizational health-management and work-participation system. This shifts the focus away from the employee as the ‘problem’ to be managed. Attention is instead directed to the interaction among employee functioning, workplace demands, environmental barriers, and organizational resources.

Second, the framework brings together three theoretical traditions that are often used separately. The Social Relational Model identifies disabling structures and relationships; the ICF explains functioning in relation to environmental context; and JD-R theory explains the work-design mechanisms through which demands and resources affect health and sustainable participation.

Third, the framework makes a deliberate distinction between conceptual domains and implementation actors. Governance, accommodation, accessibility, occupational health, psychosocial well-being, and career sustainability describe what the institution needs to manage. HR, disability support services, occupational safety personnel, facilities, IT, supervisors, and university leaders describe who may be responsible for carrying out those functions. Making this distinction avoids a common conceptual problem: treating an organizational chart as though it were a model of disability management.

### Practical Implications for Universities

The framework points public universities towards a coordinated disability-management pathway, rather than leaving employees to negotiate support separately with individual departments. In practice, such a system could provide a clearly identified access point for support, confidential referral pathways, accommodation standards, defined responsibilities, funding arrangements, inclusive occupational-health procedures, access to specialist assessment where necessary, supervisor guidance, and monitoring indicators.

The framework also suggests that a university Disability Support Service need not be concerned only with students. At the same time, DHM does not assume that one unit should control every employee disability function. Its emphasis is on coordination among relevant institutional actors, supported by clearly defined accountability. Crucially, EWD should participate in designing, governing, evaluating, and improving the system. They should not be positioned merely as recipients of institutional services.

**Research Agenda and Empirical Development**

The framework proposed in this article is intentionally provisional. Its domains are drawn from theoretical integration, international principles, existing research, and the Malaysian institutional context. They should not be interpreted as the final, validated components of a Malaysian DHM Model. The next stage of research should examine the lived experiences and priorities of both academic and non-academic EWD, explore institutional practices, identify barriers and facilitators, and determine whether the proposed domains adequately capture actual workplace needs.

A Design and Development Research program can then translate the conceptual framework into a prototype organizational model, subject its components and processes to expert and lived-experience validation, and examine its feasibility when instantiated in an authentic university setting. Because DHM intersects with occupational health and safety, validation should include appropriately qualified occupational health and safety expertise to ensure that this domain remains organizationally sound without extending the model into specialist clinical or technical practice.

Empirical investigation may consequently lead to some components being merged, modified, removed, or added to the conceptual framework presented here. This distinction is fundamental: the present article proposes the conceptual architecture, while subsequent empirical research will develop and validate the final DHM Model.

**Limitations**

Several limitations of this conceptual paper should be recognized. First, the paper offers a conceptual synthesis rather than a systematic review, so the literature discussed should not be regarded as exhaustive. Second, the framework is primarily concerned with Malaysian public higher education. Different regulatory, employment, and organizational settings may require the framework to be adapted. Third, EWD are not a homogeneous group. Disability type and visibility, career stage, employment category, gender, work role and institutional setting may all shape individual experiences in different ways.

Fourth, the proposed domains and relationships have not yet been empirically validated. At this stage, their value lies in guiding subsequent model-development research rather than functioning as confirmed standards. Fifth, occupational health and safety is recognized as an important domain of DHM, but it is not examined at the level of specialist clinical, occupational hygiene, engineering, ergonomic, or technical safety assessment. These areas require appropriately qualified professional expertise and fall outside the intended disciplinary scope of this study. The study instead addresses health and safety from an organizational disability-management perspective, focusing on coordination, referral pathways, reasonable accommodation, inclusive work practices, emergency preparedness, and access to appropriate specialist support.

Finally, DHM should not be interpreted as either a clinical model or a means of increasing institutional control over employees' health information. Its purpose is the reverse: to create organizational conditions, support pathways, and appropriate professional interfaces that enable equitable, confidential, and sustainable participation in work.

**Conclusion**

Disability inclusion in higher education employment requires more than accessible buildings, written policies, or individual accommodations. Employees with disabilities work at the intersection of job demands, institutional systems, technologies, workplace relationships, health and safety processes, supervisory practices, and career structures. DHM is proposed here as an integrated organizational response to that reality, coordinating institutional support while recognizing where specialist professional assessment and intervention are required.

By bringing together the Social Relational Model of Disability, the WHO ICF, and Job Demands–Resources theory, the framework conceptualizes disability-related work participation as an outcome of the interaction among impairment effects, organizational barriers, job demands, and workplace resources. Nine provisional domains form the proposed architecture: governance and accountability; safe disclosure and confidentiality; reasonable accommodation and assistive technology; physical and digital accessibility; occupational health, safety and emergency preparedness; psychosocial well-being and anti-ableism; supervisor and workforce capability; career sustainability, retention and progression; and monitoring, evaluation and continuous improvement.

The conceptual contribution, then, is a shift from fragmented disability support towards coordinated Disability Health Management. Rather than continually asking employees with disabilities to adapt themselves to existing university systems, the framework turns the question around. It asks how those systems can be designed, coordinated, and improved so that employees with disabilities are able to work safely, meaningfully, and sustainably.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Weighing the Risk: A Qualitative Inquiry into the Effectiveness of Halal Logistics Implementation in Fresh Grocery Retailing

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**Abstract:** As the global halal food market exceeds $2.7 trillion by 2024 and grows at a compound annual rate of more than 9% over the next decade, attention has increased on logistics processes that maintain halal integrity from farm to fork. Most extant halal logistics literature has focused on manufacturing, warehousing, and cross-border transportation, with little empirical attention to receipt and handling operations in grocery retail, where integrity is arguably most at risk (i.e., fresh grocery retail outlets). This study is filling in this gap by determining the impact of halal logistics implementation from three operational factors (equipment, segregation, and packaging) on food quality to support fresh groceries at a select grocery retail outlet in Malaysia. An exploratory qualitative case study design was used, where data from in-depth interviews with four purposively selected employees (2 from the Halal department and 2 from the Receiving department) and the transcribed text were analysed using NVivo. The results demonstrate that while segregation of entry points and other locations, as well as sealed packing practices, were fairly well implemented, shared use of weighing equipment between halal and non-halal fresh meat was identified as the greatest risk, which maintains a continual cross-contamination hazard that is only partially alleviated by disposable liners and consumer transport carts. The informants agreed on practical solutions, such as dedicated and clearly marked weight scales, protective covering for shared equipment, and regular sertu cleaning efforts. It expands the equipment-segregation-packaging framework to a retail receiving-dock context and provides concrete, low-cost elements for management and policymakers that can improve halal integrity assurance at the retail touchpoint with Muslim consumers.

**Keywords**: *Halal logistics; Halal supply chain integrity; Fresh groceries; Cross-contamination; Retail operations; Qualitative case study*

## 1. Introduction and Background

Halal, an Arabic word for "permissible, lawful" in Islam, has transcended beyond a religious designation to become an international indicator of food quality, hygiene, and safety (Tieman, 2011). The global halal food market was estimated at USD 2.7 trillion in 2024, with supermarkets and hypermarkets holding the largest distribution share, and industry undertakings expect expansion towards USD 5-6 trillion by the early 2030s (Research and Markets, 2025; Statista, 2024). This growth is driven by population growth, increased consumer awareness of halal products and their quality, safety, and ethical attributes, as well as greater harmonisation between different certification systems among producing and consuming regions (Akbar et al., 2023). This also means that Asia Pacific attracts nearly half of the global revenue, with Muslim countries such as Malaysia and Indonesia driving production and consumption. This growth is now not exclusive to Muslim consumers; in fact, halal has slowly but steadily gained traction with non-Muslim shoppers as an informal substitute for hygiene, ethical sourcing, and quality assurance, a trend which has pulled mainstream grocery retailers into the halal supply chain regardless of whether or not halal compliance was ever core to their business model.

Malaysia is a country in which Muslims form the majority of the population and has set itself as an aspiring global halal hub with the Department of Islamic Development Malaysia (JAKIM) regulatory authority, international standards MS1500 & standard food processing machinery MS2400. However, the basis of any

halal claim is not solely based on any certification but relies upon the procedural integrity of every downstream handling step, as a naturally halal product becomes unhalal once it comes into direct contact or processing with najis (filth/impurities). The role of retailers within this chain is especially precarious. However, a multi-category grocery outlet is not like manufacturing plants, which can be designed around dedicated halal production lines; in fact, fresh halal and non-halal raw meat literally cross paths every day as they are regularly received, weighed, and displayed side by side within the same retail space footprint, often employing the same receiving equipment and creating repetitive opportunities for oversight and cross-contamination to occur even though these products already have halal certification from their suppliers.

The problem addressed in this study emerged from direct observation of a grocery retail outlet's receiving department, where halal and non-halal fresh meat, including pork, is weighed using the same weighing scale. Although the outlet has introduced mitigating measures, a flattened box and a yellow container placed beneath non-halal items to catch drips and residue, these measures depend on consistent staff compliance and do not eliminate the underlying source of risk, which is the equipment itself. Because chilled meat has a short shelf life and must be received frequently in small batches, the opportunity for contact between halal and non-halal meat on shared equipment recurs many times each week, compounding the cumulative risk to halal integrity even where each incident appears minor.

Guided by this problem, the study pursues three objectives: to measure the effectiveness of halal logistics implementation in fresh groceries retailing, to identify which of three commonly cited determinants, equipment, segregation, and packaging, is most critical to that effectiveness in a real retail setting, and to generate practical recommendations for enhancing halal logistics implementation at the retail receiving interface. These objectives respond to three corresponding research questions concerning the factors that shape effectiveness, the relative criticality of each factor, and the improvements that practitioners themselves regard as feasible. The study is significant to several audiences: Muslim consumers who rely on the retail environment to preserve the halal status of what they purchase, suppliers and retail managers who must translate certification into operational practice, policymakers responsible for halal standards enforcement, and researchers seeking empirical grounding for the equipment-segregation-packaging framework beyond the manufacturing and transportation contexts in which it has predominantly been studied.

## 2. Literature Review

Halal must be taken in tandem with tayyib, wholesomeness, to define not just what Muslims can or cannot ingest but the level of cleanliness, safety, and ethical treatment that a product must receive from farm to fork. Current halal logistics literature still views this dual requirement as the conceptual anchor of the discipline, namely that a product is not halal because its ingredient components are halal but rather only so long as the entire pedigree of the chain of custody, procurement, processing, storage during gap analysis and analysis to produce points, clean transport custody, or retail conducting has been complete without contamination by najis or with contact with non-halal substances (Haleem et al., 2021; Handayani et al., 2021). This broader articulation of halal, from an ingredient-specific characteristic into a cross-supply-chain assurance, is what transforms halal logistics from merely a compliance obligation to its own substantive area of operations management research.

In the literature, Halal logistics has been defined as an extension of conventional logistics principles, whereby products and processes that need to conform with Shariah must be planned, implemented, and controlled at every node of the chain (Haleem et al. In previous systematic reviews, halal supply chain management has been summarised as including the additional components of certification, traceability, segregation and dedicated logistics assets; whereby these additional requirements increase operational complexity and cost with respect to conventional supply chains, thereby explaining why even when firms have certified their core products they only partially implement halal logistics principles - especially true for small/medium enterprises operating in mixed halal/non-halal markets (Kurniawati & Cakravastia, 2023; Rizki et al., 2023). This gap between certification and full logistical compliance is exactly the space in which contamination risk builds up, and it is this terrain that this study examines at the single retail outlet level.

Contamination in halal supply chains has been shown to originate from multiple sources: shared transport and

storage infrastructure, inadequate cleaning between handling cycles, human error at warehousing and retailing points, and, increasingly, fraudulent or unverifiable certification claims that mask non-compliant practices further upstream (Hasnan & Kohda, 2023). Because the majority of contamination pathways described in the literature are physical rather than chemical, most mitigation strategies converge on three practical levers: the equipment used to handle products, the physical segregation of halal from non-halal items, and the packaging that shields products from contact and leakage. These three levers correspond closely to the determinants examined in this study and are discussed in turn below.

Equipment is repeatedly identified as a primary vector of cross-contamination because tools such as knives, grinders, containers, and weighing scales come into direct physical contact with meat and other perishable products. Guidance from halal certification bodies stresses that equipment used for halal products must be free from contact with non-halal substances and, where contamination does occur, must undergo religiously prescribed cleansing, commonly referred to as sertu, before it can be reused for halal purposes (Halal Foundation, 2025). Industry analyses of cross-contamination risk likewise identify shared storage units, freezers, and handling tools as the most common and preventable source of halal integrity breaches, particularly in mixed retail environments where halal and non-halal items are processed within the same physical space rather than in dedicated, single-purpose facilities (ISA Halal, 2025). Recent supply chain risk studies extend this concern to processing and cosmetic manufacturing contexts as well, noting that ingredient scarcity and reliance on shared repackaging suppliers can reintroduce contamination risk even after a product has initially been certified halal (Mohd Ashmir Wong et al., 2023).

Segregation, the physical separation of halal from non-halal products throughout handling, storage, and display, is widely regarded in the literature as the most fundamental safeguard of halal status, precisely because it removes the opportunity for contact rather than relying on cleaning after the fact. Studies of halal supply chain integrity note that the required intensity of segregation varies by context; fully halal-dedicated facilities can achieve complete separation, whereas mixed retail environments serving both Muslim and non-Muslim customers must instead rely on layered controls such as separate entrances, dedicated storage zones, and colour-coded or labelled equipment to approximate the same protective effect (Handayani et al., 2021; Rajendran et al., 2024). Where segregation is only partial, as is common in international retail chains that sell both halal and non-halal meat under one roof, the burden of preserving halal integrity shifts toward the remaining two levers, equipment and packaging, making their proper implementation correspondingly more important.

Packaging serves three interlocking functions in halal logistics: it protects products from physical damage during transport and handling, it prevents cross-contact between halal and non-halal substances when full segregation is not feasible, and it communicates halal status to the end consumer through certification marks and labelling (Khoirunnisa et al., 2024). Where packaging is compromised, for example through torn vacuum seals or leaking blood from improperly wrapped non-halal meat, the risk of cross-contamination escalates sharply because the packaging can no longer function as a barrier. Contemporary halal integrity guidance therefore treats robust, intact packaging as a necessary complement to, rather than a substitute for, physical segregation and dedicated equipment (Halal Foundation, 2025). Taken together, these three literatures on equipment, segregation, and packaging converge on a single insight that motivates the present study: halal integrity at the retail level is rarely undermined by a single catastrophic failure, but rather by the cumulative, everyday friction of shared tools, incomplete separation, and imperfect packaging operating simultaneously within a single receiving department.

## 3. Research Methodology

The qualitative case study design was suitable as an exploratory inquiry into a contemporary and operational phenomenon with uncertain boundaries (halal logistics implementation, in the context of an operating multi-category grocery retail outlet). The qualitative case designs in the halal supply chain literature have been used effectively in other areas to obtain insights about the operational realities that survey-based quantitative studies bring an abstraction to, such as recent work on blockchain adoption in Malaysian halal micro, small and medium enterprises leveraging detailed interviews with practitioners to elicit practical implementation enablers and challenges (Hassam et al., 2025), or similar qualitative interview-based works that have sought

understandings of halal traceability from different lenses of policymaker and producer perspectives. In this tradition, the present study observes superior proximity to hands-on operational expertise from frontline employees over aggregated as-is survey data.

This study takes place in one grocery retail outlet in Malaysia, which sells halal and non-halal fresh meat at the same location, out of a total operational workforce of forty-eight employees ranging from store management, receiving, food and grocery, chilled & frozen goods, fresh market, cashiering, as well as the Halal and Non-Halal departments. Since the phenomenon that is the subject of this research deals with the implementation of halal logistics, which is restricted to processes directly at and between the Halal department and Receiving department, this study focused its substantive interest on employees who are employed in these two departments, as employees from both departments collectively have direct operational knowledge regarding how halal fresh meat and non-halal fresh meat are received, weighed, and handled.

A purposive sampling technique was employed to select four respondents: two employees from the Halal department and two employees from the Receiving department, each with at least one year of relevant working experience. Purposive sampling was considered appropriate given the small, specialised population and the qualitative, depth-oriented nature of the inquiry, in which information power rather than statistical representativeness determines an adequate sample; a small number of information-rich informants who deal with the phenomenon daily was judged more valuable than a larger but less experientially grounded sample.

Primary data were collected through structured interview sessions comprising six questions addressing the parties responsible for halal compliance, the existing policies and process flows governing halal fresh groceries, the training and experience expected of halal supervisory staff, the relative criticality of equipment, segregation, and packaging, any residual issues in the two factors not nominated as most critical, and each respondent's own recommendations for improvement. Each interview lasted approximately thirty minutes and was conducted at the receiving department of the outlet, allowing respondents to refer directly to the physical equipment and layout under discussion.

Interview transcripts were analysed using NVivo, a qualitative data analysis software package designed to help researchers organise, code, and identify patterns within unstructured textual data such as interview transcripts (Lumivero, 2023). Responses were coded against the three research objectives and the three independent determinants, equipment, segregation, and packaging, allowing convergent and divergent themes across the four respondents to be systematically compared. This thematic, software-assisted approach is consistent with recent qualitative halal supply chain research, which has similarly used structured coding of interview data to distil practical themes from operational narratives (Hassam et al., 2025).

## 4. Results

For the first objective, which is to examine how the effectiveness of halal logistics implementation is measured, respondents agree that three parties represent halal compliance for fresh groceries: at least the supervisor in a Halal department, the buyer, and the supplier. Suppliers are responsible for halal certification of meat and for compliance in the upstream slaughtering and processing chain; buyers are responsible for selecting and ordering halal stock appropriately; on-site supervisors are responsible for verifying incoming meat via purchase order (PO) verification and monitoring up-to-date halal status throughout day-to-day handling. Additionally, a respondent stressed that the supervisor role should be occupied by a Muslim employee, reflecting the view that religious know-how, rather than technical training alone, is a prerequisite for sound supervision. Taken together, these accounts suggest that halal logistics implementation at the outlet is structurally present, with roles and a chain of accountability, but its effectiveness in practice depends on how thoroughly those roles are executed at the physical receiving point, where our subsequent findings identify the least resilience and greatest vulnerability.

On the second objective, all four respondents identified the equipment, specifically the weighing scale used to receive incoming meat, as the number one priority among all three determinants that reduce halal logistics effectiveness. Although the receiving department had two chosen scales, respondents described a common practice of using both interchangeably for halal and non-zabiha meat, with the only barrier to direct contact

being a flat box or yellow container placed on top of the non-zabiha side. Multiple respondents expressed discomfort with this: one was uncertain whether the distribution centre itself separates casings for inter-branch transfer of non-halal stock, while another Muslim employee explicitly reported feeling uncomfortable that scales are not product type-specific. In contrast, survey participants stated that other equipment such as knives and grinders are adequately segregated between the Halal and Non-Halal departments, which highlights the weighing scales as an outlier practice rather than a systemic issue across all equipment categories.

On the last two determinants of segregation and packaging, respondents generally described these areas as relatively well managed but not without some lingering concern. Physical separation was described by the respondents operating at the level of department location and delivery entrance, with the Halal and Non-Halal departments physically far apart from each other and utilising distinct receiving points, which was perceived as a significant, albeit incomplete, protection. In terms of packaging, halal meat was also reported as sufficiently packaged in that it usually arrives vacuum-packed or wrapped properly, whilst respondents made the point that non-halal meats such as pork can arrive unquantified and either incorrectly packed or loosely shrink-wrapped, and so if any packaging issues are flagged upon arrival then strict measures via the return process implemented through the respective receiving department prevent the offending meat from setting foot on the shop floor. These accounts show segregation and packaging are sufficient secondary controls, but their sufficiency is precisely what makes the shared-equipment problem so saliently the binding constraint on aggregate performance.

Across the third objective, which is generating recommendations, respondents suggested a suite of solutions that are complementary and mutually reinforcing rather than one single solution. One suggestion frequently put forward was to have one of the two existing scales be specifically assigned for non-halal goods, and physically relocated to the Non-Halal department to alleviate receiving staff having to carry the same set of scales between departments each time a package from a non-halal supplier arrives. Another related suggestion was to cover the common scales with plastic sheets that are thrown away after use, so that blood or fluids from non-halal meat do not touch the part where halal products are weighed; this was also perceived by respondents as a temporary low-cost measure in preparation for a complete separation. Another respondent also added that investment in packaging should be seen as a complementary safeguard for an international retailer not serving Muslim consumers primarily rather than just secondarily, as segregating trolleys and transport carriers is expensive. Some respondents were frank that complete segregation would take time to establish, given that the outlet was part of a global retail chain with an extensive product range which was not solely halal – implying that recommendations were made with knowledge of organisational realities and as practical suggestions rather than abstractly idealistic proposals.

**Discussion**

This study's results corroborate and expand on prior explorations in the wider halal supply chain literature that have identified shared equipment as a key driver of cross-contamination (Halal Foundation, 2025; ISA Halal, 2025; Mohd Ashmir Wong et al., 2023). In fact, what is especially novel about the case at hand is the failure point specificity, as much of the existing literature tends to examine either an entire production line or transport fleet, whereas this paper looks at one piece of receiving equipment (the weighing scale) going wrong on its first physical handling step within a retail outlet. But this granularity is important because it proves that halal integrity can be marred by a single unaddressed touchpoint even when near 100 per cent of the rest of the chain, supplier certification, packaging, departmental segregation, etc., was working as intended. It is apparent from these observations that the outlet uses a disposable liner or container, which can be seen as a second-best substitute for dedicated equipment (which is less expensive to install), a common theme found in the larger literature where firms in mixed halal and non-halal markets often implement lower-cost partial mitigations rather than full structural separation stipulated by halal standards because there are capital costs and space costs that can be hard to justify for one product line of businesses when it only needs the entire business halal-certifed (Kurniawati & Cakravastia, 2023; Rizki et al., 2023).

Thus, it is also worth interpreting this case as the relatively favourable assessment of segregation and packaging. The implication that those two determinants are unimportant is misleading, because their adequacy should have been a necessary pre-condition for the equipment problem to rise to visibility as a binding constraint; had there also been deficiencies in segregation or packaging, the study would arguably have noted

a compounded multi-factor failure rather than a single dominant one. This fits broadly with the layered-control logic from segregation literature that has described dedicated entrances, storage zones and labelling as complementary safeguards that do not substitute where weakness in any one (in our case at least equipment) undermines the protective value of those barriers that remain intact (Handayani et al. 2021, Rajendran et al. 2014).

The respondents' own assessment that allocating and renaming existing equipment is more convenient than reconfiguring full supply routes or trolley fleets also resonates with past halal technology adoption studies, which suggest small, resource-limited operators tend to prefer sequential low-capital interventions (i.e., labelling, colour-coding and targeted cleaning protocols) while large digital/infrastructural investments such as blockchain traceability remain more characteristic of larger firms or those engaged in export-oriented, fully halal-dedicated chains (Hassam et al., 2025; Tan et al., 2022). This implies that the proper policy and management response to these kinds of findings has to be tailored towards the scale plus business model of the retailer concerned, rather than presuming that solutions which may have proved helpful in halal manufacturing or maybe logistics-provider contexts can certainly transfer directly into a mixed-format grocery store format.

Lastly, the fact that a Muslim worker was manifestly uncomfortable sharing equipment between product types despite formal certification and management-approved mitigations speaks to arguments made in the wider literature (Hasnan & Kohda, 2023) which contend that halal compliance is judged not only by clients but also by workers themselves based on observable on-the-ground handling practices rather than certifications alone. It also highlights that the effectiveness of halal logistics cannot be merely a documentation or audit exercise; it is constantly re-enacted, or subverted, at the level of operations by what staff do with specific tools, spaces, and materials used in their day-to-day work.

## 5. Managerial Implications and Recommendations

The intervention indicated in the current study for retail management that would most immediately be available and at low cost is the physical separation of this weighing option by simply moving and dedicating an existing second weighing scale to non-halal single-use products, clearly labelled with a permanent, clear label on/near it to differentiate it from the halal-designated scale. As both scales are already owned by the outlet, this recommendation solves the cost issues mentioned above by utilising existing resources, rather than new capital expenditure as in (i), which is one of the reasons for respondents' preference for full segregation of trolleys and transport equipment. Where immediate relocation is impractical due to space constraints at the receiving dock, management can also facilitate/protective plastic cover for the shared scale as a transitional measure, with a full understanding that this would minimise but not completely eliminate contact and thus needs to be treated as an interim rather than long-term solution.

These findings, in addition to equipment considerations, also reinforce the importance of having a dedicated Shariah advisor at the outlet or regional level in accordance with Malaysian standard MS2400 principles that promote a halalan-toyyiban management system whereby an endorsed Shariah reference point assists staff on how to handle and resolve ambiguities when determining whether purified-outsourced contaminated equipment needs to undergo religious purification before reuse. Perhaps management should focus on recruiting and training Muslim supervisory personnel in the Halal department because respondents connected a direct link between supervisory religious literacy and effective day-to-day compliance judgment calls; this connection was also noted in previous halal workforce research where trained professionals were found to be deciding factors around functional halal handling.

On the ground, the outlet must establish a routine sertu decontamination process for anything known to have been contaminated or reasonably suspected of being so with serious najis, such as creating an auditable procedure from what seems now to be an ad-hoc brick and liner-based mitigation. Such would not merely mitigate contamination risk; it would also provide an added reason for internal compliance audits, which could document adherence to halal conditions and provide due diligence evidence during actual halal certification audits, and they also reinforce client confidence in the integrity of outlets with Muslim consumers who are demanding visible, verifiable proof of handling over simply relying on publicity certifications.

At a broader industry and policy level, this study suggests that halal certification bodies and retail trade associations should consider issuing receiving-dock-specific guidance, distinct from manufacturing-oriented halal standards, that addresses the particular equipment-sharing risks inherent in mixed-format grocery retail, where a single outlet legitimately carries both halal and non-halal product lines. Larger retail chains with the resources to do so might also explore lower-cost digital traceability tools, building on emerging halal blockchain and QR-based verification research, to log equipment cleansing and handling events, though this study's findings suggest such investments should be sequenced after, rather than instead of, the more fundamental physical separation of shared equipment (Tan et al., 2022; Hassam et al., 2025).

## Conclusion

This study set out to measure the effectiveness of halal logistics implementation in the fresh groceries department of a Malaysian grocery retail outlet, to identify which of three commonly cited determinants, equipment, segregation, and packaging, most critically shapes that effectiveness, and to generate practical recommendations grounded in the perspectives of employees who manage this process daily. All three objectives were achieved. The evidence indicates that the outlet's halal logistics implementation is only partially effective: segregation of departments and entry points, together with generally adequate packaging, provide a reasonable foundation, but the continued shared use of weighing equipment between halal and non-halal fresh meat represents a persistent and, by the respondents' own account, avoidable source of cross-contamination risk. Equipment, rather than segregation or packaging, emerged unambiguously as the most critical determinant in this case, and respondents offered specific, low-cost, and organisationally feasible recommendations: dedicated and labelled scales, protective covering as an interim measure, and periodic sertu cleansing that management could plausibly implement without extensive capital investment.

A number of limitations to the study should temper the generalisability of its conclusions. Data collection was also restricted by the host organisation's confidentiality requirements to interview accounts from four respondents at one outlet and did not permit direct observation of company documentation or triangulation across multiple retail sites. This was a qualitative case study, and data were analysed rather than statistically generalisable; the configuration of equipment described here (two weighing scales across product types) is not necessarily transferable between grocery formats or markets. A quantitative, multi-outlet design that can verify whether equipment sharing remains the primary risk factor across a larger and more heterogeneous sample of retail contexts would be useful for future research; as well, it should be possible to extend this line of inquiry to test whether emerging digital traceability and blockchain-based verification tools could be operationalised in lower-cost forms for mixed-format grocery retail (as opposed to being applicable only in dedicated halal manufacturing/ export logistics contexts). Despite these caveats, the study provides an empirically derived and practitioner-informed story of where halal integrity currently rests least robustly at the retail interface and thus serves as an actionable basis for participation from retailers, certifiers and researchers alike who are keen to bridge the practice gap between halal certification and logistics-type practices.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# From Global Landscapes to Local Contexts: A Bibliometric Analysis of Artificial Intelligence and Student Behavior

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**Abstract:** The development of artificial intelligence (AI) applications has profound implications for higher education, including student behaviors, engagement, and productivity in learning. While academic literature addressing the implications of AI applications is on the rise, its relevance for fields of economics, business, and the social sciences remains disparate and localized. In this regard, this paper analyzes the bibliometric landscape of AI research using a set of indicators that include keyword co-occurrence, time and research density, and emerging research fronts using VOSviewer, and the search was limited to Scopus-indexed journal articles (2000-2025). A descriptive analysis was done based on three sets of documents, namely the global baseline, the discipline-specific body of work, and a local Malaysian dataset. The global dataset has produced a mature and integrated network with a primary emphasis on educational data mining and learning analytics. Nevertheless, temporal overlay visualization analysis reveals a sharp transition to the human and ethical factors surrounding generative artificial intelligence, including academic integrity and frameworks for evaluating teacher acceptance of disruptive technologies. In contrast, the Malaysian dataset was found to have a sparsely connected network, suggesting the growing nature of local research. Indeed, studies pertaining to Malaysia appear to focus on the interactions between students and ChatGPT and lack psychological theories in any of the included works. This study has identified the fundamental disconnect between regional and international research practices. As such, it can serve as the foundation for future studies that seek to understand the effects of artificial intelligence on the emotional, social, and academic development of students in developed digital economies.

**Keywords**: *Artificial Intelligence; Student Behavior; Bibliometric Analysis; VOSviewer; Generative AI.*

## 1. Introduction

The introduction of artificial intelligence (AI) in higher education has caused substantial disruptions to traditional pedagogical models across the disciplines of economics, business, and the social sciences. Within the educational sector, AI has introduced sophisticated tools and algorithms that facilitate learning processes, offering interactive platforms, intelligent tutoring systems, and automated feedback mechanisms that adapt to the needs and progress of each student (Adu & Adebayo, 2023). The convenience of adaptive learning systems, virtual assistants, and AI-enhanced learning platforms allows students to learn at their own pace and receive customized support based on their unique learning patterns and needs (Chen & Liu, 2024).

As a new and quickly developing technology, AI is transforming students' studying habits, performance, and conduct in the classroom. Although AI is beneficial to the learning process and encourages digital empowerment, differences in technology acceptance and behavioral intention toward using AI in education exist worldwide (Ma et al., 2024; Ayanwale et al., 2024). Therefore, it is vital to understand how new learning technologies influence behavioral patterns and conduct in general.

Other than changing academic workflows, the integration of AI introduces complex behavioral and psychological implications for students. Studies have shown that the tendency of students to rely on AI chatbots and tools for social and academic support has adverse effects, including loss of social connection and increased levels of exhaustion, which, in turn, affect students' academic performance negatively (Crawford et al., 2024; Klimova & Pikhart, 2025). The growth in research publications and the diversity of themes highlight AI's potential as a transformative tool in education. Therefore, it becomes pertinent to keep track of how academic literature is responding to these behavioral shifts to understand how the dynamics of student behavior are being influenced by those tools. Moreover, understanding student behaviors in AI-based learning systems can support the development of ethical frameworks and guidelines to ensure that AI applications in education are used responsibly and equitably, preserving student privacy and autonomy (Alam & Raza, 2022; Mahendra et

al., 2023; Mureşan, 2023)
Therefore, this study utilizes VOSviewer to conduct a comprehensive bibliometric analysis with three primary objectives:

- To identify the current research landscape of artificial intelligence and student behavior within the disciplines of economics, econometrics and finance, business, management, accounting, and social science.
- To discover the potential and future research paths of artificial intelligence and student behavior within the disciplines of economics, econometrics and finance, business, management, accounting, and social science.
- To evaluate the current and potential research focus on artificial intelligence and student behaviour in Malaysia.

## 2. Methodology

This study adopted a quantitative bibliometric analysis design to systematically map the research landscape of artificial intelligence and student behaviour. By evaluating metadata from published literature, bibliometrics allows for an objective, macro-level synthesis of research trends, structural keyword networks, and geographic focus areas across multiple academic disciplines.

### Database and Eligibility Criteria

The Scopus database was used as the search source due to its recognized quality, as it includes thousands of peer-reviewed sources on social sciences, business, and economics. The time frame of the search was set to the last 25 years (2000-2025) to ensure the relevance and breadth of the topic. The inclusion and exclusion criteria were set as follows:
Search string: ("artificial intelligence" OR "AI" OR "machine Learning" OR "deep learning" OR "learning system") AND ("behavior in education" OR "student behavior" OR "learner behavior")
Language: English; to avoid biases for language incompetence
Index: Scopus; Journal articles and conference proceedings
Subject Areas: Limited to *Economics, Econometrics and Finance*, *Social Sciences*, and *Business, Management and Accounting* for the second and third dataset.

### Data Collection and Dataset Breakdown

To meet the requirements of the research objectives, three sets of data were obtained. The first set (dataset 1) was based on a broad search using the mentioned search string in 2.1. The terms were used in the search engine to retrieve articles discussing the role of artificial intelligence in education on a global scale. The second set of data (dataset 2) included the articles that had the same terms with a specific focus on Education, Economics, Econometrics & Finance, Social Sciences, and Business, Management & Accounting. Finally, the third set (dataset 3) was obtained with a restriction to a country: Malaysia.

### Bibliometric Mapping using VOSviewer

The extracted bibliographic data in CSV format were uploaded into VOSviewer (version 1.6.21) for network and cluster visualization and analysis. Following that, the software's options were set according to the research objectives listed below:
Type and unit of analysis: A co-occurrence analysis was conducted by selecting all keywords (both author and index keywords) as the unit of analysis.
Counting method: The Full Counting method was selected. By using the full counting method, every co-occurrence of a keyword pair in a document is given an equal weight. As such, it provides an accurate measurement of the link strength and connection density within the literature network.
Visualization modes: A network visualization map and an overlay visualization map were generated for:
Network map: Identifying clusters and key hubs and spokes (responding to research objective 1).
Overlay map: Enabling the interpretation of temporal trends by identifying nodes with the nearest average year, as well as future fronts of innovation (responding to research objective 2).
Additionally, a comparable cluster map from Dataset 3 is compared to the corresponding cluster map in Dataset 2 to determine the areas of research gaps or specializations in Malaysia (responding to research objective 3).

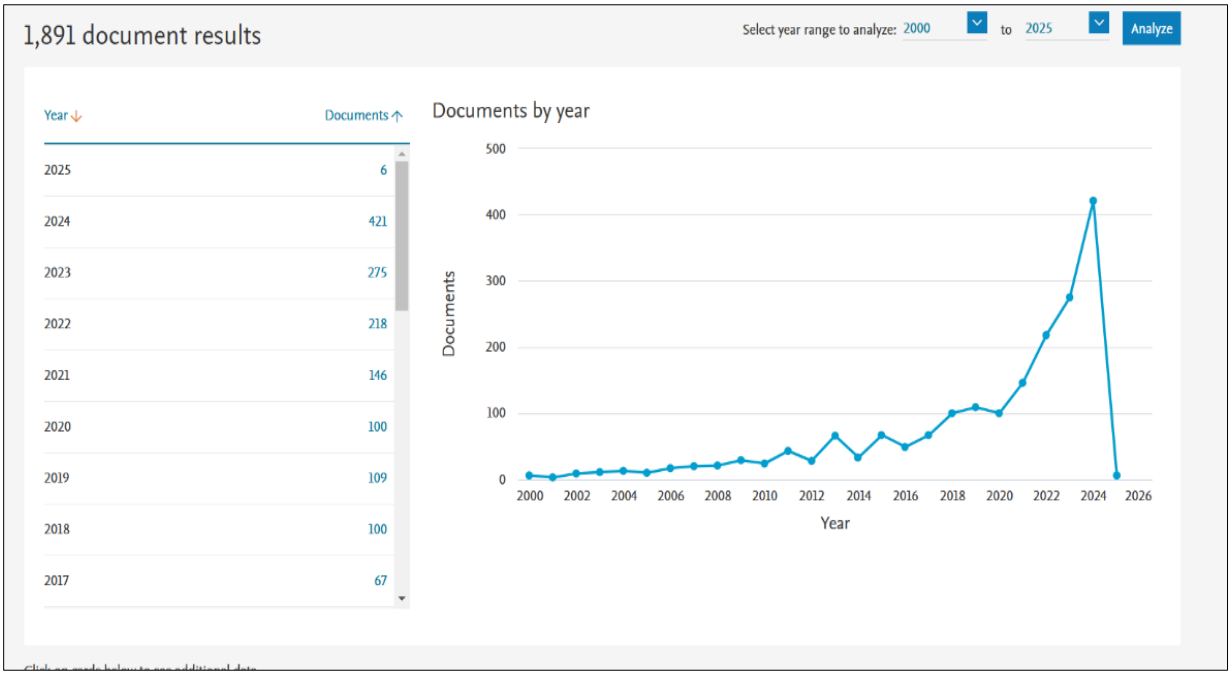
## 3. Analysis and Results

### Global Research Landscape of Artificial Intelligence and Student Behavior

Data on Artificial Intelligence and Student Behavior were extracted from the Scopus database. According to the results, 1,891 documents were published from 2000 to 2025. The following sections present the analysis to identify the current research landscape of artificial intelligence and student behavior.

### Trend Analysis by Year

**Figure 1: Publications on AI and Student Behavior (2000-2025)**




The line graph in Figure 1 clearly indicates a steady rise in the number of publications on AI and student behavior since 2010, with a significant spike in recent years. The information illustrated in the graph implies that researchers have become interested in understanding how the world around them can be harnessed to influence education and better comprehend behaviors in a classroom or laboratory setting.

In particular, the graph demonstrates that the number of documents on the topic rose sharply in 2020 and peaked in 2024 with 421 papers. The sudden increase in 2020 can probably be attributed to the COVID-19 pandemic, during which the need for virtual learning tools became more pressing than ever. Perhaps the implications of the pandemic made people realize the importance of AI in education.

Indeed, it appears that the medical field is driving the growth in publications on AI and education. Moreover, there is a possibility that the graph reflects the fact that researchers from other areas, including psychology and computer science, are now engaging in collaborative research to find out how best to use the world around them to advance education and transform behaviors in a physical or digital laboratory.

**Trends in Research Contributions by Country or Territory and Affiliation**

**Figure 2: Top Contributing Countries and Institutional Affiliations in AI and Student Behavior Research (2000–2025)**

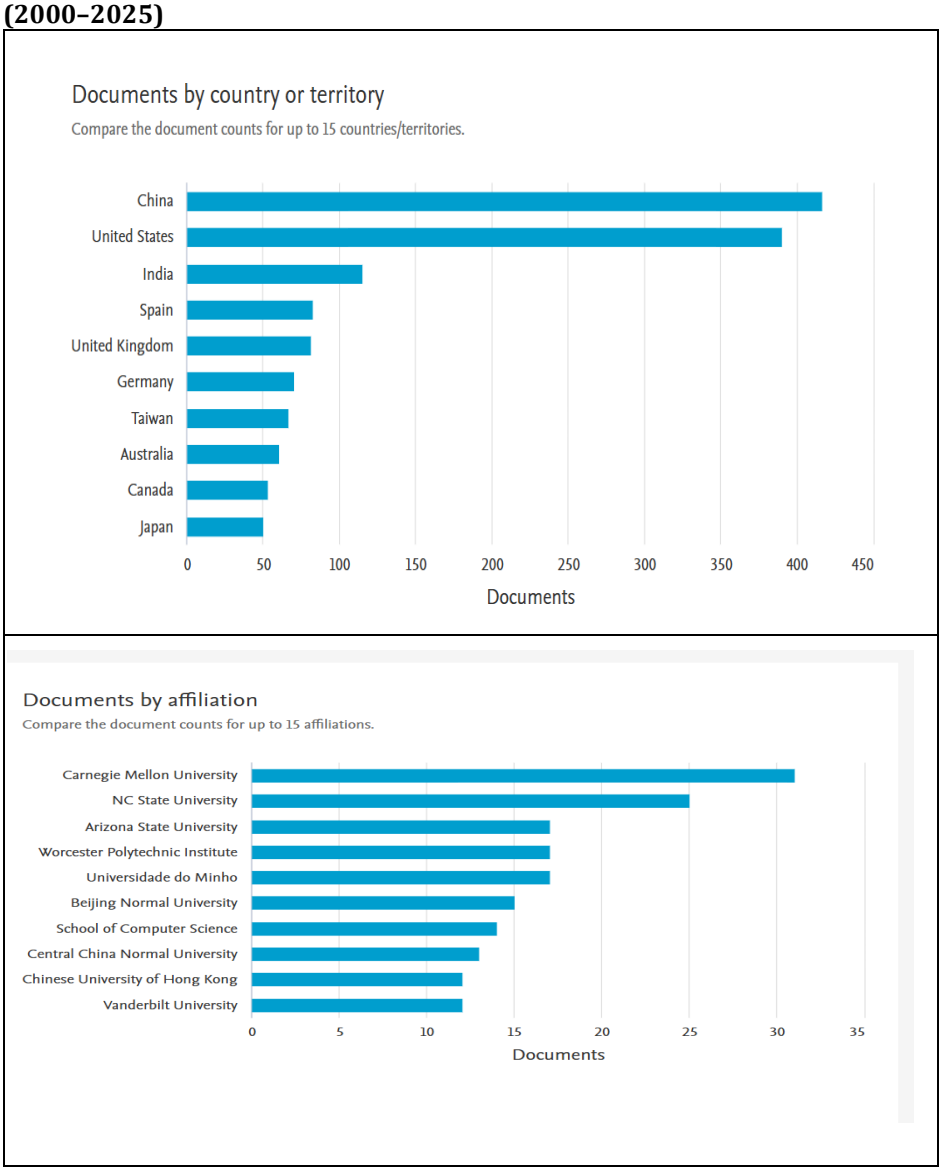



Figure 2 shows that the research on AI and student behaviors is led by China and the United States, reflecting strong national investments in AI-enhanced educational technologies. China focuses on large-scale adaptive learning systems, while the U.S. innovates in personalized learning, and India is third on the list, which implies a tendency to explore scalable AI-based educational solutions.

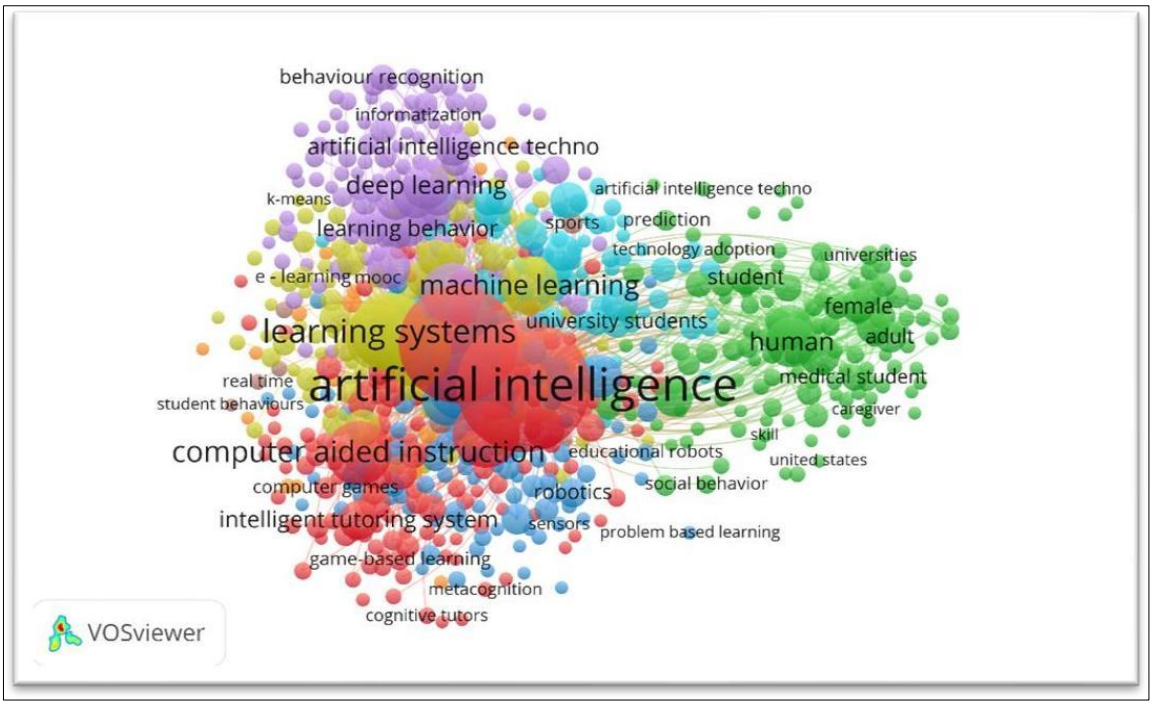
Countries like Spain, the United Kingdom, and Germany, which are members of the European Union, have a share in the research field, and they focus on AI-based inclusive education, which fits in with the EU's policy. This can be seen from the number of organizations, which include universities and companies, and their contribution to the field. For instance, the universities that are the most represented in the field of study of AI and student behaviors are Carnegie Mellon University and NC State University, with 31 and 25 documents, respectively. This fits in with the universities' reputation for excellence in computer science and education.

The countries represented in the list of the most productive organizations include the U.S., European countries

like Spain, the United Kingdom, and Germany, and Asian countries like China, India, and Japan. The Universities of Minho (Portugal), Beijing Normal University (China), Chinese University of Hong Kong (China), and others are involved in the research field of AI and student behaviors, which implies a tendency to collaborate internationally and multidisciplinary.

**Network Visualization**

**Figure 3: Network Visualization of Artificial Intelligence and Student Behavior**

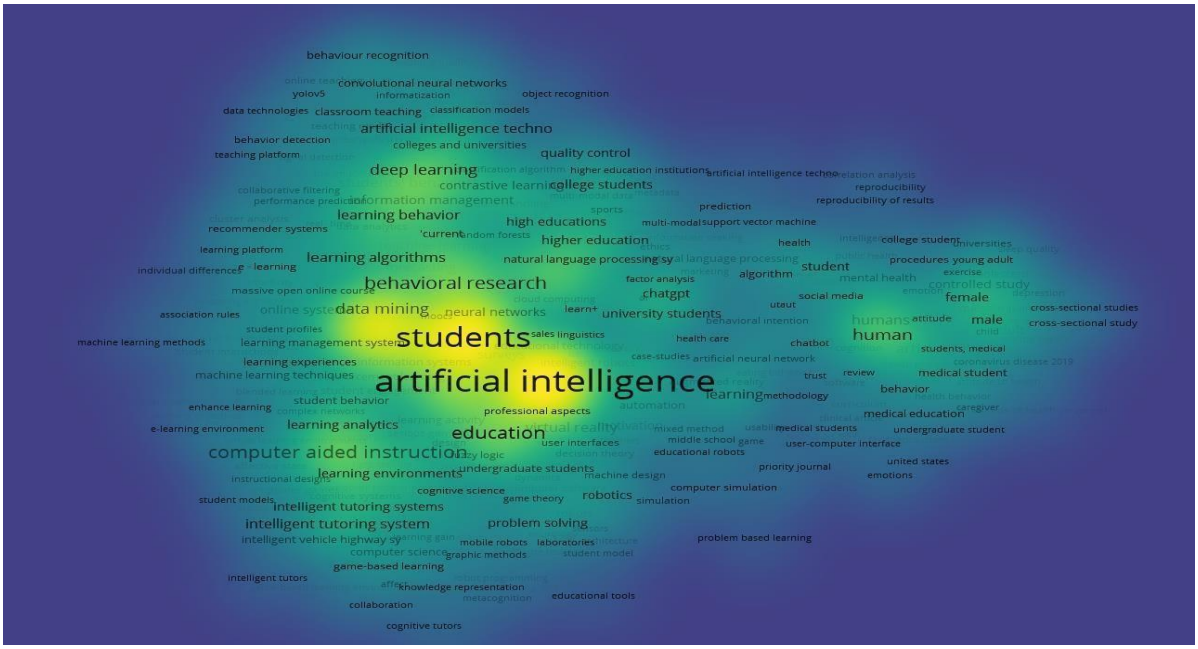



The co-occurrence network map created with the software VOSviewer based on the dataset "artificial intelligence and student behavior" is presented in Figure 3. As can be seen on the map, the search was not narrowed down to specific fields or regions. Thus, the map covers a wide range of topics related to the influence of artificial intelligence on education. In this map, the number of occurrences was set to 5, and there are 694 keywords. The main keyword in the network is artificial intelligence, which can be seen from the size of the node. The keyword is the most widespread in the articles included in the search. It can also be observed that most other keywords in the network are related to artificial intelligence in education contexts. The topics covered by the network include learning systems, machine learning, deep learning, and others.

The network map was built based on the co-occurrence of words. For the identification of topics covered by the dataset, the keywords with the highest frequency were taken into consideration. As a result, the main topics covered by the articles included in the search are artificial intelligence, learning systems, machine learning, and deep learning. This shows that the research heavily relies on advanced algorithms to analyze the behavior within digital platforms. On the other hand, the demographic clusters like "female", "adult", "student," and "medical student" show that the user-focused demographic studies operate independently from the algorithmic research.

**Density Visualization**

**Figure 4: Density Visualization of Artificial Intelligence and Student Behavior**




Based on Figure 4, the density visualization reveals that research on AI and student behaviors is highly concentrated on understanding and enhancing student learning through artificial intelligence. Central themes include keywords such as "artificial intelligence," "students," "education," and "learning," indicates that most of the researchers are focused on the computer science of building AI for the students but lack of studies on the students' physiology aspects such as how the student feel, think and behave when they are using AI.

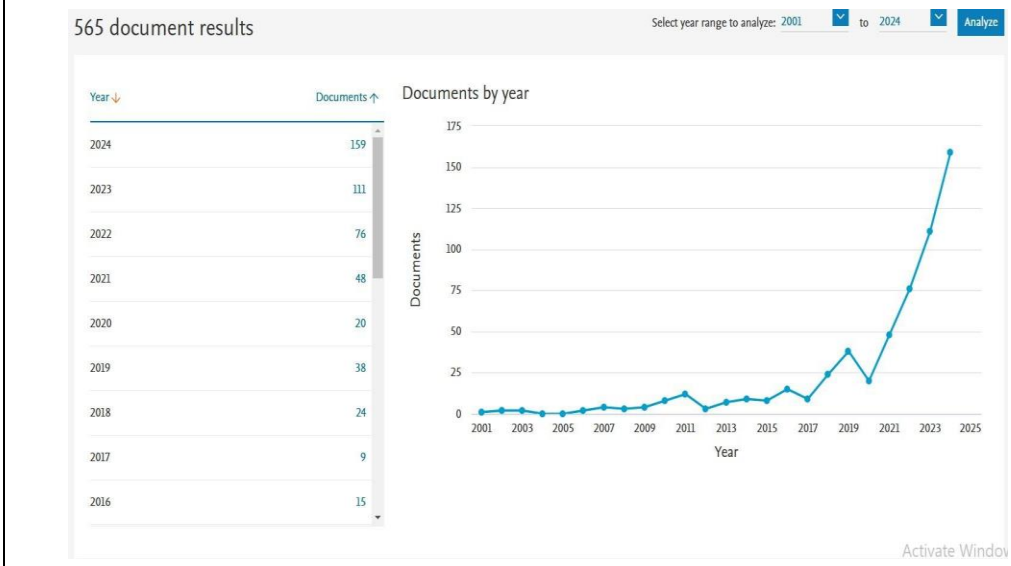
**AI and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting**

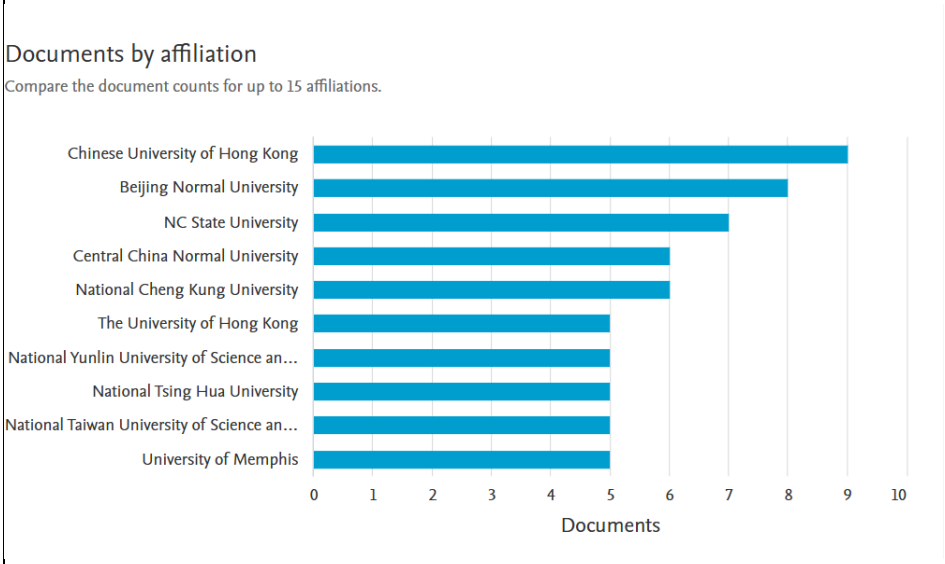
Data for Artificial Intelligence and Student Behavior from the discipline of Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting was extracted from the Scopus database. As a result, 565 documents were published from 2000 to 2025. The analysis of this data was conducted to discover the potential and future research paths of artificial intelligence and behavior within these specific disciplines.

**Publication Growth and Institutional Contributions by Affiliation**

Based on Figure 5, the data shows a relatively low level of research activity from 2001 through the mid-2010s, with publications per year remaining under 25 until around 2018. However, starting from 2019, it gained momentum and rose dramatically to reach 159 in 2024. The recent interest reflects the recognition of the importance of AI in studying and influencing student behaviors. It is also consistent with the overall tendency of AI to penetrate various areas of human activity, including academic fields beyond technology, such as economics, social sciences, and business. The COVID-19 pandemic has probably boosted this trend, as many educational establishments worldwide started employing AI for monitoring students' behaviors and providing remote learning experiences. The research field has an evident bias toward Asia, where universities appear to be at the edge of implementing AI innovations in education.

**Figure 5: Top Contributing Countries and Institutional Affiliations in AI and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting**



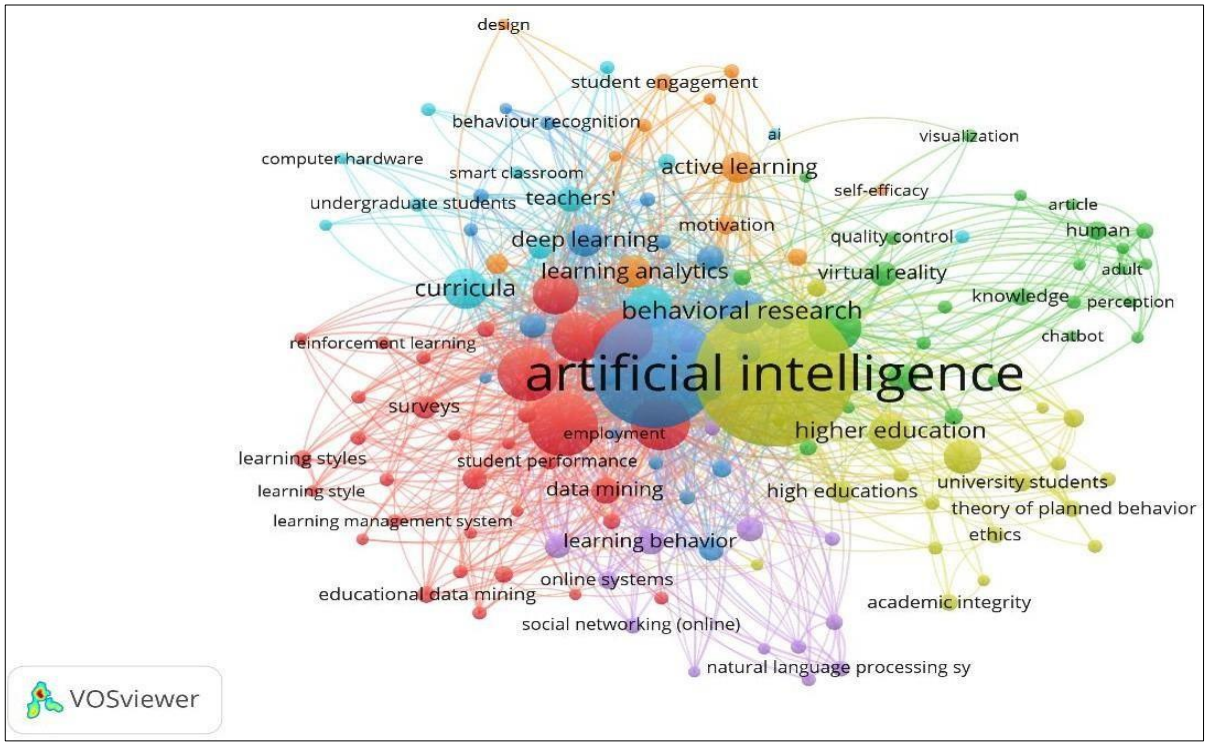

The researchers in Hong Kong and China have the highest number of publications on AI and student behavior in economics and social sciences. However, the universities in the U.S., including such contributors as NC State and the University of Memphis, participate in the research field as well. Therefore, the tendency appears to be global, and the role of AI in studying and influencing student behaviors in economics and social sciences is recognized worldwide.

**Overlay Visualization**

The co-occurrence network map of the keywords generated in VOSviewer for the dataset filtered by Economics, Social Sciences, Business, Management, and Accounting, with a threshold set at 5, is presented in Figure 6. The map includes 141 keywords found 5 or more times in the dataset. It represents the research focus on artificial intelligence (AI) and student behaviors in the selected fields of study. This word cloud reflects the trends of incorporating AI into education, primarily emphasizing student behaviors.

In particular, the map demonstrates the tendency to use AI for student behavioral modeling and research. The significance of the utilization of AI for educational purposes extends to business intelligence, economic modelling, and management studies, signifying the relevance of education, particularly higher education, to contemporary society. The word cloud indicates that the term "artificial intelligence" is the most frequent and influential concept in the analyzed set of articles. In most of the analyzed articles, AI is considered a concept that goes beyond the mere improvement of the learning process. Instead, based on the co-occurrence network map above, researchers are more interested in training algorithms on student behavioral patterns.

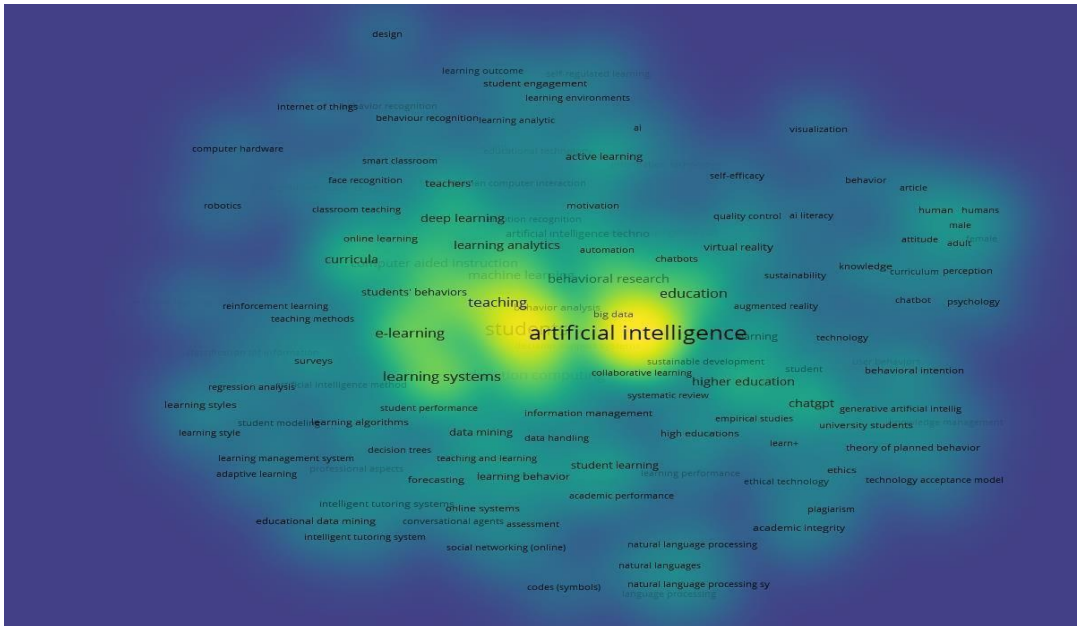
**Figure 6: Overlay Visualization of Artificial Intelligence and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting**




The overlay map reflects the trends in the utilization of AI in education over time. Earlier studies tended to concentrate on the technical aspects of the trend, namely, the ways to improve existing technologies to make the mining of educational data more efficient. In contrast, the latest literature includes a substantial number of articles addressing the ethical concerns related to the use of AI in educational settings. In particular, the terms "ethics," "academic integrity," and "theory of planned behavior" are reported in the most recent studies, indicating the researchers' interest in understanding the role of ethical considerations in AI-driven education.

**Density Visualization within Target Disciplines**

**Figure 7: Density Visualization of Artificial Intelligence and Student Behavior in Economics, Econometrics and Finance, Social Sciences, Business, Management and Accounting**




The most densely populated keywords are "artificial intelligence," "education," "students," and "teaching." These terms, located in the central yellow area, indicate that a significant portion of research is dedicated to examining how AI can enhance educational practices and understand student behaviors within educational settings. This central focus suggests a foundational interest in the role of AI as a transformative tool for education, emphasizing its potential for personalized learning and adaptive teaching methods.

**AI and Student Behavior in the Malaysian Setting**

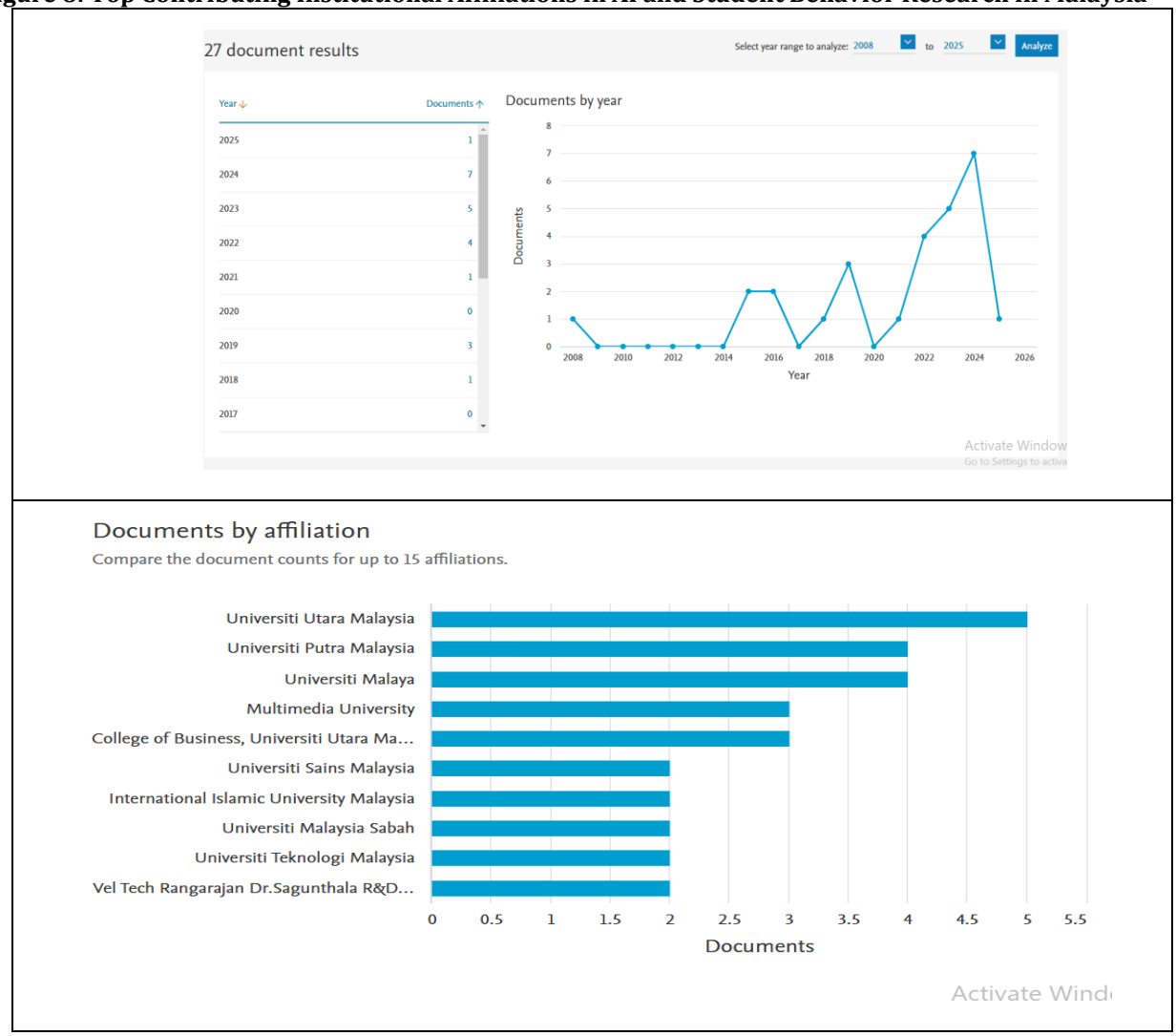
Data for Artificial Intelligence and Student Behavior in Malaysia were extracted from the Scopus database. As a result, 565 documents were published from 2000 to 2025. The analysis of this data was conducted to evaluate the current and potential research focus on artificial intelligence and student behaviour in Malaysia.

**Trend Analysis by Year and Affiliation in Malaysia**

Research on the topic of artificial intelligence and student behaviors in Malaysia has experienced gradual development, with few publications between 2008 and 2018 but a significant increase since 2019. There was a sudden upsurge of interest in 2023 and 2024, which appears to be associated with a growing recognition of the importance and value of digital learning and technologies, including AI, in education, especially after the COVID-19 pandemic (Mohsin et al., 2024; Madiah et al., 2025; Chieh & Teik Aun, 2025). Therefore, there is a visible trend that Malaysia is turning its attention towards exploring how AI might be applied in education to promote engagement and learning. In the future, it is expected that research efforts will be dedicated to advancing comprehension of various methods and techniques used to stimulate students using artificial intelligence.

According to the graph in Figure 8, the universities that make the biggest contributions to the research field of artificial intelligence and student behaviors in Malaysia are Universiti Utara Malaysia, Universiti Putra Malaysia, and Universiti Malaya. Overall, the three universities appear to produce a comparably high number of research works on the subject. In addition, other institutions such as Multimedia University and Universiti Sains Malaysia generate a considerable amount of research works on the topic under consideration. Thus, there is a visible tendency that multiple organizations engage in education-related artificial intelligence research in the country.

**Figure 8: Top Contributing Institutional Affiliations in AI and Student Behavior Research in Malaysia**

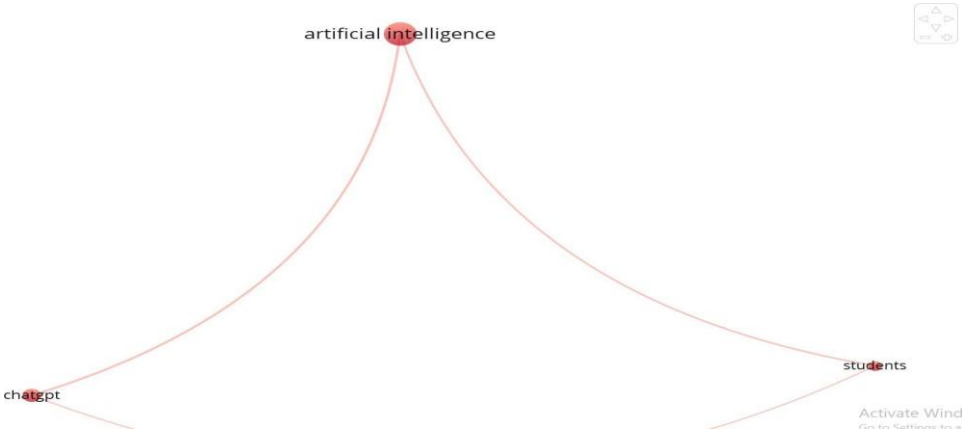



**VOSviewer Network Analysis**

Figure 9 shows that the VOSviewer analysis of the dataset related to Malaysia resulted in a network with only three nodes: 'artificial intelligence,' 'students,' and 'ChatGPT.' The fact that only three keywords appear prominently in a network related to Malaysia indicates that the country's research area is underdeveloped and lacks a considerable number of topics. Indeed, based on the analysis, it can be concluded that the study of artificial intelligence and students' conduct is the major research area in Malaysia, and it has been attracting only a small amount of attention.

The center of the network is taken by the term 'artificial intelligence,' which means that the country's scholars are interested in AI and its implications for education and society in general. In most cases, such studies are driven by the assumption that AI will profoundly alter the way people operate; hence, it is essential to approach the phenomenon with due care and attention.

**Figure 9: Network Analysis of AI and Student Behavior Research in Malaysia**

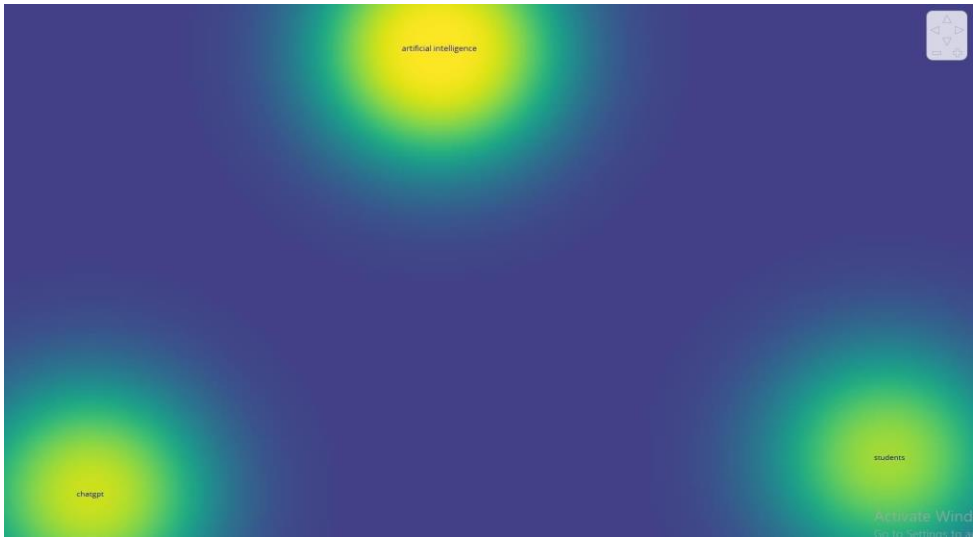



The way in which the term 'students' relates to 'artificial intelligence' implies that researchers are interested in AI's impact on students' behaviors. Such studies can be motivated by the intention to identify the ways AI can be integrated into a broader educational setting to make the process of acquiring knowledge more effective and efficient.

As for the relation between 'students' and 'ChatGPT,' it can be assumed that Malaysian scholars are also interested in the ways ChatGPT and other similar AI chatbots can benefit students. It seems reasonable given that such technologies can offer students a wide range of solutions to help them succeed in their studies without spending too much time doing so.

**Density Visualization and Regional Research Gaps**

**Figure 10: Density Visualization of Artificial Intelligence and Student Behavior in Malaysia**




Based on the density visualization in Figure 10, it can be inferred that, in the case of Malaysia, contemporary research into artificial intelligence, students, and ChatGPT is fragmented and disjointed. There is not much overlap between the three areas of study, which can be deemed as evidence of the lack of attention that research into AI in the setting of education attracts. Therefore, there is a great number of potential research topics related to artificial intelligence and students in Malaysia. Further studies should be aimed at unifying the three research areas to integrate AI and ChatGPT into the existing educational framework in the country.

## 4. Discussion

The primary objective of this bibliometric analysis was to map the intellectual structure of artificial intelligence and student behavior across global and localized contexts within the social sciences and business disciplines. By comparing global outputs (Datasets 1 and 2) with the Malaysian context (Dataset 3), this study reveals a profound disconnect between global research maturity and regional research infancy.

### Global Maturity vs. Regional Infancy

Globally, literature has evolved from foundational, technically driven topics such as educational data mining and learning management systems into highly complex, human-centric investigations. The global overlay visualizations indicate that current frontier research is urgently addressing the psychological and moral dimensions of AI adoption. Current discussion emphasizes the ethical considerations of Generative AI integration, noting its potential to disrupt traditional assessment practices and raise concerns around academic integrity and the authenticity of student work (Francis et al., 2025).

Conversely, the Malaysian research network is remarkably disconnected. The localized data reveals a hyper-focus on the triadic relationship between artificial intelligence, ChatGPT, and students. The total absence of behavioral constructs (e.g., motivation, cognitive load, emotional well-being) and pedagogical frameworks indicates that regional research is still reacting to the initial disruption of generative AI.

### A Framework for Future Research

To bridge this gap, future research, especially in the Malaysian context and other developing digital economies, should go beyond descriptive technology adoption studies. Given the 'cold spots' in the density maps, further research could focus on:

Exploring Behavioral Theories: Future studies should incorporate established behavioral theories, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) or the TPB, to understand the underlying reasons why business and social science students misapply or correctly apply generative AI. Applying the UTAUT model is an appropriate theoretical framework to examine students' voluntary adoption of novel technologies like ChatGPT (Budhathoki et al., 2024). Further elucidating this theoretical model, particularly in the context of student anxiety, and testing its applicability in the Malaysian higher-education institutional setting, would yield valuable cross-cultural insights into technology-adoption behavior and intention to adopt (Budhathoki et al., 2024).

Ethics and Academic Integrity: Empirical studies are needed to explore the ethical implications of the use of AI, plagiarism, and policy compliance among university students. GenAI presents a significant challenge to academic integrity since its disruptive potential undermines the authenticity of student work (Francis et al., 2025). Future studies should focus on the responsible application of GenAI to avoid a dilution of students' essential cognitive and creative competencies (Francis et al., 2025).

Cognitive and Emotional Impacts: Researchers could explore the affective domain by investigating AI-induced anxiety, digital fatigue, and the impact of AI-dependence on students' metacognition and critical thinking abilities.

## 5. Conclusion

The research is aimed at finding out how the students' behavior may change as artificial intelligence transforms higher education. The research was conducted using the bibliometric method to determine the key trends and directions of the change in question. I used the software tool VOSviewer to visualize the trends and thus identify the research foci from 2000 to 2025. According to the findings, the field appears to shift from a local regional level to a global one. In particular, the attention to the topic in different regions is growing, yet the current research practice is fragmented, with a focus on basic mechanisms of interaction with generative artificial intelligence. Thus, the paper helps identify the subsequent research questions, areas, and hypotheses that would be needed to explore the change in student behaviors in relation to transformative AI.

The study has several limitations that should be considered when interpreting the results and planning future related research. Firstly, the study has utilized one database, Scopus, which may present an incomplete picture of the field. Future studies should consider employing multiple databases, including Web of Science and Google Scholar. Secondly, the field is changing rapidly, given the rise of transformative AI, meaning that the behaviors of the last few years may no longer be relevant. Therefore, there are some recent papers not included in the study that may have different findings.

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# Enhancing Cooperative Governance and Rural Entrepreneurship for Sustainable Agricultural Development: A Proposed Comparative Study of Uzbekistan and Malaysia

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**Abstract:** This paper presents a comparative study of cooperative governance and rural entrepreneurship in Uzbekistan and Malaysia based on one main issue, which is smallholder farmers produce 75 to 85 percent of Uzbekistan's horticultural output, however, only 7.5 percent of agricultural land is managed through formal cooperatives. Why did this issue happen, and how can Malaysia's experience with FELDA and FELCRA be used to help other countries dealing with the same challenge? Based on the institutional theory, social capital theory, and entrepreneurial ecosystem approaches, this paper outlines an integrated conceptual framework for understanding the barriers and opportunities facing cooperative development in Uzbekistan. Malaysia serves as a comparative reference point throughout. The framework highlights four interconnected factors of influence, i.e., institutional environment, social and cultural dynamics, organizational capacity, and market integration. Malaysia's experience with FELDA and FELCRA suggests that sustained government support, systematic trust-building, and investment in organizational capacity can overcome historical barriers to cooperation. As a conceptual paper, the proposed framework requires empirical validation through future comparative research. It offers practical implications for policymakers, development practitioners, and farmer organizations seeking to enhance collective action in agricultural sectors. The paper contributes to the limited research on agricultural cooperation in transition economies and proposes a research agenda for investigating how Malaysia's experience with state-supported cooperative models might help Uzbekistan's ongoing agricultural reforms.

**Keywords**: *Agricultural cooperatives, governance, rural entrepreneurship, sustainable agriculture, comparative study.*

## 1. Introduction and Background

Agricultural cooperatives represent a distinctive organizational form that combines economic objectives with social and democratic principles. Most cooperatives offer pathways to overcome market inefficiencies, access technology, and achieve economies of scale for smallholder farmers. Uzbekistan's agricultural sector represents both the challenges and the opportunities for cooperative development. In terms of statistics, the smallholder farmers in Uzbekistan are currently operating on fragmented landholdings, producing 75 to 85 percent of the country's fruit and vegetable output. Nevertheless, only 7.5 percent of agricultural farmland is managed under formal cooperative structures (World Bank, 2021). This disconnection between productive capacity and organizational infrastructure reflects a significant challenge for agricultural transformation in Uzbekistan as one of the agricultural nations in Central Asia.

The transformation of Uzbekistan's agricultural sector started after independence in 1991, focusing more on individual farming rather than collective structures. It reflected a political rejection of earlier collective agriculture initiative models (Abdurakhmonov & Khamidov, 2023) that has resulted in new challenges whereby smallholder farmers face constrained access to finance, limited technological adoption, weak bargaining power in concentrated markets, and persistent difficulties in achieving economies of scale (Bernard & Spielman, 2009; Trebbin, 2014). These challenges are intensified by historically rooted distrust among farmers, insufficient business and management skills, and an unclear regulatory framework that fails to adequately support cooperative formation (Bijman et al., 2012; Lerman, 2017).

Recent policy shifts indicate a transitional period for agricultural governance in Uzbekistan. The draft of the 2022 Law on Agricultural Cooperatives reflects an expanding effort by Uzbek policymakers to leverage smallholder collaboration (Ministry of Agriculture of the Republic of Uzbekistan, 2022). This legislative shift, however, invites a critical examination of how cooperative governance and rural entrepreneurship can be restructured to drive long-term sustainability. In Malaysia, the state-backed land development frameworks like

FELDA (est. 1956) and FELCRA (est. 1966) were scaled through integrated cooperative systems that fundamentally reshaped smallholder livelihoods (FELDA, 2020; FELCRA, 2020). This suggests that institutional backing, when paired with target-driven credit, technical extension, and local capacity-building, can significantly elevate not only smallholder participation but also production yield. Recent bilateral engagements between Tashkent and Kuala Lumpur reinforce the strategic utility of this comparative lens (Bernama, 2024; The Star, 2025).

This study is conceptual in nature, rather than presenting empirical findings, and proposes a research agenda. The main goal is to develop a strong conceptual framework that can be useful for future empirical investigation. The research questions addressed in this paper are: What are the main challenges for the establishment and operation of successful cooperatives by rural farmers in Uzbekistan? What do the Malaysian cooperative models tell us about the agricultural reform effort in Uzbekistan? What are the ingredients of successful cooperative governance and rural entrepreneurship, and how can they be adapted to the Uzbek context?

The paper proceeds as follows. Section 2 reviews the theoretical and empirical literature on agricultural cooperatives, governance, and rural entrepreneurship. Section 3 presents the comparative context of Uzbekistan and Malaysia. Section 4 outlines the proposed conceptual framework, including testable propositions. Section 5 discusses the proposed research methodology and agenda. Section 6 presents implications for policy and practice. Section 7 concludes with recommendations for future research.

## 2. Literature Review

The theoretical literature on cooperatives is diverse in its disciplinary roots. It draws upon economics, sociology, political science, and organizational studies. In this section, the main perspectives are presented, and the gaps that are filled by the proposed framework are underlined.

### Perspectives of Institutional Economics

From the institutional economics perspective, cooperatives are an organizational response to market failures and transaction costs (Williamson, 1985). Smallholder farmers incur high transaction costs in accessing input markets, information, credit, and output markets. This is because they are small, geographically dispersed, and have limited bargaining power. Cooperatives reduce these transaction costs through pooling of resources, information sharing and economies of scale in terms of input procurement and output marketing (Bijman et al., 2012). The cooperative form has advantages in an environment with imperfect information, asset specificity, and uncertainty, which are all common features of agricultural markets (Hendrikse & Veerman, 2001). Governance challenges are also present in cooperatives because of their distinct ownership and control arrangements. The property rights approach highlights the tension between the individual interests of member owners and collective goals (Hansmann, 1996). Cooperatives need to harmonize potentially conflicting goals of various types of members, deal with free-rider issues, and align governance systems to member incentives and the performance of the organization (Cook, 1995; Bijman et al., 2012).

### Trust and Social Capital

Social capital theory offers complementary insights. Putnam (1993) describes social capital as the features of social organization such as networks, norms and trust that facilitate coordination and cooperation for mutual benefit. Within the framework of cooperatives, social capital is defined as the interpersonal trust, shared norms, and reciprocal relationships among farmers that help overcome collective action problems (Woolcock & Narayan, 2000). Trust, as one of the important elements of social capital, is deeply valued in Uzbekistan. Historical experiences of forced collectivization have created a deep-seated distrust of formal cooperative structures (Lerman, 2017; Kandiyoti, 2018). This historical legacy creates a deficit of trust that needs to be addressed through deliberate trust-building mechanisms. Social capital theorists point to the multi-level nature of trust, i.e., interpersonal, community, and institutional. Effective cooperative governance requires attention to each of these levels (Pretty, 2003). The success of FELDA and FELCRA in Malaysia has been partly attributed to a systematic approach in establishing trust, which involved community and religious leaders to gain the acceptance of farmers (Mansor & Zakaria, 2019).

**Approaches to Entrepreneurial Ecosystems**

Recent rural entrepreneurship scholarship has focused on entrepreneurial ecosystems. These are the networks of actors, institutions, and resources that are interlinked and that support entrepreneurial activity (Stam, 2015; Spigel, 2017). This view considers not only individual entrepreneurial characteristics, but also the wider environment. Some of the main elements include formal institutions (laws, regulations, and policies), informal institutions (norms, culture, and social networks), resource availability (finance, infrastructure, and human capital), and market conditions (Stam & van de Ven, 2021). The entrepreneurial ecosystem perspective on agricultural cooperatives underlines the many enabling conditions that are needed for the success of cooperatives. Cooperative development is not only dependent on individual farmers' motivation but also on supportive policy frameworks, accessible financial services, suitable training and extension, functional infrastructure and market linkages (Markelova et al., 2012).

**Cooperatives and the livelihoods of smallholder farmers**

There is much empirical evidence that agricultural cooperatives can make significant improvements to the livelihoods of rural smallholders, even though the results are highly context-dependent. Systematic reviews indicate that cooperative membership is positively correlated with income, agricultural productivity, technology uptake, and market access (Abebaw & Haile, 2013; Ma & Abdulai, 2016; Verhofstadt & Maertens, 2014). In East Africa, cooperative membership has been found to increase the incomes of smallholder farmers by 20 to 30 percent through improved market access and collective bargaining (Wanyama et al., 2008). Research in Ethiopia has shown that members of cooperatives receive higher prices and have better access to credit and extension services (Francesconi & Heerink, 2010; Bernard & Spielman, 2009). In India, Trebbin (2014) demonstrated that producer companies enabled small farmers to access modern retail chains and capture value through quality enhancements and transaction cost reductions.

Similar positive outcomes have also been observed among Malaysian cooperatives, especially in the oil palm sector. Studies on Sustainable Oil Palm Growers Cooperatives have shown that cooperative membership enables smallholders to achieve efficient farm management, lower operational costs, and better market access (Ishak & Che Omar, 2023). In the meantime, studies also showed the positive impact of financial literacy and risk management literacy on cooperative financial performance. Moreover, intangible resources like member participation and relational capital are important determinants of cooperative performance (Ishak & Che Omar, 2023).

**Cooperatives in the Transition Economies**

The study of agricultural cooperation in transition economies reveals some issues. Agriculture became fragmented after moving from collective farms to individual plots. The economies of scale and access to services were diminished (Swinnen & Vranken, 2010; Lerman, 2017). Research in several transition economies shows that farmers still face obstacles to cooperation. This means that there is a lack of trust in collective organizations, limited management skills, ambiguous legal structures, and weak financial infrastructure (Lerman et al., 2004; Swinnen & Vranken, 2010). Informal networks based on family, kinship, and neighborhood ties often replace formal cooperatives. But they have neither a legal status nor an organizational capacity to make an impact in the market (Kandiyoti, 2018; Decker et al., 2020). A similar gap in research is seen for agricultural cooperatives in Uzbekistan on the above-mentioned topic. An ethnographic study in Andijan (Kandiyoti, 2018) reveals how farmers migrate between different social and economic networks and are distrustful of formal cooperative formations. This is further evidenced by Abdurakhmonov and Khamidov (2023), who describe current policy advancements and identify implementation issues that limit the effectiveness of new legislation.

**Structures of cooperative governance**

Agricultural cooperative governance is the institutions, processes, and activities through which members control and oversee (Cornforth, 2004). Democratic member control is characterized by cooperative governance, which is generally in the form of one-member-one-vote systems, boards elected by members, and accountability procedures (Bijman et al., 2012). Research has identified a number of governance difficulties peculiar to cooperatives. The horizon problem occurs when members' short-term interests conflict with the long-term sustainability of the organization (Cook, 1995). The control problem is the potential divergence of preferences of the members and the board or management choices (Hansmann, 1996). The portfolio dilemma

illustrates the challenges that occur in fulfilling the needs of a diversified membership as cooperatives grow (Hendrikse & Verman, 2001). Good governance concerns the makeup and competence of the board, decision-making process, transparency of information, accountability systems, and dispute resolution procedures (Sacchetti & Tortia, 2014). In the research, explicit financial management, frequent meetings of members, and bylaws are emphasized (Markelova et al., 2012; Bernard & Spielman, 2009). According to Malaysian research by Ishak and Che Omar (2023), the most important intangible resource in influencing the financial and non-financial performance of the cooperative is member engagement.

**Institutional support and policy environment**

Government policy is important in creating an environment for the development of cooperatives. Important policy areas include legal recognition and registration procedures, taxation and financial incentives, access to credit and subsidies, provision of extension and training services, and market infrastructure (Bijman et al., 2012; Francesconi & Heerink, 2010). The Malaysian experience with FELDA and FELCRA highlights the need for continued government support. One of the key success factors is the leadership from the government, which has been given consistent support from the New Economic Policy in 1971 to the mid-1990s (Mansor & Zakaria, 2019). This support has helped FELDA and FELCRA to develop practical know-how on value chain management, land consolidation and rehabilitation, and financial services for smallholder farmers (Mansor & Zakaria, 2019). The theoretical literature on cooperatives draws from multiple disciplinary traditions. Economics, sociology, political science, and organizational studies all contribute. This section reviews the main perspectives and identifies gaps that the proposed framework addresses.

**Comparative Context: Uzbekistan and Malaysia**

**Uzbekistan: The Challenge of Cooperative Development**

In Uzbekistan, small private farms dominate the agricultural industry. 75–85 percent of the production of fruits and vegetables (World Bank, 2021). These smallholders farm on fragmented landholdings, a relic of agrarian reforms that favored individual farms over communal institutions (Abdurakhmonov & Khamidov, 2023). These farmers have little formal cooperation. This condition constrains the ability to address market inefficiencies, embrace current technologies, and negotiate better prices (Bernard & Spielman, 2009; Trebbin, 2014). Historical hurdles to cooperation have included distrust among farmers, a legacy of forced collectivization (Lerman, 2017). There is also a lack of cooperative management skills and poor regulatory backing (Bijman et al., 2012). Scholars working on Central Asia have highlighted that informal networks sometimes substitute for the absence of formal cooperatives but lack the legal and financial infrastructure to scale (Kandiyoti, 2018). The recent policy changes, such as the proposed Law on Agricultural Cooperatives (2022) and the national agricultural plan, show a greater government emphasis on supporting farmer collectives (Ministry of Agriculture of the Republic of Uzbekistan, 2022). The challenge is to implement it. Their usefulness is limited due to confusing restrictions and limited capacity (Abdurakhmonov & Khamidov, 2023).

**Malaysia: A Model of Progressive Cooperative**

The experience of the agricultural cooperative in Malaysia is a useful lesson. Two major institutions, FELDA and FELCRA, have respectively played vital roles in the agricultural growth of Malaysia (Mansor & Zakaria, 2019).

FELDA, which was formed in 1956, was initiated to tackle landlessness and rural poverty. The FELDA model selects landless rural Malays and uneconomic smallholders as settlers, provides them with at least 4 hectares of land planted with rubber or oil palm, housing, and basic facilities such as water supply, schools, and mosques. It consists of three phases: cooperatives for learning, individual land allocation, and land titling. It also provides loans for development costs, which are deducted from the settlers' income within 15 years, and consistent government support, including monthly subsidies for the first few years (Mansor & Zakaria, 2019). The integration is supported by Koperasi Permodalan FELDA (KPF), a multi-billion ringgit cooperative. Institutionalized upstream plantation logistics. KPF is a platform for settlers and staff to pool resources, gain institutional equity, and participate in dividends from downstream processing, logistics, and global agribusiness marketing. The World Bank has recognized FELDA as one of the most successful land development agencies in the world despite the high cost of almost USD 25,000 per household in the 1980s (Mansor & Zakaria, 2019).

Founded in 1966, FELCRA deals with land fragmentation and rehabilitation. The key features are the consolidation of fragmented land holdings into efficient production units, provision of low-interest loans with long grace periods and 25-year repayment terms, profit-sharing arrangements where 80 percent of the revenues are given to the participants and 20 percent to the repayment of the loans, organization of the farmers into cooperatives to engage in agri-business activities, and generation of off-farm income to supplement the plantation income (Mansor & Zakaria, 2019). The experience of FELCRA shows that earning the trust of farmers through community participation, involvement of community and religious leaders, and campaign organization are important ways to help farmers realize the benefits of land consolidation (Mansor & Zakaria, 2019).

**Recent Developments and Bilateral Cooperation**

Recent developments indicate increasing agricultural cooperation between Malaysia and Uzbekistan. Both countries have engaged at a high level and discovered areas of partnership. These consist of aquaculture, smart farming, agricultural research and development, and sustainable technology (The Star, 2025; Bernama, 2024). The Malaysian Agricultural Research & Development Institute (MARDI) is considering a collaborative research project with Uzbekistan's Center of Knowledge and Innovation in Agriculture (AKIS) (Bernama, 2024). In 2025, Malaysia's bilateral agricultural trade was RM338.48 million, with great potential for expansion (The Star, 2025). Malaysia's experience in biofloc technology for aquaculture and smart agricultural technologies (The Star, 2025; Bernama, 2024) is complemented by Uzbekistan's expertise in horticulture and irrigation. These improvements provide a basis for deeper learning and cooperation in cooperative growth. They contribute to making the proposed comparative study very topical and relevant.

**Proposed Conceptual Framework**

Based on the theoretical and empirical material reviewed above, this section proposes an integrated conceptual framework. The framework is to provide future empirical studies on cooperative governance and rural entrepreneurship in Uzbekistan with comparative insights from Malaysia.

**Theoretical Integration**

Institutional economics analyzes the establishment and regulation of cooperation by the way formal and informal rules affect them. But it says little about trust or social interactions. Social capital theory covers that gap; it talks about trust and networks but does not pay enough attention to the wider policy and market environment. Approaches to entrepreneurial ecosystems capture the interrelated circumstances for cooperative entrepreneurship. But they do not specifically address the special cooperative governance concerns. The framework offered here synthesizes diverse ideas in a way that more accurately reflects the complexity of cooperative development than any one theory could.

**Institutional Environment**

The institutional environment is composed of official and informal regulations that affect the creation, governance, and performance of cooperation.

*Legal and Regulatory Framework.*

The legal framework in Uzbekistan was developed based on the draft Law on Agricultural Cooperatives of 2022. Key factors impacting cooperative formation include registration procedures, governance requirements, financial rules, and tax incentives. The effectiveness depends on the implementation processes and on the local administrative competence (Bijman et al., 2012; Sacchetti & Tortia, 2014). Malaysia's experience points to the need for a supportive legal framework and robust institutional capabilities. Dedicated legislation and ongoing government assistance were advantages of FELDA and FELCRA (Mansor & Zakaria, 2019). Malaysian Palm Oil Board (MPOB) provides technical advice and support for cooperatives through its TUNAS offices nationwide (MPOB, 2023).

*Policy Coherence and Implementation.*

Cooperative development crosses a few policy areas. Such coordination involves the cooperation of government ministries and agencies (Markelova et al., 2012). Mansor & Zakaria (2019) stated that FELDA and FELCRA in Malaysia are placed under direct supervision by the Prime Minister's Department and continued backing by successive administrations. The ability for policy implementation in Uzbekistan, especially at the local levels, still has to be addressed (Abdurakhmonov & Khamidov, 2023).

**Social and Cultural Dynamics**
Social and cultural factors shape farmer attitudes toward cooperation and influence cooperative functioning.

*Trust and Social Capital*
In Uzbekistan, the legacy of collectivization from the past has led to deep-seated suspicion (Lerman, 2017; Kandiyoti, 2018). This trust deficit can be addressed by focusing on interpersonal trust, institutional trust, and system trust (Woolcock & Narayan, 2000; Pretty, 2003). The Malaysian example shows that systematic trust-building is achievable. FELCRA's approach was to work with community and religious leaders to win farmer approval and to organize campaigns to illustrate the benefits of collaboration (Mansor & Zakaria, 2019). This has been further strengthened by recent efforts like the KPSM cooperatives, which offer substantial benefits in terms of effective farm management and market access (Ishak & Che Omar, 2023).

*Social Networks and Cultural Values*
Informal networks matter in the lives of rural people in both Uzbekistan and Malaysia. In Uzbekistan, these networks are a social safety net but can impede official cooperation (Kandiyoti, 2018). Cooperatives in Malaysia have been able to leverage existing community institutions while introducing formal governance that promotes accountability and scale (Mansor & Zakaria, 2019).

**Organizational Capacity**
Organizational capacity encompasses skills, systems, and resources enabling effective cooperative functioning.

*Human Capital and Leadership*
The performance of cooperatives is critically dependent on quality leadership (Bijman et al., 2012). Leadership development has been a focus in Malaysia, and cooperatives have been trained and provided with technical advice from MPOB (MPOB, 2023). Financial literacy and risk management literacy have a positive effect on cooperative financial success (Ishak & Che Omar, 2023). Member participation and relational capital are the most essential intangible resources that determine the performance of cooperatives (Ishak & Che Omar, 2023).

*Governance Practices*
Quality governance is at the heart of the sustainability of cooperatives. The key practices are member engagement, transparency, accountability, conflict resolution, and strategic planning (Cornforth, 2004; Markelova et al., 2012; Sacchetti & Tortia, 2014). Malaysian cooperatives show the necessity of good ties with members and key constituencies (Ishak & Che Omar, 2023).

*Financial Management*
Another requirement for the sustainability of cooperatives is the ability to be financially viable. Adequate capitalization, sustainable sources of income, and financial controls are key (Cook, 1995; Markelova et al., 2012). Mansor & Zakaria (2019) indicate that the loan repayment mechanism of FELDA and the profit-sharing agreements of FELCRA are models of financial sustainability.

**Market Integration**
Market integration encompasses connections between cooperatives and the broader economic environment.

*Market Access and Value Chains*
Cooperatives provide mechanisms for smallholders to reach markets. Market information, quality standards, value addition, and collective bargaining are some of the factors (Markelova et al., 2012; Wanyama et al., 2008). The Malaysian KPSM cooperatives are also a good example of cooperatives involved in entrepreneurial operations such as the delivery of fertilizer, road maintenance services, gas stations, and direct sale of fresh fruit bunches to mills (Ishak & Che Omar, 2023). These activities contribute to income for members and sustainability of the cooperative.

*Financial Services*
Having the right financial services available is key. 2.2 Role of Malaysian Cooperatives. Malaysian cooperatives provide financial services to smallholder farmers through Koperasi Permodalan FELDA (KPF) (Mansor and Zakaria, 2019). FELDA's credit mechanisms for development costs and FELCRA's low-interest loans with long

repayment periods are models to inform Uzbek policy (Mansor & Zakaria, 2019).

*Value Chain Relationships*
Cooperative results are highly dependent on relationships with buyers, processors, and other value chain operators. Malaysian cooperatives have substantial value chain links, even with mills for direct fresh fruit bunch sales (Ishak & Che Omar, 2023). FELDA's experience in value chain management can provide practical know-how for the development of cooperatives in Uzbekistan (Mansor & Zakaria, 2019).

**Propositions for Empirical Testing**
The proposed framework generates several testable propositions that can guide future empirical investigation.

**Proposition 1**: Cooperative formation in Uzbekistan is positively associated with the clarity and implementation capacity of legal and regulatory frameworks, moderated by local administrative capacity.
**Proposition 2**: Trust-building interventions that engage community and religious leaders are positively associated with cooperative participation rates in Uzbekistan, following the FELCRA model.
**Proposition 3**: Organizational capacity, particularly leadership quality and financial literacy, mediates the relationship between institutional support and cooperative performance.
**Proposition 4**: Market integration, including value chain relationships and access to financial services, is positively associated with cooperative sustainability and member income.
**Proposition 5**: The effectiveness of transferring Malaysian cooperative models to Uzbekistan is contingent on local adaptation to historical, cultural, and institutional contexts.

These propositions provide a structured agenda for empirical testing and refinement of the conceptual framework.

**Interconnections and Dynamic Relationships**
The four domains of the conceptual framework interact in complex ways. Institutional-social interactions shape how policies are implemented and how social norms influence institutional effectiveness (Swinnen & Vranken, 2010). Capacity-institutional interactions determine how effectively cooperatives can access and utilize institutional support. Social-capacity interactions enable knowledge sharing and collective learning (Pretty, 2003). Market-capacity interactions determine cooperatives' ability to meet market requirements and capture value (Markelova et al., 2012).

**Application to Uzbekistan with Malaysian Lessons**
Applying this framework to Uzbekistan with comparative insights from Malaysia highlights several key dynamics that warrant empirical investigation.

*Historical Legacy and Institutional Change.*
Uzbekistan's historical legacy continues to shape farmer attitudes, while recent policy developments create opportunities. Malaysia's experience demonstrates that sustained government support and systematic trust-building can overcome historical barriers (Mansor & Zakaria, 2019). This proposition requires empirical testing in the Uzbek context.

*Informal Networks and Formal Structures.*
Both countries have good informal networks and structures. Uzbekistan cooperatives should use existing informal networks and formal governance mechanisms like Malaysia's FELCRA (Mansor & Zakaria, 2019). This concept should be explored for applicability to Uzbekistan.

*Circular Economy and Sustainability.*
Both countries recognize the importance of sustainable agriculture. Malaysian cooperatives incorporate sustainability practices, including MSPO certification and environmental measures (MPOB, 2023). The transferability of these practices to Uzbekistan merits exploration.

*International Lessons and Local Adaptation.*
Malaysia's experience suggests that successful cooperative development requires local adaptation. Key success

factors- trust, governance quality, and market integration- are generalizable. But their specific manifestation requires attention to local context. This proposition forms the primary guiding question for exploring and understanding the phenomena under study.

## 3. Research Methodology

The methodology section presents a recommended research approach for the empirical part of the study. The proposed methodology is intended to lay the groundwork for future research that will test and refine the conceptual framework presented above.

### Research Design

A comparative case study design is proposed for the empirical investigation as it is appropriate to investigate complex phenomena within their real-world contexts and for comparing experiences across different settings (Yin, 2018). The comparative case study design provides an opportunity for systematic identification of similarities and differences between Uzbekistan and Malaysia, and extraction of transferable learning. The research to be proposed would be qualitative in nature. This is suitable for recording rich views, recognizing social and institutional challenges, and finding best practices from real-world instances (Creswell & Poth, 2018). Qualitative approaches could explore subtle social, cultural, and institutional factors affecting cooperative involvement.

### Proposed Data Collection Methods

The following data collection methods are proposed for the empirical phase:

#### In-Depth Interviews

Semi-structured interviews with key stakeholders would gather firsthand insights on cooperative challenges, governance models, and policy impacts. Proposed participants include smallholder farmers in Uzbekistan and Malaysia to understand experiences, trust levels, and reasons for joining or avoiding cooperatives. Cooperative leaders in both countries would be interviewed to assess governance structures, decision-making processes, and financial sustainability. Policymakers and government officials in both countries would provide perspectives on policy implementation and institutional support. Agricultural experts and NGO representatives in both countries would help identify technical barriers and training gaps. Interviews would be conducted using open-ended questions, with thematic coding using NVivo or manual analysis.

#### Case Study Analysis

Case study analysis on successful cooperatives in Uzbekistan and Malaysia will help to find out best practices, crucial success elements, and scalable methods. Suggested selection criteria are good-performing cooperatives in each country, steady market access and profit sharing, and international comparative cases. Data will be collected through field visits (if possible) or remote interviews with cooperative administrators, annual reports, testimonies from members, and financial records. Key measures would be transparency of governance, member retention, and value-added activities.

#### Document Review

Document evaluation of policies, regulations, and reports on agricultural cooperatives in both nations would contextualize findings within policy frameworks and historical trends. Recommended sources include primary sources such as the 2022 draft cooperative law and agricultural plan documents of Uzbekistan, legislation and policy documents of Malaysia's FELDA and FELCRA, and reports from Ministries of Agriculture and international organizations. Secondary sources would include the scholarly literature on cooperative governance and the NGO evaluations of rural development programs. A content analysis would uncover policy gaps and offer a chance for a comparative analysis of similar reforms in both settings.

#### Data Analysis

Thematic analysis would be used to interpret findings and derive actionable insights for cooperative development. Data integration via triangulation would involve combining interview, case study data, and document analysis to validate themes. Cross-case analysis would reveal patterns of similarities and differences between Uzbekistan and Malaysia. The analysis will be based on the premises given in Section 4, with the aim

of developing the conceptual framework based on the empirical evidence.

**Ethical Considerations**

The proposed research would obtain informed consent from all participants, anonymize sensitive data, and involve local translators if needed. Cross-cultural research protocols would be developed in consultation with local partners in both countries.

## 4. Discussion

The framework developed here gives a way to analyze the aspects that lead to the success of the cooperatives in Uzbekistan. Malaysia is used as the baseline for comparison throughout. The four areas, institutional environment, social and cultural dynamics, organizational capacity, and market integration, are not new in substance. They echo the findings of others (Bijman et al., 2012; Markelova et al., 2012; Sacchetti & Tortia, 2014). What is new, I argue, is the use of these domains explicitly in relation to Central Asian and Southeast Asian agricultural settings, and the comparative element allows us to see what is transferable and what is site-based.

How does this framework answer the research questions? The first question was about the challenges of creating and managing cooperatives in Uzbekistan. The framework identifies several elements. They are interconnected. Institutional barriers include unclear legislative structures and low implementation capacity (Abdurakhmonov & Khamidov, 2023). Social and cultural barriers are deeper: distrust based on past experiences, informal networks replacing formal collaboration (Kandiyoti, 2018; Lerman, 2017). Organizational capacity is another constraint; leadership skills are limited, governance approaches are weak, and financial control is often inadequate (Bijman et al., 2012). Market integration has specific challenges such as limited access to information, quality benchmarks, and value chain dynamics (Markelova et al., 2012).

The next question was on whether the cooperative frameworks of Malaysia may impact the reforms in Uzbekistan. A comparative analysis yields a number of useful findings. The case of Malaysia's cooperation with FELDA and FELCRA demonstrates that persistent government support, systematic trust building, and capacity building of the organizations may transcend the historical challenges to the cooperation (Mansor & Zakaria, 2019). The Malaysian models highlight the significance of smooth registration processes, uniform policy support by different governments, and approaches to maintain financial sustainability through loan recovery and profit-sharing models (Mansor & Zakaria, 2019). The KPSM example shows how cooperatives can engage in entrepreneurial activities to increase members' income and the organization's sustainability (Ishak & Che Omar, 2023).

The third question was on the factors that encourage good cooperative governance and rural entrepreneurship. The framework points to many important drivers of success. Establishing confidence is key. It calls for concentration on the quality of administration, transparency, and visible benefits (Pretty, 2003; Woolcock & Narayan, 2000). The longevity of cooperatives depends on the competence of an organization primarily in terms of leadership, managerial competencies, and financial frameworks (Bijman et al., 2012; Cook, 1995). The market integration calls for attention to value chains, quality and market dynamics (Markelova et al., 2012). These factors are consistent with results from other locations, suggesting their relevance, but also the need for regional tailoring (Bernard & Spielman, 2009; Trebbin, 2014; Wanyama et al., 2008).

What is our stance on theoretical contribution? The combination of theoretical frameworks of institutional economics, social capital theory and entrepreneurial ecosystem models is the importance of the research findings for the current understanding. Each of these perspectives has been applied to cooperatives in isolation. Synthesis into an integrated framework gives a fuller understanding of the different influences on collaborative success. The comparative perspective, drawing on experience in both Central Asia and Southeast Asia, adds to the literature by pointing to the importance of contextual factors in processes of collaborative progress.

Did the framework serve the research objectives? The identification of distinct domains and their relationships gives a systematic approach to the study of collaborative development. The comparison aspect provides a disciplined way to learn from the Malaysian experience. The proposed study plan outlines specific strategies to

evaluate and enhance the framework. Empirical investigation can validate these theoretical advances.

## 5. Conclusion

The present theoretical paper has offered a comparative analysis of the potential of developing cooperative governance and rural entrepreneurship as a model for achieving sustainable agricultural development in Uzbekistan with Malaysia as a reference. The study built a coherent conceptual model, drawing on institutional theory, social capital theory, and entrepreneurial ecosystem frameworks, to outline four interconnected domains affecting cooperative success: institutional context, social and cultural dynamics, organizational capability, and market integration.

Previous research shows that there are major hurdles to collaborative development in Uzbekistan. Today's cooperative engagement is hampered by the historical legacy of skepticism, limited organizational capacity, and weak market integration. But recent policy developments and the growing market prospects provide the setting for change. Mansor & Zakaria (2019) show how Malaysia's experiences with FELDA and FELCRA have proven that these barriers may be overcome with continued government support, with the systematic building of trust and strengthening of the capacities of the organizations. The comparative analysis will be focused on the significance of these lessons in the Uzbek context.

The theoretical framework proposes that we need to face different dimensions at the same time. Enhancement of legal and regulatory structures. Building institutional capacity. Allowing Market Entry. Overcoming social and cultural barriers. The Malaysian experience provides tangible frameworks for all these things, from the FELCRA approach to build farmers' confidence through community engagement to the KPSM approach to entrepreneurial activities (Mansor & Zakaria, 2019; Ishak & Che Omar, 2023).

**Limitations and Future Directions.**
The proposed framework in this paper requires empirical verification by future comparative research, thus offering a way forward for empirical investigation. Future studies should conduct the indicated comparative analysis to empirically examine the cooperative experiences of Uzbekistan, explore the knowledge transfer mechanisms between Malaysia and Uzbekistan, and appraise the adoption of Malaysian cooperative frameworks in the setting of Uzbekistan. Grasping some of the difficulties, governance methods, establishing confidence and market adoption can help to improve understanding and inform data-driven policy development. The limitation of the research is the research focused on two countries which limit the generalization of the results. The comparative study may be extended to other countries of Central Asia or Southeast Asia in later studies.

In conclusion, there are significant chances for Uzbekistan to improve the livelihoods of smallholder farmers, support sustainable agriculture, and achieve wider developmental goals through more collaborative governance and rural entrepreneurship. Malaysia's experience shows that this promise may be realized with sustained government support, systematic trust-building, and strengthening of organizational capacities. This research provides a theoretical framework to comprehend these intricate processes and to identify points of successful intervention. This proposed comparative analysis will try to evaluate and improve upon this framework, generating evidence-based recommendations for policy and practice.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Students' Perspectives Towards Learning and Course Management System: McGraw-Hill Connect Platform For ECO415 (Economics)

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**Abstract:** Learning Management Systems have reshaped higher education, transforming face-to-face classrooms into blended and online environments that dismantle spatial and temporal constraints. McGraw-Hill Connect has emerged as a comprehensive digital learning and course management platform, automating preparation, simplifying course building, and providing robust analytics for instructors alongside personalized study environments for students. Integrating AI-enabled adaptive features, the platform optimizes pedagogical delivery, promotes learner autonomy, and supports diverse learning strategies. This study examines undergraduate students' perceptions of McGraw-Hill Connect at Universiti Teknologi MARA, Puncak Alam Campus, Malaysia, focusing on the ECO415 Economics course that has adopted the platform since COVID-19. Using a descriptive quantitative design, data were collected from 154 undergraduates across four departments. Cronbach's alpha confirmed reliability for the educational and technical dimensions. Distributions were approximately non-normal for the educational and technical dimensions; a bootstrapping procedure was applied to test independent-samples t-tests. The independent-samples t-tests revealed a significant gender difference in the technical dimension, with female students scoring higher than male students; no significant difference emerged for the educational aspect. A one-way ANOVA confirmed no significant departmental variation for either dimension. Findings indicate positive perceptions of both technical and educational value, supported by subscription growth from 2,657 learners in 2021 to 4,606 in 2025. The findings suggest that adaptive learning and AI-enabled personalization may support learner autonomy and pedagogical efficiency.

**Keywords:** *Learning management system, digital learning and course management system, Connect*.

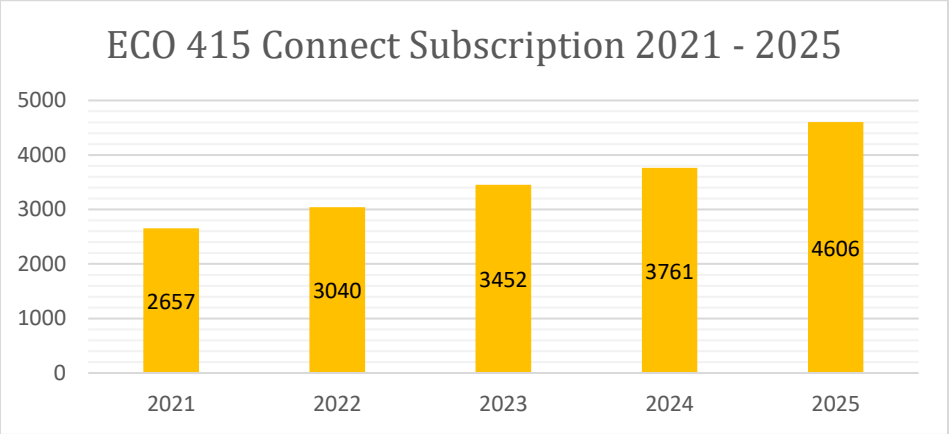
## 1. Introduction

Six years have passed since the world was hit by the Covid pandemic that stopped the entire world for a while. This has altered conventional education, allowing technology to completely redefine classic teaching and learning models. Today's digital tools support a variety of personalized learning strategies that cater to unique student profiles, ultimately empowering learners to take control of their own education (Aminatun & Oktaviani, 2019; Simamora & Oktaviani, 2020). Today's technology accommodates unique student needs through diverse learning approaches, ultimately empowering learners to take charge of their own education (Aminatun & Oktaviani, 2019; Simamora & Oktaviani, 2020).

The way Learning Management Systems (LMS) have evolved shows we are moving toward fully integrated, anytime-anywhere learning environments—effectively dismantling the old constraints of physical space and rigid timetables (Sanchez et al., 2024). In addition, these web-based technologies used to deliver, track, and manage educational content have driven the evolution of traditional face-to-face classrooms into blended and fully online learning environments (Altınpulluk & Kesım, 2021). Learning Content Management Systems (LCMS) prioritize digital instruction as their core educational framework and focus specifically on the development of e-learning content (Shurygin et al., 2021). In tandem with an LMS, it supplies students with self-directed learning materials. Digital learning platforms have witnessed staggering growth. Metrics from Tencent Conference and Tencent Classroom between 2023–2025 highlighted a user base of 400 million, while daily global engagement in online education and meetings surged to an estimated 3 billion participants worldwide (Huang & Rex, 2023). As the backbone of blended and e-learning models that rely heavily on LMS and LCMS, these systems support crucial real-time and delayed communication across multiple devices. This connectivity enables educators to build varied instructional strategies that promote collaborative discussion and active student engagement.

McGraw-Hill Connect is a comprehensive, digital learning and course management platform (LCMP) designed to enhance the educational experience for both instructors and students. By automating time-consuming prep work, simplifying course building, and offering robust performance analytics, the platform significantly streamlines educator workloads. For students, Connect provides a personalized, flexible learning environment through features like the GenAI-powered AI Reader, SmartBook® adaptive learning, and on-the-go study access via the ReadAnywhere® app. Ultimately, the platform is engineered to spark curiosity, boost student engagement, and drive measurable academic success. At the Faculty of Business and Management UiTM, one of the courses that has been using this platform for its teaching and learning is ECO415 (Economics). The use of this platform started during COVID when classes started to be conducted online. It has been more than five years since then. Based on the Connect subscription data in Figure 1, the increase in subscriptions for the platform indicates that users, lecturers, and students have started to adapt well to the transformation from traditional face-to-face teaching and learning methods to the new digital learning style. This platform, a dynamic online and blended learning environment, has trained and allowed students to become independent learners.

**Figure 1: Connect Subscription**




Note: Subscription to Connect between 2021 - 2025
Source: McGraw-Hill Education (MHE) Analytic Portal, ECO415 activation usage year report 2021–2025, McGraw-Hill

## 2. Literature Review

The Technology Acceptance Model (TAM) is an appropriate theoretical framework applied to investigate students' acceptance and perceptions toward the course management system. TAM was developed by Davis (1989) by emphasis two important factors: perceived usefulness and perceived ease of use affecting users' acceptance of technology. In the context of learning and course management systems, perceived ease of use reflects the extent to which students perceive the system as easy to access, navigate, and operate, while perceived usefulness refers to the extent to which students believe that the system supports and improves their learning activities. The technical aspect reflects system accessibility, functionality, reliability, and ease of use, whereas the educational aspect may capture the system's usefulness in supporting learning, accessing learning materials, communication, and completing learning activities.

The rapid growth of digital technology has transformed higher education delivery, with Learning Management Systems (LMS) becoming an important component in modern teaching and learning environments. Learning Management Systems have grown into flexible, all-encompassing educational spaces that remove the usual boundaries of time and place (Sanchez et al., 2024). These crucial digital platforms help manage, distribute, and track course materials, satisfying both teaching and technical demands (Altınpulluk & Kesım, 2021; Dlamini & Ndzinisa, 2020). They encourage independent learning by allowing students to monitor their own performance and collaborate with peers (Tuğtekin, 2023). Ultimately, research shows that modern schools and universities must integrate these systems to improve educational quality and increase access to online learning (Prahanı et al., 2022; Kasim & Khalid, 2016).

Students' perceptions are an important factor in determining the efficacy of digital learning platforms, as the availability of technology does not always guarantee meaningful use. Students are more likely to use a digital learning system when they believe it is useful, easy to use, and supportive of their learning goals. Khoo et al. (2024) reveal that usability and instructional value are closely related to students' acceptance and continued use of LMS. Their findings indicate that LMS can improve students' learning experiences when the technology is aligned with the learners' academic needs. This is also supported by Almusharraf (2024), who found that students' perceptions of the technical aspects of an LMS can influence their willingness to use the system. In terms of student engagement, Nkomo and Nat (2021) explained that engagement in technology-supported learning is multidimensional and involves different aspects of students' participation in the learning process. A recent scoping review by Du Plooy et al. (2024) also provided evidence on the use of personalized adaptive learning in higher education. The review reported improved academic performance in 59% of the studies and increased student engagement in 36% of the studies. These findings indicate that adaptive learning features may provide additional support for students' learning and engagement. In this context, McGraw-Hill Connect represents a more specialized digital learning and course management platform that combines learning materials, assessment, and personalized learning features. Babtain (2021) found that students were generally satisfied with Connect, particularly in relation to understanding course materials, studying and reviewing for examinations, and the system's usability and friendliness.

## 3. Methodology

This study employed a quantitative cross-sectional survey design to investigate students' perceptions of the use of the McGraw-Hill Connect digital teaching and learning platform. A descriptive and inferential approach was used to analyze the data. The target population is undergraduate students from the Faculty of Business and Management at Universiti Teknologi MARA Puncak Alam Campus. A convenience sampling technique was used to collect data among students enrolled in the Economics course who used the Connect platform. A total of 154 valid questionnaires were collected. The descriptive analysis of the demographics is shown in Table 1.

**Table 1: Demographic analysis**

| Variables | Frequency | Percent (%) |
|---|---|---|
| Gender | | |
| Male | 22 | 14.33 |
| Female | 132 | 85.7 |
| Age | | |
| 18-20 years old | 49 | 31.8 |
| 21-23 years old | 101 | 65.6 |
| 24-26 years old | 4 | 2.6 |
| Department | | |
| Department of Economics and Financial Studies (DEFS) | 29 | 18.8 |
| Department of Entrepreneurship and Marketing Studies (DEMS) | 41 | 26.6 |
| Department of International Business and Management Studies (DEIMS) | 58 | 37.7 |
| Department of Technology and Supply Chain Management Studies (DTSCM) | 26 | 16.9 |

Data were collected using a self-administered questionnaire through an online platform, Google Forms. The questionnaire is divided into two main sections: Section A is demographic profiles to gather data on gender, age, and academic discipline and Section B is the measurement items on the perception towards the Connect platform from technical and educational aspects. The measurement items were adapted with minor modifications from Putri and Sari (2020). Responses were scored on a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree).

The instrument's reliability was evaluated using Cronbach's alpha. The overall scale for educational and

technical aspects was above the acceptable threshold of 0.70, supporting the reliability of the instrument. The quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 29. The statistical significance level was set a priori at $\alpha = 0.05$. The analysis was performed in three sequential phases, which are descriptive statistics, an independent-samples t-test, and a one-way analysis of variance (ANOVA). The descriptive statistics analysis includes means, standard deviations, frequencies, and percentages to summarize the demographic profile of the participants and the primary variables. Normality of the data was assessed using skewness and kurtosis. The independent samples t-test was conducted to compare the mean scores of students' perceptions toward the use of the Connect platform from the technical and educational aspects, respectively, between males and females. One-way analysis of variance (ANOVA) was used to determine whether there are differences in students' perceptions of the use of the Connect platform from the technical and educational aspects, respectively, across students of four departments in the faculty.

## 4. Findings and Results

This study investigates students' perceptions of the use of the McGraw-Hill Connect digital teaching and learning platform from technical and educational aspects among the undergraduate students at the Faculty of Business and Management, Universiti Teknologi MARA Puncak Alam Campus, Malaysia.

Descriptive statistics and reliability coefficients were calculated to examine the distribution and internal consistency of the variables, as shown in Table 2. The distribution of the data was assessed for normality using skewness and kurtosis. As detailed in Table 2, the skewness values for the use of the digital teaching and learning platform in both the technical aspect (-3.41) and the educational aspect (-3.55) fell well outside the acceptable range of ±1.0. Consequently, the data for both variables are highly negatively skewed, indicating that the assumption of normality is not met.

Internal consistency was evaluated using Cronbach's alpha. The technical aspect ($\alpha\alpha = 0.721$) and the educational aspect ($\alpha = 0.895$) Cronbach's alpha coefficients exceeded the standard threshold of .70 (Hair et al., 2018), indicating that both scales are sufficiently reliable.

**Table 2: Descriptive Statistics, Normality, and Reliability Tests**

| Variables | No if items | Mean | SD | Skewness | Kurtosis | Cronbach's alpha |
|---|---|---|---|---|---|---|
| Use of the digital teaching and learning platform (Technical aspect) | 7 | 3.94 | 0.509 | -3.41 | 0.728 | 0.721 |
| Use of the digital teaching and learning platform (Educational aspect) | 7 | 4.02 | 0.631 | -3.55 | -0.278 | 0.895 |

*Note. SD* = Standard Deviation. Skewness and kurtosis values within ±1.0 indicate acceptable normality. Cronbach's alpha> 0.70 indicates acceptable internal consistency.

As the skewness values indicated that the data were not normally distributed, bootstrapping with resampling 5000 was applied to the independent samples *t*-test and ANOVA to obtain more robust estimates and reduce the reliance on the normality assumption. The use of bootstrapping is appropriate when the normality assumption is not fully satisfied, as it provides empirical estimates of the sampling distribution based on repeated resampling of the observed data (Field, 2018). The results of the independent samples *t*-test and ANOVA are presented in Tables 3 and 4, respectively.

**Table 3: Independent Samples t-Test Results for Technical and Educational Aspects by Gender**

| Aspect | Gender | *N* | *M* | *SD* | Levene's *F* (*p*) | *T* | *df* | *P* |
|---|---|---|---|---|---|---|---|---|
| Technical aspect | Male | 22 | 3.62 | 0.571 | 1.292 (p=0.258) | -3.223 | 152 | 0.002 |
| | Female | 132 | 3.99 | 0.481 | | | | |
| Educational aspect | Male | 22 | 3.90 | 0.831 | 0.7254 (p=0.008) | -0.762 | 24.687 | 0.335 |
| | Female | 132 | 4.04 | 0.593 | | | | |

*Note. N* = Sample size; *M* = Mean; *SD* = Standard Deviation; *df* = Degrees of freedom.

**Table 4: One-Way ANOVA Results for Technical and Educational Aspects Across Four Departments**

| *Aspect* | *Source of Variation* | *SS* | *Df* | *MS* | *F-test* | *p-value* |
|---|---|---|---|---|---|---|
| Technical aspect | *Between Groups* | *1.274* | *3* | *0.425* | *1.659* | *0.178* |
| | *Within Groups* | *38.396* | *150* | | | |
| Educational aspect | *Between Groups* | *0.363* | *3* | *0.121* | *0.300* | *0.826* |
| | *Within Groups* | *60.595* | *150* | | | |

*Note. SS* = Sum of Squares; *df* = Degrees of Freedom; *MS* = Mean Square

An independent samples *t*-test was conducted to compare the mean scores of students' perceptions of the technical and educational aspects of the Connect platform, respectively, between males and females. Levene's test indicates equal variances assumed for the technical aspect (F=1.292, p > 0.05), while equal variances are not assumed for the educational aspect (F=0.7254, p < 0.05). The analysis revealed a statistically significant difference between the males and females for the technical aspect ($t$ = 3.223, df=152, p < 0.05, 95% CI [-0.592, -0.142], Cohen's $d$ = 0.742) but not statistically significant difference between the males and females for the educational aspect ($t$ = *-0.762, df = 24.687*, $p$ > 0.05, 95% CI [-0.521, 0.240], Cohen's $d$ = -0.223). Specifically, males (M = 3.62, SD = 0.571) scored significantly lower than females ($M$ = 3.99, $SD$ = 0.481). These results indicate that male and female students' perceptions of the technical aspect of the Connect platform were significantly different, with female students having a higher score than male students.

A one-way ANOVA was performed to evaluate whether there are differences in perception of the technical and educational aspects of the Connect platform for students from four different departments in the faculty. The ANOVA results indicated no statistically significant difference across students from four different departments for technical ($F_{3,150}$= 1.659, $p$ = 0.178 > 0.05) and educational aspect ($F_{3,150}$= 0. 300, $p$ = 0.826 > 0.05), respectively.

**Discussion**

The findings indicate that the undergraduate students generally perceived McGraw-Hill Connect positively in both its technical and educational dimensions. The mean scores reported for the two dimensions were close to 4.00 on a five-point scale, suggesting that students broadly agreed that the platform was usable and supportive of their learning. The findings indicate that Connect was favorably perceived as both a technological tool and a learning environment for ECO415. The result is consistent with Khoo et al. (2024), who linked perceived usefulness and ease of use with students' acceptance of learning management systems, and with Babtain (2021), who reported generally favorable student satisfaction with Connect for understanding course content, studying, and examination preparation.

The positive technical perception is important because ease of access, system usability, and reliable platform functions influence whether students continue to engage with digital learning systems. Almusharraf (2024) similarly found that students' perceptions of the technical aspects of an LMS can shape their willingness to use

it. In the present study, the favorable technical rating, together with the growth in Connect subscriptions from 2,657 learners in 2021 to 4,606 in 2025, suggests increasing institutional and student acceptance of the platform. Subscription growth is not, by itself, evidence of improved learning, but it provides contextual support for the survey finding that Connect has become embedded in the delivery of ECO415 following the transition to online and blended learning during the COVID-19 period.

Students also reported a favorable perception of Connect's educational dimension. This suggests that the integration of course materials, assessments, feedback, and adaptive learning features is viewed as relevant to students' academic needs. The finding supports earlier research showing that LMS platforms can encourage self-directed learning by enabling students to monitor their performance and access learning resources flexibly (Tuğtekin, 2023). It is also consistent with Du Plooy et al. (2024), whose review found evidence that personalized adaptive learning can improve academic performance and engagement. However, the current study measured students' perceptions rather than their actual achievement or behavioral engagement. Therefore, the findings support the perceived educational value of Connect but do not establish that the platform caused improvements in grades, engagement, or learner autonomy.

The gender comparison produced a more specific result. Female students reported significantly more favorable perceptions of the technical aspect than male students ($M = 3.99$ and $M = 3.62$, respectively; $t = -3.223$, $p = 0.002$), with the reported effect size indicating a meaningful difference. Accordingly, the null hypothesis of no gender difference for the technical dimension is rejected. This difference may reflect variation in prior experience, frequency of use, digital study practices, or expectations of platform usability; however, these factors were not measured and should not be assumed from the present data. The result instead signals a practical need to examine whether particular students experience avoidable technical barriers and whether orientation, technical guidance, or ongoing support should be tailored accordingly.

In contrast, there was no statistically significant gender difference in perceptions of the educational aspect. The null hypothesis of no gender difference for this dimension is therefore not rejected. Although the mean score for female students was slightly higher than that for male students, the observed difference was not sufficiently large to rule out sampling variation. This suggests that students of both genders generally recognized similar educational value in the platform. Taken together with the significant technical result, the finding shows that perceptions of technological usability and perceptions of instructional value should be treated as related but distinct dimensions. A platform may be educationally useful across groups even when the user experience is not perceived equally.

The one-way ANOVA found no significant differences among students from the four departments for either the technical dimension ($F(3, 150) = 1.659$, $p = 0.178$) or the educational dimension ($F_{3,150} = 0.300$, $p = 0.826$). The null hypotheses of no departmental differences are therefore not rejected. These results imply that the platform's perceived usefulness is broadly consistent across the academic disciplines represented in the sample. This is relevant to practice because it supports the continued use of a common digital platform for ECO415 students from different departments without evidence that its technical or educational value is confined to one disciplinary group. The finding also aligns with the wider literature describing LMS platforms as flexible environments capable of supporting access, content delivery, performance monitoring, and learning across varied higher-education contexts (Altınpulluk & Kesım, 2021; Sanchez et al., 2024).

Overall, the study meets its stated purpose by evaluating students' perceptions of Connect from technical and educational perspectives and by determining whether those perceptions differ by gender and department. The evidence supports the broader expectation that students perceive value in the platform, but it only partially supports an expectation of subgroup differences: a difference was identified for gender in the technical dimension, whereas educational perceptions did not differ by gender and neither dimension differed by department. The findings extend existing research by providing institution- and course-specific evidence from a Malaysian public university after several years of sustained platform use. They also underline that future evaluation should examine technical experience separately from educational effectiveness and should combine perception data with objective evidence of usage and learning outcomes.

## 5. Conclusion and Recommendations

This study concludes that McGraw-Hill Connect is positively perceived by ECO415 undergraduates at Universiti Teknologi MARA, Puncak Alam Campus, in relation to both its technical functions and educational value. The instrument demonstrated acceptable internal consistency, and the findings showed that students across the four departments held broadly comparable views of the platform. A statistically significant gender difference was found only for the technical dimension, with female students reporting a more favorable perception than male students, while no significant gender difference emerged for the educational dimension. These findings suggest that Connect has become an accepted component of teaching and learning for ECO415, while also identifying technical experience as an area that may not be uniform across all students.

The study contributes to current research by adding course-level evidence on the sustained use of a specialized digital learning and course management platform in Malaysian higher education. It supports prior work connecting usability and instructional value with students' acceptance of digital learning systems and demonstrates the importance of assessing technical and educational perceptions as separate constructs. In practice, the results support the continued use of Connect for ECO415 and potentially for other suitable courses, provided that implementation remains aligned with course outcomes, student needs, and appropriate academic support.

Several recommendations follow from the findings. Lecturers and administrators should maintain a structured orientation for first-time users, provide concise technical guides and responsive assistance, and monitor recurring access or usability issues. Particular attention should be given to understanding the technical-perception gap between male and female students through follow-up surveys, focus groups, or user-experience testing rather than assuming its cause. Lecturers should also make purposeful use of Connect's adaptive learning, assessment, feedback, and analytics features and regularly review whether these functions are helping students prepare, practice, and learn independently. Periodic evaluation should combine student feedback with platform usage data, completion rates, assessment performance, and course outcomes so that decisions about adoption or expansion are evidence-based.

The conclusions must be considered in light of the study's limitations. The research used convenience sampling, involved one course at one faculty and campus, and included an unequal gender distribution. These factors limit the generalizability of the results and may affect the stability of subgroup comparisons. The cross-sectional, self-reported design captures perceptions at one point in time and cannot determine causal effects on academic performance or engagement. The study also did not examine variables such as prior digital experience, internet access, device type, frequency of platform use, socioeconomic background, instructor practices, or specific Connect features that might explain differences in perception.

Future research should use larger and more balanced samples across courses, faculties, campuses, and institutions. Mixed-method studies incorporating interviews, focus groups, or usability observations would help explain the gender difference found in the technical dimension and identify the platform features students find most helpful or difficult. Future studies should also examine relationships among perceived usefulness, ease of use, actual usage behavior, engagement, learner autonomy, assessment performance, and retention. Such work would provide stronger evidence for decisions on platform design, instructional integration, student support, and broader institutional adoption.

**Acknowledgement:** The paper is 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. 18, No. 4, 2026 (ISSN 2220-3796)**

# Motivation at Play: A Bibliometric Analysis of the Emerging Gamification and Game-Based Learning in Education

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**Abstract:** The growing use of gamification and game-based learning (GBL) is transforming education by promoting interactivity, engagement, and a learner-centered approach. This paper examines research trends in gamification and GBL, focusing on student motivation and the effectiveness of integrating these methods into curricula. We conducted a bibliometric analysis of research articles from the Scopus database published between 2012 and 2026. VOSviewer software was used to visualize research trends, keyword co-occurrences, research areas, and emerging themes. A qualitative analysis identified common themes. Results show a significant increase in research on gamification and GBL since 2018, with a notable rise after 2020. Network and density visualizations highlight motivation, teaching, and e-learning as primary themes. Time-slicing analysis indicates a shift from technology-centered research to a focus on learner engagement, motivation, e-learning, health education, and remote learning. Emerging topics include augmented reality, serious games, simulation, and escape rooms. The findings emphasize the importance of considering learner motivation and engagement, appropriate technology, instructional level, and educator readiness when implementing gamification and GBL. This study enhances understanding of key areas of focus in educational research on gamification and GBL. The results can inform practitioners, researchers, and policy-makers in the development and implementation of digital learning experiences.

**Keywords**: *gamification; game-based learning; student motivation; education; bibliometric analysis; VOSviewer; learner-centred learning*

## 1. Introduction and Background

The rapid advancement of digital technologies has fundamentally transformed teaching and learning practices across educational institutions, offering new opportunities to engage students in interactive learning and to utilize a wide range of technological tools. However, as the educational environment becomes increasingly digitized, it is necessary for educators to implement learning models that enable them to effectively engage students in ways that sustain their learning interest and keep them motivated.

Game-based learning (GBL) is an innovative educational concept that incorporates game elements and principles into interactive learning experiences (Ding & Yu, 2024). In recent years, the need and importance of GBL have significantly increased due to the growing trend away from traditional teacher-centered contexts and the increasing need for innovative learning methods and engagement strategies. Game-based learning is a joyful cognitive activity that adheres to academic guidelines to achieve several educational results. Compared to conventional or traditional directive learning strategies, GBL uses game dynamics and elements such as rules, interaction, goals, competition, and problem-solving to ensure students engage in educational activities and learn concepts and skills more effectively (Al-Jamili et al., 2024). According to Chang et al. (2024), game-based learning, through interactive games, simulations, or virtual environments that replicate real-life circumstances, enables students to practice and apply theoretical knowledge in a secure setting. Meanwhile, Ding & Yu (2024) also mentioned that GBL has been shown to improve students' motivation to learn and performance, with a focus on in-game design and conducted in an experimental setting without educators' involvement.

For students who lack motivation and tend to struggle academically, game-based learning (GBL) has become an effective tool for engaging them in immersive, dynamic learning experiences (Hsu & Cheng, 2021). Students can actively investigate complex academic ideas and phenomena through interactive, dynamic environments

created by game elements such as challenges, rewards, and competition, thereby enhancing their motivation to learn (Ding & Yu, 2024). Chang et al (2024) further agree that gamifying learning materials may boost students' enthusiasm and motivation for their education. In the meantime, the increase in engagement and participation also leads to better comprehension of complicated subjects.

Locally, in the context of Malaysia, a study by Che Mansor and Rosly (2024) found that students taught using mathematical games outperformed those who received only traditional instruction, showing that game-based learning is not just a game but also helps students achieve academic success. Another study by Chang et al (2024) found that incorporating game-based learning in education has effectively enhanced students' self-efficacy and motivation to learn. Meanwhile, Ghapar (2024) believes it is essential to develop digital skills among students in higher education institutions through digital gamification, which aligns with the Malaysian government's and related ministries' efforts to create a digitally literate generation and to foster innovation using digital technology in the Twelfth Malaysia Plan. Previous studies have shown that using GBL as a new approach to learning improves students' achievement and may foster a pleasant, engaging learning environment while also developing their ability to think strategically and logically.

However, despite the growing body of research on GBL and its extensive application in education, a comprehensive synthesis of research trends and the evolution of GBL in education has remained limited. Existing studies primarily focus on specific technologies or individual aspects. A key challenge in this research is to identify how emerging technologies in gamification can contribute to students' education, particularly regarding motivation. Furthermore, there is limited research on how GBL enhances students' motivation in the learning process, given the evolving landscape of gamification in education. Therefore, to bridge the gap, this study conducts a bibliometric analysis to map and synthesize existing research on the emerging fields of gamification and GBL in education. This study seeks to answer the following key questions.

Accordingly, this study employs a bibliometric approach to map and synthesize the development of research on gamification and GBL in education. Specifically, the study addresses two interrelated questions: how have gamification and game-based learning evolved in relation to student motivation, and how can game- based learning be effectively incorporated into education? By addressing these questions, the study seeks to provide a clearer understanding of the field's development and the emerging role of motivation in gamified learning research.

The remainder of this paper is organized as follows. Section 2 reviews the literature on gamification and game-based learning in education, student motivation, and barriers to adoption. Section 3 describes the bibliometric method, data collection and screening procedures, and VOSviewer analysis. Section 4 presents publication trends and the network, overlay, and density visualizations. Section 5 discusses the major themes and their implications for incorporating GBL into education. Section 6 concludes the paper by outlining its contributions, limitations, and directions for future research.

## 2. Literature Review

### *Gamification and Game-based Learning in Education*

According to Krath et al. (2021), gamification, which refers to structured play with rules, goals, and challenges for entertainment, was first developed in 2008 and has grown in popularity since 2010. Unlike games, gamification is distinguished by its serious objective. Although there are many definitions of gamification, most focus on either the practice of gaming and gameful experiences in serious settings or on game features and mechanisms. Another study, Zainuddin et al. (2020), identified various commonly used gamification elements, including points, badges, leaderboards, levels, and avatars.

Serious games and GBL are two other concepts closely associated with gamification. GBL is the process of achieving predetermined learning objectives through gameplay and game materials, and of improving learning by incorporating challenges and problem-solving that give players and learners a sense of achievement. The researcher further agrees that the goals of GBL are to educate the students. The goal of GBL is to educate. The approach is based on a full-fledged game, sometimes known as a serious game. Serious games can be used for other objectives beyond education, such as industry, training, or simulation with real-world applications for

students in the future. Positive gaming experiences can be used for important purposes, such as education or behavior change, rather than solely for entertainment (Krath et al, 2021).

***Students' Motivation in Education***

Carpio de los Pinos et al. (2026) define motivation as the need to channel energy towards specific goals, encompassing social achievement and internal factors like self-concept and self-esteem. The researcher highlights the connection between positive motivation and self-concept, stating that optimal motivational stimulation occurs at middle levels for effective behavior development and maintaining behaviors. In order to be effective, motivational activities must foster creativity and individuality, enable students to express their unique personalities, and significantly expand on their past knowledge. Integrating current technologies improves students' motivation to learn and their academic performance (Shalgimbekova et al., 2024). Chang et al (2024) stated that games play an important role in human culture and society by increasing motivation and involvement, leading most educational institutions, which typically do not involve games, to adopt GBL.

According to Krath et al (2021), gaming's reputation as a motivator is one of the factors contributing to the rise in popularity of gamification, serious games, and GBL. Motivation is a theoretical concept that manifests as behavior and can lead to positive cognitive outcomes, such as improved learning and achievement. In educational settings, high-quality motivation, such as intrinsic motivation, is associated with better outcomes than low-quality motivation, such as motivation through extrinsic rewards. Chen (2023) further agrees that combining games with learning can boost students' motivation, learning effectiveness, and experience by providing interesting and challenging activities. GBL is a proven way to provide enjoyable learning experiences and improve motivation and outcomes.

***Barriers to Adoption of Gamification***

Although many educators are now embracing various technological tools to improve students' learning outcomes, there has been a reported list of challenges and barriers to gamification and GBL. These include student perceptions, inadequate technology, lack of training, limited funds, absence of relevant educational games, and a lack of administrative support (Kaimara et al., 2021; Sabornido et al., 2022). It is worth noting that these challenges are more likely to be experienced in smaller institutions due to insufficient funds, the cost of purchasing the necessary games, and a lack of sufficient technological infrastructure.

## 3. Research Methodology

This study employs bibliometric analysis in which the research problem and questions guided the search strategy. A bibliographic database, Scopus, was chosen to gather research evidence using keywords: "gamification" AND "education" AND "game-based learning" AND "students." The documents were screened based on their titles, abstracts, and keywords. The source manuscript shows that 665 articles were found, and 504 were included. Table 1 below demonstrates that the database includes 504 articles and 201 conference proceedings.

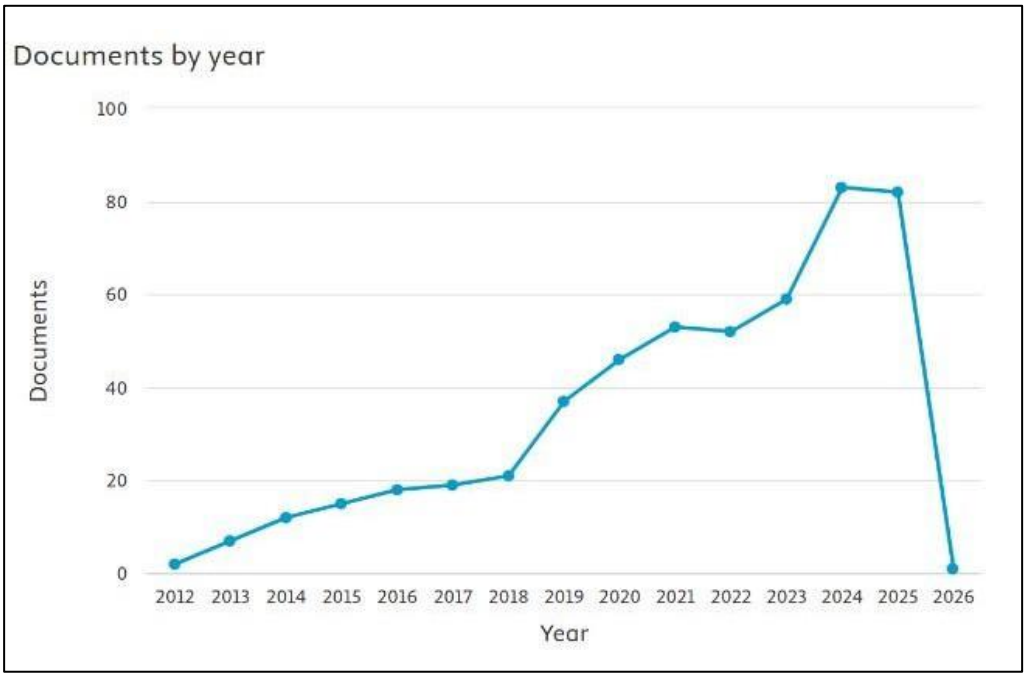
The inclusion criteria included English-language journals and conference proceedings published between 2012 and 2026. Excluded items were lecture notes, symposiums, trade magazines, book reviews, letters, books, book chapters, literature syntheses, bibliometric studies, and reviews.

**Table 1: Dataset information**

| Description | Results |
|---|---|
| ***Initial search*** | |
| Timespan | 2012 - 2026 |
| Number of documents | 665 |
| ***Applying exclusion criteria*** | |
| Timespan | Only include 2012 – 2026<br>Exclude Before 2012 |

| | |
|---|---|
| Document type | Journal articles and conference proceedings<br>Exclude: Lecturer notes, symposiums, trade magazines, book reviews, letters, books, and chapters in books. Also, papers on literature synthesis, bibliometrics, and reviews. The main reason is to focus on empirical findings. |
| Language | English |
| Article | 504 |
| Proceeding | 201 |
| Total number of citations | 9,513 |
| Average citations per document | 18.88 |

**Figure 1: Number of publications based on year**

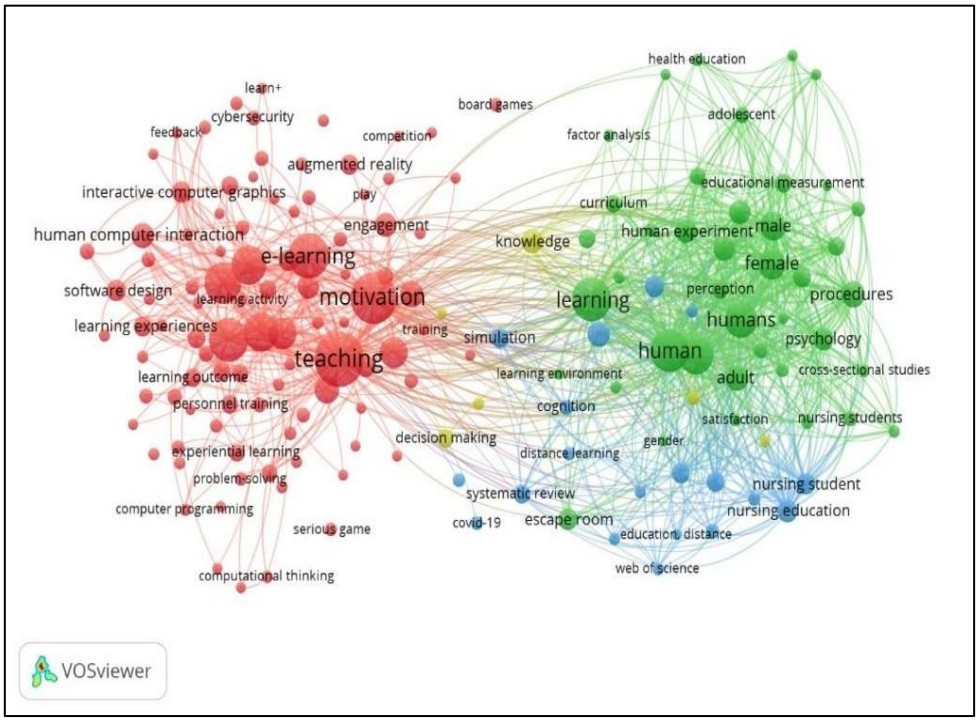



The selected publications were analyzed using VOSviewer for bibliometric mapping, followed by qualitative analysis to identify themes. Publication trends were examined across the 2012–2026 period, while network, overlay, and density visualizations were used to examine keyword relationships, thematic prominence, and changes in research emphasis over time.

## 4. Results

The results of the present bibliometric analysis of gamification and GBL in education, including research questions, are discussed in this section. Particular attention is paid to research trends, topic clusters, and keyword dynamics that highlight academic interests and provide insight into the field's development during the study period. The findings provide insight into the main areas of academic interest, common patterns in term co-occurrence and the importance of gamified technologies for educational motivation.

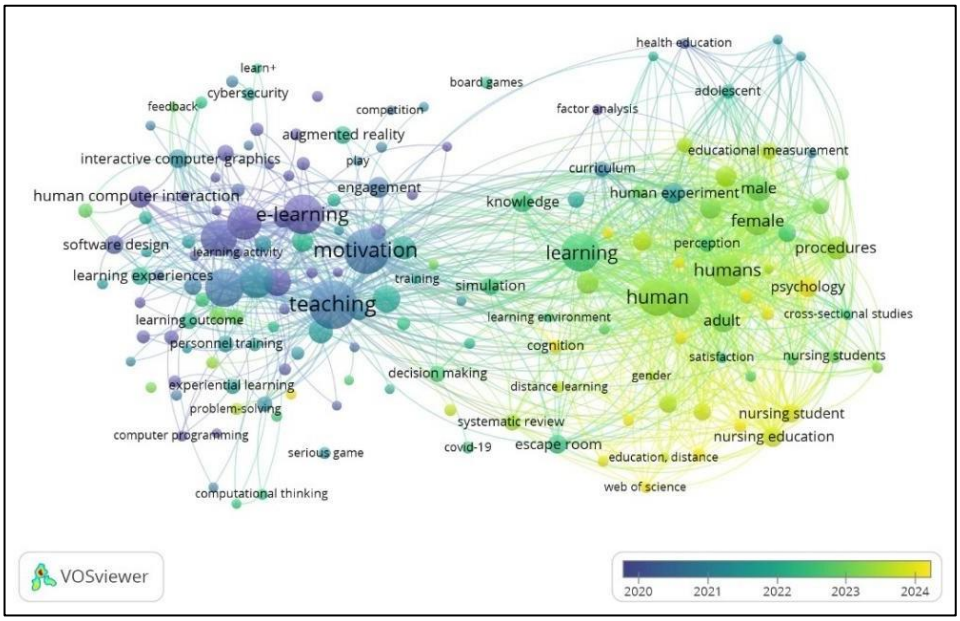
**Figure 2: Network Visualization**




VOSviewer was used to conduct an in-depth analysis of the articles by examining each keyword identified in the previous step. The tool helped identify the relevance and weight of emerging gamification and students' motivation to learn. The network visualization is shown in Figure 2, where the four nodes are the most prominent. These nodes are "motivation", "e-learning", "teaching", and "human", signifying the most widespread topics and positive influences on game-based learning among students, with "motivation" being the major theme.

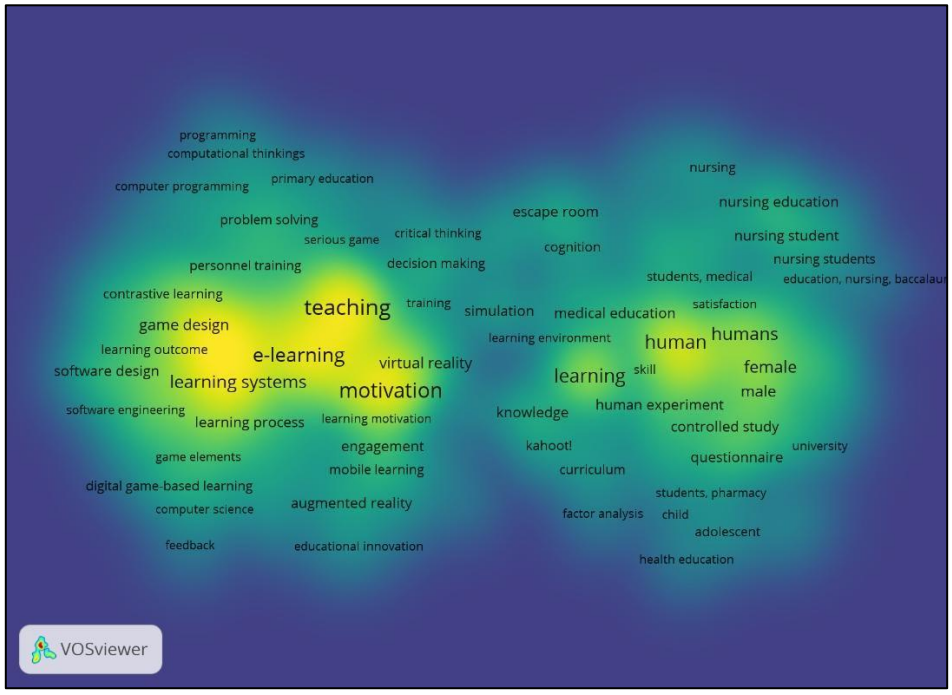
The largest green area includes the words "motivation" and "teaching" and is linked to the green area labeled "human-centered learning." This connection strongly suggests that the current trend in gamification is toward human-centered learning, with a strong emphasis on student motivation. On the other hand, the "teaching" node is linked to the blue area labeled "nursing student". The connection suggests that GBL and gamification methods are used in nursing and health education, as students are often required to develop skills through simulation. Overall, the network visualization highlights a focus on studies in the teaching field, motivation, and human-centered learning, with involvement of health/nursing education themes. This implies that the latest trends in game-based learning research prioritize learner-centered, experiential learning, with gamification as a tool to increase motivation and encourage skill mastery.

**Figure 3: Overlay Visualization**




Next is to evaluate the overlay visualizations, which show how research on a specific technology has changed over time. The color and area of each circle correspond to the quantity of research undertaken in that field. Figure 3 displays the findings for the earlier years of 2020 to 2021, depicted in shades of blue, with the research primarily focusing on foundational technological aspects of gamified learning, namely "e-learning" and "teaching". Then, studies shifted toward "motivation" and "engagement" as they became more prominent in 2022. However, in 2023, the study broadened to a human-centered approach that involves human perception. Last but not least, recent research trends have shifted to health education and distance learning.

**Figure 4: Density Visualization**



The colors in the overlay visualization illustrate how research interest has changed over time. Darker or colder hues indicate earlier work, whereas brighter or warmer hues are more likely to display current work. Based on Figure 4, the density visualization shows that "motivation," "teaching," and "e-learning" are the center of the most active research hotspots in gamification and game-based learning. For instance, “motivation” and “teaching” remain the primary areas of emphasis in gamified learning research, with the highest numbers of citations and studies. On the other hand, the result shows that during a washout, yellow hues are focused on “medical education”, indicating that the integration of GBL reflects the effectiveness of gamified approaches in skill-based and experiential learning environments. This visual method offers insight into the emergence and expansion of interest and activity in these connected areas.

In order to answer the first research question, which is how emerging gamification and game-based learning evolved in relation to student motivation, according to the bibliometric analysis, publications on gamification and GBL increased steadily starting in 2018 and then significantly after 2020. This growth aligns with the post-pandemic shift in the education sector, in which digital and interactive learning became necessary and important.

As shown on the overlay visualization in Figure 3, Augmented Reality (AR), serious games and simulation, e-learning, and escape room-based learning play an important role in the growing trend of gamification and GBL in education. These technologies can significantly improve students' education by boosting their motivation to study and their engagement, leading to better academic results. This development indicates that research has shifted from studying technology tools and system design to focusing more on the behavioral and psychological implications of gamified learning. Accordingly, these findings highlight the increasing understanding that technology alone does not lead to academic success. Instead, factors like student motivation, engagement, and emotional connection are essential.

Additionally, according to the second research question, the findings in Figure 2 highlight the growing importance of e-learning and digital platforms. This emphasizes the need for strong technological readiness. The availability of digital infrastructure, such as stable internet connectivity, proper devices, and easily accessible learning management systems, is essential for the successful integration of GBL. In the meantime, adequate training and exposure for educators also play a vital role in educators' confident use of GBL in the classroom. These factors require careful preparation, as they may lead to failure even with the most effective GBL approach.

**Discussion**

The research has utilized a bibliometric method to analyze the trends in gamification and game-based learning (GBL) research and education articles from 2012 to 2026. Among the results, there are several trends in publication counts, the most common themes, changes in themes over time, and areas of interest in gamification and GBL.

The first trend concerns the number of publications. The years 2012 – 2018 show steady growth in the number of works, whereas 2020 and subsequent years witness a significant increase. The growth may be related to the shift towards more digital and technology-enabled learning initiatives within educational settings, which is explained by the overall tendency towards online learning and its adoption by educational institutions. Yet, the number of publications is not necessarily linked to the efficacy of the new trends.

The next two trends concern the most common themes in research on gamification and GBL. The network visualization shows that the terms “motivation”, “teaching”, “e-learning”, and “human” are the most frequent ones. The words “motivation” and “teaching” are both connected to a considerable number of other terms, suggesting that they are significant themes in current gamification and GBL research. The connection to “human” probably signals a focus on human experience in studies that aim to find the link between gamification/GBL and education. The terms “nursing students” and “health” also appear frequently and are connected to “teaching” and other educational terms. This means that health education, especially nursing, is another common theme in gamification and GBL research. Thus, the network visualization shows that most studies focus on the relationship between gamification/GBL and motivation in teaching, particularly in health education. However, the mere appearance of the terms together does not mean that they are related.

The overlay visualization shows shifts in research foci over time. The earlier studies, dated 2020 and 2021, tend to focus on e-learning and teaching. The later articles are more likely to mention motivation and engagement and include terms related to humans and education. The density visualization confirms the prevalence of terms connected to teaching, e-learning, and motivation. It also shows that terms connected to health and nursing are gaining popularity. Moreover, recent articles mention concepts such as augmented reality, serious games, simulation, and escape rooms. Thus, the three visualizations reveal several trends in gamification and GBL research, education, and practice. While some terms, such as teaching, e-learning, motivation, and engagement, remain popular, newer articles feature concepts of augmented reality and serious games.

The three trends revealed by the study can be developed by future research in different directions. First of all, although the current articles are dominated by mentions of motivation and teaching, further research is needed to determine whether gamification/GBL has a significant effect on these themes. Secondly, it would be interesting to see how gamification and GBL influence different areas of education with regard to their level (school, university, vocational education) and particular educational settings (online instruction, blended learning, classroom activities). Finally, newer trends in gamification and GBL tend to focus on augmented reality and serious games in education. These themes could also be explored in depth to determine whether they have any noteworthy effect on the learning experience.

In conclusion, the present bibliometric study has analyzed the trends in gamification and GBL research and education. All three aspects – research, education, and practice – show multiple trends and shifts in focus. The study found that most articles focus on motivation and engagement in gamification and GBL, particularly in health education. Yet, current attention to this issue does not necessarily mean that gamification/GBL has a significant effect on learning in general, or in the fields of education most popular among researchers. The study can be continued with further bibliometric analysis or with quantitative and qualitative analyses of individual articles to examine the methodologies and results they present.

## 5. Conclusion

### Contributions and Practical Implications

This study extends the existing literature by providing insight into the main themes and directions of research on gamification and GBL. The methodology used in this study is also a valuable contribution to the literature on gamification and GBL, as it provides an example of how keyword co-occurrence analysis can be used to identify topics that share common elements. The findings of this study are significant for educational settings, as they identify the themes that dominate research on gamification and GBL, as well as the areas that require further research.

The findings of this study have important implications for both educators and educational institutions. To an educator, the findings would emphasize the need to consider the inclusion and role of game elements and goals within a particular educational setting. The findings would indicate the need for gamification, in which elements of games are integrated into the educational setting, rather than simply increasing the presence of games. Educational institutions, however, would be responsible for ensuring that educators have the necessary support and training to incorporate games into instructional settings to optimize learning. Finally, the implications of these study findings would be significant for researchers, as they would highlight themes warranting further in-depth exploration of how gamification and GBL can be used to optimize learning across different educational settings.

### Limitations and Future Research

The study has certain limitations, among which is the use of only English-language sources cataloged in Scopus. The analysis might have produced different results if multiple databases, including non-English ones, had been used. Furthermore, the bibliometric method is highly dependent on the accuracy of keyword combinations and might not account for qualitative differences in studies.

Future research on gamification should be extended to multiple databases and sources, including Web of Science and IEEE Xplore and should consider differences across fields and educational stages. Additionally, the

factors affecting GBL implementation and application might be evaluated using a mixed-methods approach. More studies are needed on student motivation, engagement, and learning outcomes both in the short and long term. Particular emphasis should be placed on educators' views, competencies, and abilities, as well as on institutional barriers to adoption.

## Conclusion

This study aimed to explore the development of research on gamification and game-based learning through a bibliometric analysis. The analysis revealed key themes and relationships between the terms in this area. The review found that motivation, teaching, and engagement are the most common themes in gamification and game-based learning research. Additionally, the analysis showed that e-learning and the use of these methods in practice, particularly in health and nursing education, are significant research topics.

The findings emphasize that most papers focus on learning and the educational aspects of gamification and game-based learning. The majority of the reviewed articles discuss how this new approach can be used in teaching to promote participation and engagement. They suggest that educators should pay more attention to the characteristics of games and their impact on learning outcomes. This bibliometric analysis did not determine whether gamification and game-based learning methods affect education. However, it revealed the need for further studies exploring the effectiveness of this approach.

Thus, this analysis provided findings about the themes and trends in gamification and game-based learning research. The findings may be useful to researchers seeking to identify the most common topics in this field. Moreover, the results can help educators and institutions interested in promoting learning through games identify aspects that warrant further investigation.

**Acknowledgement:** The authors would like to express their sincere appreciation to the Faculty of Business and Management, Universiti Teknologi MARA (UiTM), for the support and resources provided in facilitating this research. The authors also acknowledge all individuals who contributed directly or indirectly to the completion of this study.

**Declaration of Generative AI and AI-Assisted Technologies:** During the preparation of this manuscript, the authors used **ChatGPT (OpenAI)** as an AI-assisted tool for language refinement, grammatical improvement, and to enhance the manuscript's clarity and readability. The tool was not used to generate or fabricate research data, conduct the bibliometric analysis, or determine the study findings. All AI-assisted content was critically reviewed, verified, and revised by the authors, who take full responsibility for the accuracy, integrity, and final content of the manuscript.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Negotiating Paid Work and Caregiving: Experiences of Japanese Mothers of Children with Special Needs

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**Abstract:** Mothers of children with special needs may encounter difficulties sustaining paid employment when caregiving demands intersect with working hours, school and service arrangements, and children's changing needs. This study examines how mothers negotiate paid work and caregiving within their caregiving circumstances. An exploratory qualitative design was employed with ten mothers whose children attended an elementary special support school in Japan. Data were generated through written interviews comprising 18 open-ended questions and analysed using reflexive thematic analysis. Four interrelated themes were developed: conditions of work-care incompatibility and its consequences; negotiating employment through trade-offs and adaptation; care and workplace support as enabling conditions; and the continuing value of paid work. The findings show that difficulties in combining employment and caregiving were shaped not only by the demands of care but also by the timing and unpredictability of children's needs and care arrangements. Mothers responded by adjusting working hours, employment arrangements and career expectations, although these adaptations reflected different combinations of constraint, caregiving priorities and accommodation to children's needs. Family, formal and workplace support expanded employment possibilities when sufficiently compatible with mothers' and children's circumstances. Despite these difficulties, paid work continued to hold financial, personal or professional value for several mothers. The study contributes an experience-centred understanding of work-care negotiation by showing how caregiving demands, employment conditions and available support shape the forms of employment that remain feasible while paid work may continue to be a valued part of mothers' lives.

**Keywords**: *Children with Special Needs, Maternal Employment, Work-Care Negotiation, Qualitative Research*

## 1. Introduction and Background

Mothers of children with special needs may experience particular challenges in sustaining paid employment because caregiving responsibilities may go beyond routine childcare. Mothers may need to juggle medical appointments, rehabilitation, school arrangements, transport, and other forms of support with work to meet children's health, developmental, and educational needs. These demands can influence labour force participation, working hours and income (Vinck & Van Lancker, 2020; Wondemu et al., 2022). They may also have longer-term implications for the kind of employment mothers can take on and the career opportunities they are able to pursue (Østerud et al., 2024).

However, the extent to which mothers of children with special needs are able to retain paid employment is not solely determined by the demands of caregiving. Whether they are able to remain in employment also depends on the support they have and their working conditions. Adequate care services and family support can, for instance, help mothers balance their employment and caregiving responsibilities. Similarly, flexible working arrangements could allow mothers to meet the needs of their children without significantly reducing their employment commitment. However, the lack of support and the rigid working conditions can be a constraint to their employment opportunities. Previous studies have demonstrated that the experience of maternal employment is influenced by the interaction of caregiving demands, support available, and working conditions (Opoku et al., 2025; Østerud et al., 2024).

Paid employment should not simply be understood as an additional demand competing with care work. Working provides financial resources and independence and can be personally or professionally significant for mothers (Saputra & Karyono, 2014). Østerud et al. (2024), for example, identified substantial work-family conflict and adverse career consequences among mothers of disabled children but also instances in which

caregiving experiences contributed to new occupational directions. The relationship between work and care may therefore encompass both constraint and value. Reducing or relinquishing employment may ease some pressures associated with caregiving, but it may also involve reduced income, altered career prospects or the loss of work that mothers value.

The interaction between caregiving responsibilities, available support and employment conditions is also relevant in Japan, where the distribution of childcare responsibilities within families can influence mothers' participation in paid employment. Greater paternal involvement in childcare has been associated with higher odds of Japanese mothers remaining in full-time employment (Dhungel et al., 2023). For mothers of children with special needs, additional caregiving responsibilities associated with their children's disabilities may further influence their employment opportunities, particularly when working arrangements and available care services do not adequately accommodate their needs.

Accordingly, this study employs an exploratory qualitative approach to examine how mothers of children with special needs negotiate paid work and caregiving within their caregiving circumstances. Japan is treated as the empirical context of the study rather than as an explanatory cultural category. By examining the conditions that shape mothers' employment experiences, the adaptations they make and the value they continue to attach to paid work, the study provides an experience-centred account of work-care negotiation. The following research question guides the study: How do mothers of children with special needs negotiate paid work and caregiving roles in the context of their caregiving demands?

## 2. Literature Review

### Caring for Children with Special Needs and Participation in Paid Work

Caring for children with special needs can differ from routine parenting in both the intensity and duration of care required. Functional limitations may increase children's dependence on others for everyday activities such as feeding, dressing, bathing and mobility, while healthcare, rehabilitation and other forms of support can create additional demands on parents' time and resources (Brekke & Alecu, 2023; Raina et al., 2005). The implications extend beyond the direct provision of care. Parents may need to organise services, respond to health or behavioural needs and accommodate circumstances that are difficult to reconcile with other areas of life. Accordingly, the significance of caregiving for paid employment lies not simply in the amount of care provided, but in the demands that caregiving places on the time, health and resources that parents also require to participate in work.

Parents of children with special needs have been found to experience greater stress, anxiety and depression than parents of children without special needs (Cheshire et al., 2010; Osmančević Katkić et al., 2017). Using longitudinal population-register data from Norway, Brekke and Alecu (2023) similarly found higher risks of depression, anxiety, sleep disorders, and some physical health problems among mothers caring for children with disabilities. These findings are important to the work-care relationship because caregiving and employment draw upon some of the same finite personal resources, including time, physical capacity and psychological energy.

Parents of children with special needs have been found to take more time away from work, reduce working hours and decline overtime (Anderson et al., 2007; Wondemu et al., 2022), but the extent to which these demands disrupt employment depends partly on the resources available to accommodate them. Østerud et al. (2024), for example, identified substantial work-family conflict and adverse income and career consequences among mothers of disabled children in Norway, while inadequate health and welfare provision contributed to the difficulties they experienced. Similarly, working mothers of children with disabilities in the United Arab Emirates relied on different combinations of family members, paid caregivers and rehabilitation and support services to sustain care during working hours (Opoku et al., 2025). These studies shift attention from the caregiving burden alone towards the conditions surrounding caregiving, and suggest that similar responsibilities may have different employment consequences depending on the support mothers can mobilise.

Caregiving responsibilities may be particularly difficult to accommodate when employment is organised

around fixed expectations of employees' time and availability. Flexibility in working hours, leave arrangements and managerial responses can provide greater scope for employees to respond to caregiving demands, whereas rigid arrangements and limited organisational understanding may restrict their employment options. Research on mothers of children with intellectual disabilities, for example, has identified inflexible working arrangements and limited understanding from employers and colleagues among the difficulties encountered in employment (Al-Oraini, 2024). The extent to which caregiving affects mothers' employment therefore depends partly on how well employment arrangements accommodate their caregiving responsibilities.

Reduced working hours, occupational changes or withdrawal from employment may ease immediate incompatibilities between work and care but may also include financial and career consequences. Østerud et al. (2024) found negative effects on income and careers for mothers of disabled children but also identified cases where the knowledge and experiences gained through caregiving created new occupational pathways. A similar analysis in Iran by Yoosefi Lebni et al. (2021) showed lost opportunities and maternal sacrifice when considering broader socio-economic constraints. Hence, employment adaptation is not to be understood as either an automatic voluntary choice or an imposed sacrifice. Rather, mothers' decisions may reflect different combinations of caregiving priorities, employment opportunities, and constraints on the alternatives available to them.

Paid employment should not be understood only as a competing demand to caregiving. Working mothers of autistic children found value in work because it contributed to the family's finances and financial independence and allowed them to meet their children's needs (Saputra & Karyono, 2014). This complicates a straightforward work-family conflict interpretation. Jobs may make caregiving more difficult for carers by placing demands on them, but at the same time they provide resources that mothers value. Reduction or abandonment of paid work may thus not only reduce some types of work-care conflict but may also not be an unambiguous improvement in the situation of mothers.

The literature thus indicates that the link between paid work and caregiving is characterised as an interaction of care demands, available resources and employment conditions rather than as a straightforward contest between two roles. The time, health, and employment opportunities of mothers can be strained by caregiving; family and formal support can alter their capacity to respond to such strains; and workplace arrangements can widen or narrow the employment choices that are available. At the same time, paid work may have financial and personal value despite the difficulties of sustaining it. This perspective gives a wider platform to look at how mothers negotiate paid work and caregiving without presupposing that their experiences are well described by conflict, balance, sacrifice or choice.

**Work and Care in the Japanese Context**

The distribution of childcare and domestic responsibilities within Japanese families remains gendered, although caregiving arrangements vary across households (Porter & Loveland, 2019). For mothers raising children with disabilities, this division of responsibilities may intersect with caregiving demands that extend beyond those associated with routine childcare. Japanese research has documented higher psychological distress among mothers of children with disabilities than among mothers of children without disabilities (Yamaoka et al., 2016). Research has also highlighted the importance of social and formal support in reducing the burden experienced by Japanese mothers caring for children with disabilities (Moriwaki et al., 2022; Porter & Loveland, 2019). Collectively, these findings suggest that mothers' caregiving experiences need to be understood in relation to both their responsibilities and the support available to them.

The way families share childcare is also important for mothers' participation in paid work. Dhungel et al. (2023) investigated Japanese mothers who had worked full-time prior to childbirth, finding that roughly one-third were not working full-time 18 months after delivery. Greater odds of mothers remaining in full-time employment were associated with increased paternal involvement in child care. Similarly, Tanaka et al. (2026) reported that a workplace intervention promoting work-life balance increased fathers' involvement in childcare and their spouses' labour supply. Although these studies did not specifically examine mothers of children with special needs, their findings indicate that maternal employment is associated with how childcare responsibilities are shared within families and the workplace conditions that may facilitate such arrangements. Research focusing specifically on Japanese mothers of children with intellectual disabilities provides further

evidence of the challenges associated with sustaining paid employment. Ejiri and Matsuzawa (2019), in a study of mothers of school-aged children with intellectual disabilities, reported an employment rate of 49%, compared with an employment rate of 71% among mothers with children of the same age range in the same prefecture. Among mothers in the study who were not employed, 57% nevertheless expressed a desire to work. These findings suggest that non-employment should not necessarily be interpreted as a lack of interest in paid employment. Rather, mothers' employment participation may be influenced by caregiving responsibilities and the circumstances under which employment is possible. In a subsequent study, Ejiri and Matsuzawa (2023) found that mothers of school-aged children with intellectual disabilities sought working hours compatible with their children's school schedules, greater flexibility in taking leave, and extended operating hours for childcare services. These findings highlight the importance of employment arrangements and care services that accommodate mothers' caregiving responsibilities.

Existing Japanese research has contributed to understanding the employment circumstances of mothers of children with special needs, particularly in relation to employment participation, psychological wellbeing, family support and childcare provision (Ejiri & Matsuzawa, 2019, 2023; Moriwaki et al., 2022; Yamaoka et al., 2016). However, these studies have largely examined particular aspects of mothers' circumstances rather than how caregiving responsibilities, employment conditions, and available support are experienced together in their everyday working lives. Consequently, further qualitative inquiry is warranted to understand how mothers sustain, adjust or reconsider paid employment while fulfilling their caregiving responsibilities.

## 3. Research Methodology

This study employed an exploratory qualitative design to examine mothers' experiences of paid work and caregiving while caring for a child with special needs. The study focused on how participants described and interpreted their circumstances in their own words. Written interviews were used because the open-ended format allowed participants to reflect on their experiences and formulate their responses in their own time.
The written interview comprised 18 open-ended questions addressing participants' work and child-rearing circumstances. The questions were developed following a review of the literature and previous empirical studies concerning employment, caregiving and the experiences of parents of children with disabilities or special needs. The open-ended format allowed participants to identify situations and experiences they considered salient rather than restricting their responses to predetermined alternatives. Written qualitative approaches have previously been used to elicit accounts from parents and carers (Elliott & Luker, 1997; Heaton et al., 2006; Newman & Fawcett, 1995). A limitation of written interviews, however, is the absence of synchronous interaction, which prevented the researchers from probing responses or seeking clarification.

The interview questions were developed in English and translated into Japanese by a Japanese academic co-researcher who was a native speaker. A back-translation procedure was subsequently used to compare the Japanese and English versions. Any discrepancies were considered in relation to the intended meaning of the questions rather than literal word-for-word correspondence, with the aim of maintaining conceptual equivalence between the two language versions.

Following ethical approval from the Research Ethics Committee of the primary researcher's institution, the researchers formally contacted an elementary special support school in Japan by email, explained the study and requested permission to conduct the research. Eligible participants were mothers who cared for a child with disabilities, resided in the same household as the child, and had been employed either full-time or part-time for at least the preceding 12 months. Following approval, the school mediated the recruitment and data-collection process. Study materials were distributed by the school to mothers of children in third-grade classes. Completed materials were collected by the school and returned to the researchers by mail. Eleven mothers returned written interviews. One respondent was excluded from the present analysis because she had been a full-time mother since giving birth and therefore did not meet the employment eligibility criterion. Ten mothers consequently constituted the final analytic sample.

The written responses were analysed using reflexive thematic analysis following Braun and Clarke's approach (Braun & Clarke, 2021, 2024). Analysis began with repeated reading of the complete responses to develop familiarity with each participant's account before examining patterns across the dataset. Initial codes were

developed systematically across the written material, with attention to participants' explicit descriptions as well as meanings relevant to their work and caregiving circumstances. Coding was not organised according to individual interview questions; related experiences described across different parts of participants' accounts were considered together. Candidate themes were developed through iterative engagement with the codes, extracts and dataset as a whole. Themes were conceptualised as patterns of shared meaning organised around a central concept rather than as summaries of individual interview topics. Theme development was recursive, with movement between codes, candidate themes, extracts and the complete dataset as interpretations were developed and refined. Differences and contrasting accounts were retained as analytically meaningful, and frequency alone was not treated as evidence of thematic importance. The final themes were refined for internal coherence and distinction from one another, and illustrative extracts were selected to demonstrate how the analysis was grounded in participants' accounts.

## 4. Results

The study involved ten Japanese mothers of children with special needs, aged between 30 and 47 years. Most had received tertiary education and had worked in various occupations, either full-time or part-time. Their children had a range of disabilities and health conditions, including autism spectrum disorder, intellectual and developmental disabilities, chromosomal conditions, and other developmental or health-related conditions. These characteristics provide context for understanding the mothers' employment and caregiving experiences, particularly the circumstances under which they sought to sustain paid work.

Analysis of the written interviews revealed four interrelated themes: (1) Conditions of Work-Care Incompatibility and Its Consequences; (2) Negotiating Employment through Trade-offs and Adaptation; (3) Care and Workplace Support as Enabling Conditions; and (4) The Continuing Value of Paid Work. The themes indicate that the experiences of paid work and caregiving of mothers were influenced by the interaction between care demands and the conditions under which employment and care were organised. Mothers responded to these conditions by making various adjustments to their work, while the employment arrangements that were still possible were influenced by the support of family, formal institutions and the workplace. For some mothers, paid work continued to be a source of financial, personal and professional value.

### Theme 1: Conditions of Work-Care Incompatibility and Its Consequences

The difficulty of reconciling employment with the demands of caregiving was a key condition influencing the experiences of mothers. The problem was not simply the coexistence of work and care. Instead, tensions arose where working hours and expectations of employment intersected with school timetables, after-school services, hospital and rehabilitation appointments, school holidays, unforeseen disruptions and children's needs.

For a number of mothers, the opening hours of schools and care services were not aligned with the time needed for employment. P5 said: "In normal times I worked four or five days a week, from morning to night, but this was not possible during school holidays. Day services are only open from 10:00 to 16:00 during long holidays (summer holidays, etc.), so it is difficult to work as a full-time (regular) employee because of late starts or early departures." P6 had a similar incompatibility. Her job as a nurse required shifts and preparation before the formal start of duty, and the school buses and day services ran on different schedules. During summer holidays, day care began at 10:00, making her usual working arrangements particularly difficult. P7 likewise described difficulty reconciling full-time work with hospital appointments and developmental support. When her child entered special needs school, the timing of the school bus and limitations in after-school care could not be accommodated within her working arrangements.

Work-care incompatibility was not confined to scheduled services. Children's changing or unpredictable needs could also make fixed employment arrangements difficult. P3 provided a clear account of this difficulty. Her child was refusing to attend school at the time, making working from home necessary. However, this arrangement remained insufficient when working hours were rigidly fixed: "... Even with working from home, I feel it is tough if the working hours are rigidly fixed." She explained that her child sometimes wanted her to play or provide attention during working hours. Her account therefore distinguishes between flexibility in where work is performed and flexibility in when work can be performed. Working from home could reduce one constraint without necessarily resolving the competing temporal demands of work and care.

Unexpected disruptions created further difficulties. P8 described having to take prolonged absences when classes closed during COVID-19 or influenza outbreaks. Although sick-child care was formally available, she had not used it because staff were not accustomed to caring for children with disabilities. Thus, mothers could encounter employment difficulties even where services existed if those services could not adequately accommodate their children's needs.

The consequences extended beyond disruption to employment. Mothers described psychological and physical strain, financial consequences and concerns about the quality of care they were able to provide. P1 reported exhaustion, headaches and irritability while managing work alongside rehabilitation and care for two children. P5 reported reduced annual income and sometimes feeling negative because she wanted to work more. P4 described becoming emotionally unstable and subsequently reducing her workload. P7 reported that the stress surrounding schooling and whether she should continue working resulted in hives and other health effects. P3 similarly described the broader effects of being unable to move freely because of her child's needs. The restrictions extended beyond employment to ordinary activities such as shopping and having time for herself, which she described as becoming mentally painful and exhausting.

Some mothers also felt that work pressures affected the care they could provide. P4 was troubled that multiple work responsibilities prevented her from attending to her child as slowly and carefully as she wished. P7 felt that being busy with work reduced opportunities for developmental care and limited the time she could spend interacting carefully with her child. P6 described how the loss of personal fulfilment associated with her employment circumstances affected her experience of caregiving: “Because I did not feel fulfilled myself, I felt unable to fully engage with raising my child or to respond to my child as gently as I wanted. I felt that I was sacrificing too much of myself.”

Work-care incompatibility therefore had consequences across interconnected areas of mothers' lives. Depending on individual circumstances, these included reduced income, physical and psychological strain, career concerns and perceived limitations in their ability to provide care in the manner they considered desirable.

**Theme 2: Negotiating Employment Through Trade-offs and Adaptation**

Mothers responded to these conditions in different ways. Their accounts included reducing working days or hours, moving from full-time to part-time employment, changing workplaces, limiting the extent to which they pursued work, relinquishing career aspirations and, in one case, resigning from full-time employment. These adjustments made work more compatible with caregiving for mothers, but often at a cost.

P1 cut back on her labour force participation because the demands of a heavier workload were not compatible with her caregiving responsibilities: “I have to reduce the number of working days, otherwise I can’t cope.” For P5, the adjustment was to remain employed but in a different career direction. With limited hours of day services it was difficult to find regular full-time employment and she said: “At the time I graduated from university, I gave up on the career I’d dreamed of.” However, she continued to work part-time. Her experience thus distinguished giving up a particular career path from giving up paid employment altogether.

P6 had worked full-time as a nurse but moved to part-time work due to poor understanding of disability in her workplace. She then looked for a job that she felt was more understanding of her situation. This adjustment was at the price of a perceived career cost: "Of course, I could no longer build my career or hope for the future." For P7 the incompatibilities became difficult enough for her to resign from full-time employment when her child started primary school. The decision came at a time when the school-bus schedule and after-school care conflicted with working hours and the grandparents, who had previously helped, were ageing and finding physical care more difficult. Her experience demonstrates how an employment decision may be the consequence of a multitude of intersecting conditions rather than one caregiving demand.

Other mothers set boundaries around how much they worked. P9 talked about deliberately restricting her work involvement: "If I work as much as I want, my child's health deteriorates or I cannot take my child to developmental care, so I work with restraint. But I accept that now, feeling that my child's growth is more important.” Her story shows a trade-off between working as much as she would have liked and making time

for her child's health and developmental care. But she did not describe the adjustment as entirely negative. She said she had changed her working style and tried to work more efficiently. Similarly, P10 reported that caregiving had altered her preferred way of working, though her account suggested her preferences had also changed over time: "My feelings changed over time, and so did the way that I wanted to work. I learned to accept that some change was inevitable." At the time of the interview, she was working part-time and reported relatively little current difficulty in providing care under this arrangement.

These narratives illustrate that mothers' responses cannot be reduced to either unbounded choices or imposed sacrifices. Some adaptations were perceived as losses, especially when mothers curtailed career aspirations or desirable forms of work. Others were described as needed or acceptable changes to reflect shifting priorities. But the choices mothers made were influenced by employment arrangements, the demands of caregiving, and the support available to them. Negotiating work and care then often meant determining what form and extent of employment could be sustained, rather than simply deciding whether to work.

**Theme 3: Care and Workplace Support as Enabling Conditions**

The support available to mothers also affected their ability to retain employment. Family members, formal services and workplaces provided many types of support including direct childcare, transport, after school care and greater flexibility in working arrangements. However, their narratives suggested that support assisted with employment only when it was sufficiently available and appropriate to mothers' situations.

Family members sometimes provided care that allowed mothers to stay employed. P1 depended on her child's father and grandmother at the time of the child's return home and also used after-school day care and rehabilitation services. This informal network of care was explicitly dependent on her ability to continue working: "I can work as long as the grandparents (my parents and my husband's parents) are well, but if something happens I will quit." From her account, an employment arrangement could be viable so long as family support was available but could be uncertain if the capacity of those carers changed.

P7 similarly received assistance from her husband, grandparents and sister and used after-school day care and therapy services. Yet the declining physical capacity of ageing grandparents reduced the support available to her. P9 lived with her parents and received their assistance while also accessing public developmental and physical therapy services. These accounts show that informal and formal support could operate together rather than as alternative sources of assistance.

Workplace arrangements could facilitate employment differently by altering when or where mothers were required to work. P8's part-time hours were organised around seeing her child onto the school bus. She intended to remain with her employer because the workplace accommodated her preferred working days and hours. She also identified telework and hourly paid leave as arrangements that could assist mothers with short-duration care requirements such as school transportation and hospital visits.

P4 likewise described an understanding workplace with a family-first policy. Working from home and prioritising home life were important to her, and she indicated that because her workplace accommodated these requirements, her caregiving circumstances had not produced a particular negative effect on her career. However, interpersonal understanding did not necessarily guarantee that practical accommodation was possible. P7 described colleagues in her nursery workplace as understanding, but staffing limitations meant that taking frequent leave for her child remained difficult. Thus, supportive attitudes and an organisation's practical capacity to accommodate caregiving were not necessarily equivalent.

Formal support showed a similar distinction between availability and usability. P8 reported that sick-child care existed, but she did not use it because staff were not accustomed to children with disabilities. P6 knew of Family Support services but expressed distrust of leaving her child with unfamiliar people and preferred, where possible, to manage transportation herself. P5 limited her daughter's attendance at day services because she considered excessive use physically and mentally taxing for her child.

Support, therefore, facilitated work-care negotiation not simply through its existence, but through its fit with mothers' and children's circumstances. Family availability, day service operating hours, mothers' confidence

in care providers and workplace flexibility could widen or narrow the employment arrangements that mothers considered feasible.

**Theme 4: The Continuing Value of Paid Work**

Several mothers appreciated being in employment, financially, personally or professionally. This helps to explain why their responses often involved attempts to retain some form of paid work even when their working hours, employment arrangements or career expectations had to change.

One of the clearest contrasting accounts came from P2. Unlike mothers reporting high work-care strain, she viewed the support she received positively and did not describe a specific career impact. She enjoyed her part-time work because: "It's refreshing to have my own money and my own time, and I do enjoy it very much." In this account, paid work provided both financial independence and personal time, rather than simply being a competing responsibility. P5 also wanted to continue working even if she had given up on her earlier career ambitions: "I want to continue because I think it is necessary to spend time doing what I like (work) even if it is part-time." Her account suggests that the loss of a preferred career path did not destroy the personal value she attached to work.

For other mothers, the value of work was closely linked to professional identity and development. P4 said she found her work a rewarding experience and she wanted to keep learning, saying she had no intention of resigning. Despite the career limitations P6 had faced, she still strongly identified with nursing: "I wanted to do that profession, so I want to keep going if I can. As a nurse I want to use my experience of having a child with a disability". Her account reveals a tension that was present elsewhere in the findings: work could be a source of constraint and frustration, but also a valued part of the mother's life.

P9 also stated that she enjoyed her job and that her experiences could be useful to teach other people's children, giving a reason for the intention to remain employed despite deliberately limiting the extent to which she sought work. P10 also wanted to continue working and associated employment with the opportunity to try new things and learn from senior colleagues.

The accounts hence demonstrate that paid work could generate difficulties and retain value. Work provided income, personal time, enjoyment, a professional identity and opportunities to learn and achieve fulfilment for different mothers. This continuing value reflects that work-care negotiation did not necessarily lead to withdrawal from employment. Instead, many mothers sought ways to maintain work within the parameters of their caregiving circumstances, even when this meant changes to working hours, employment arrangements, or career expectations.

**Discussion**

This study explored how mothers of children with special needs negotiate paid work and caregiving in the setting of their caregiving demands. The results indicate that this negotiation was influenced by the demands of care, the organisation of employment and care arrangements and the support available for mothers. Mothers responded by changing working hours, employment arrangements and career expectations, but the extent and importance of these adaptations varied by participant. For many mothers, however, paid work continued to be financially, personally or professionally valuable despite the difficulties in sustaining it. Overall, the findings of these studies suggest that work-care negotiation is not well represented as a simple choice between employment and caregiving. Instead, it is about mothers adapting employment within the constraints of what makes some ways of working more feasible than others. A valued working role is sought to be maintained where possible.

One important finding concerns the conditions under which work and caregiving became difficult to combine. Previous research has established that caring for children with special needs can place considerable demands on parents' time and resources and affect their participation in employment (Anderson et al., 2007; Brekke & Alecu, 2023; Wondemu et al., 2022). The present findings provide a more detailed account of how such constraints were experienced. Difficulties arose not only from the amount of care required but from the timing and unpredictability of care. School schedules, transportation, after-school services, hospital and rehabilitation appointments, school holidays and unexpected interruptions could conflict with working hours. Even working

from home did not necessarily resolve these difficulties when working time remained fixed, and a child required attention during those hours. Temporal flexibility therefore appears to matter alongside flexibility in work location.

The temporal dimension is particularly relevant when considered alongside Japanese evidence concerning mothers of children with special needs. Ejiri and Matsuzawa (2023) found that mothers of school-aged children with intellectual disabilities wanted shorter and more flexible working hours as well as longer operating hours for after-school childcare services. The present findings illustrate why both may matter. Adjustments on only one side of the work-care relationship may be insufficient when employment and care arrangements continue to operate according to incompatible schedules. This helps to explain why the feasibility of employment may depend not only on whether care services are available but also on whether the periods covered by those services correspond sufficiently with the periods during which mothers need to work.

The repercussions of these incompatibilities extended beyond the mere participation in employment. Participants reported feeling exhausted, stressed, and experiencing financial strain, and in some cases, concerns that work demands affected the care they were able to provide. These results align with evidence of increased psychological distress among mothers of children with disabilities (Yamaoka et al., 2016) and the larger body of research on adverse mental and physical health consequences of intensive caregiving (Brekke & Alecu, 2023). The study does not prove that work-care incompatibility caused these outcomes. But the mothers' stories show how the demands of employment and caregiving might meet in the everyday, drawing on the same limited resources of time, physical capacity, and psychological energy. This highlights the significance of viewing maternal wellbeing as part of the context in which paid work is maintained, rather than an individual outcome of employment.

The second finding concerns mothers' responses to these conditions. Their adjustments entailed working fewer days or hours, moving from full-time to part-time work, and changing workplaces, thereby limiting career aspirations and exiting full-time employment. Similar employment consequences such as reduced working hours, time away from work, and negative income and career consequences have been reported in previous research among parents caring for children with disabilities (Anderson et al., 2007; Østerud et al., 2024; Wondemu et al., 2022). The present findings, however, indicate that the meaning of these adaptations was not uniform. Some mothers reported little ambition in their work or the loss of a desired job, while others came to view changes in their work arrangements as necessary or acceptable in light of their children's needs. This variation is important as it implies employment adjustment should not be understood as a fully voluntary choice or a uniform imposed sacrifice. Mothers did exercise agency in how they responded to their circumstances, but their agency was limited by the options available to them. For example, a mother may prefer to work part-time rather than full-time. However, that preference may simultaneously reflect her own caregiving preferences and the unavailability of care arrangements that can accommodate full-time employment. This corresponds to the findings of Østerud et al. (2024) regarding negative career effects and change of occupational orientation for mothers of disabled children, as well as the documentation by Yoosefi Lebni et al. (2021) of lost opportunities and maternal sacrifice within the general economic constraints. In this regard, the distinction between choice and constraint is not as clear as employment status in itself would suggest. Negotiation in this study often involved what form and extent of employment could remain viable within mothers' caregiving circumstances.

A third finding concerns the role of family, formal and workplace support in shaping those possibilities. Previous research has shown that mothers may rely on combinations of family members, paid caregivers and formal services to sustain employment and caregiving (Opoku et al., 2025). Japanese research has likewise highlighted the importance of social and formal support for mothers caring for children with disabilities (Moriwaki et al., 2022; Porter & Loveland, 2019), while Ejiri and Matsuzawa (2019) identified childcare-service use as one of the factors associated with maternal employment. The present findings support the importance of these resources but add a further distinction: the availability of support did not necessarily mean that it was usable for employment purposes.

Formal services, for example, could be available but operate for hours that did not correspond with employment schedules. A service might also be regarded as unsuitable because staff were not accustomed to

caring for children with disabilities, while another mother was reluctant to use available support involving unfamiliar caregivers. In another account, greater use of day services was limited because the mother considered it physically and psychologically demanding for her child. These experiences indicate that the practical value of formal support depends on its fit with both employment requirements and the needs of the child. Support should therefore not be treated as a simple present-or-absent resource. Its timing, appropriateness and mothers' confidence in the care provided can determine whether it actually expands their employment possibilities.

Similarly, family support was conditional. Some mothers were able to continue employment with the support of spouses, grandparents and other relatives, but dependence on ageing grandparents also rendered some arrangements potentially fragile. This is similar to Japanese research that has found a link between fathers' involvement in childcare and mothers' continuation in full-time employment (Dhungel et al., 2023). The current study extends this understanding by illustrating how mothers may cobble together care from multiple sources, and how the viability of employment may depend on the continued functioning of that assemblage. Family and formal support, then, seem less like distinct resources and more like components of the care arrangements which make employment more or less possible.

Another aspect of the environment of support was workplace conditions. Some mothers described employers that were flexible on working hours, working from home, or family priorities, but other accounts showed that understanding at work did not necessarily translate into practical accommodation. An employer or colleagues could be sympathetic, for example, while staffing requirements still made frequent leave difficult. This distinction is consistent with the broader literature showing that rigid working arrangements and limited organisational understanding can restrict employment opportunities for mothers caring for children with disabilities (Al-Oraini, 2024). The present findings suggest that workplace support has a practical as well as an interpersonal dimension: understanding is valuable, but its capacity to facilitate employment depends on whether it can be translated into workable arrangements.

The final finding adds an important qualification to an interpretation centred solely on work-care conflict. Several mothers continued to value paid work even when caregiving had required substantial employment adjustment. Work provided different combinations of income, personal time, enjoyment, professional identity, learning and fulfilment. This finding is consistent with Saputra and Karyono (2014), who found that employed mothers of autistic children valued work for its contribution to family finances and financial independence. Also echoing Østerud et al. (2024) where participants described career difficulties but in some cases occupational development from their caregiving experiences. As a consequence, employment can be both a source of demands and a valued life domain.

The combination of constraint and value is important in understanding why a reduction or leaving of paid employment should not be automatically taken as a solution to work-care difficulties. Less employment may also create more time for care, but may also mean a reduction in income, altered career prospects, or the loss of personally meaningful work. In contrast, remaining employed can conserve financial resources, professional identity, or time in a role of value outside caregiving, while adding additional pressures. A work-family conflict perspective captures an important part of these experiences because work and care clearly competed for finite time and energy. It does not, however, fully capture why mothers sought to retain employment despite those competing demands. The findings therefore support a broader understanding of work-care negotiation in which strain and value can coexist.

## 5. Managerial Implications and Recommendations

The findings have implications for organisations employing mothers with disability-related caregiving responsibilities. Workplace support is likely to be most useful when it addresses the practical circumstances that make work and care difficult to coordinate. In this study, difficulties arose when working hours conflicted with school transportation, care services, medical and rehabilitation appointments, or unexpected changes in children's needs. Where job requirements permit, flexibility in working hours, work location and access to leave may therefore help employees respond to caregiving demands without having to make more substantial changes to their employment. The appropriate arrangement, however, is likely to differ according to both the nature of the job and the employee's caregiving circumstances.

The findings also suggest that organisational understanding needs to extend beyond expressions of sympathy towards consideration of what adjustments are practically feasible. Some mothers described understanding workplaces, yet operational conditions such as staffing requirements still restricted their ability to take leave. Managers should therefore consider caregiving needs in relation to actual work arrangements rather than assume that a generally supportive workplace is sufficient. Regular communication between employees and their immediate supervisors may help identify where adjustments are possible while recognising the operational requirements of the organisation.

Organisations should also be cautious about interpreting reduced working hours or requests for flexibility as evidence of limited commitment to employment. Several mothers in this study continued to value their work financially, personally or professionally even after caregiving circumstances had led them to reduce their hours, move to part-time employment or modify their career expectations. Where feasible, employees who adjust their working arrangements because of caregiving should therefore continue to have access to meaningful work and opportunities for learning and professional development. The managerial priority is not to prescribe whether mothers should work full-time or part-time, but to widen the range of workable employment arrangements through which employees can remain engaged in paid work while meeting substantial caregiving responsibilities.

## Conclusion

This study explored how ten mothers of children with special needs attending one elementary special support school in Japan negotiated paid work alongside caregiving. Their accounts show that work-care negotiation involved more than managing two competing roles. The feasibility of employment was shaped by the timing and unpredictability of caregiving demands, the organisation of work and care services, and the family, formal and workplace support available to mothers. In response to these circumstances, mothers adjusted working hours, employment arrangements and career expectations in different ways. These adaptations could involve loss or constraint, but they could also be regarded as necessary or acceptable responses to children's needs. They should therefore not be interpreted as either wholly voluntary choices or uniformly imposed sacrifices.

The study also shows that the availability of support alone does not determine whether it enables employment. Family assistance may become uncertain as caregivers age, formal services may not correspond with working hours or children's needs, and workplace understanding may not always translate into practical accommodation. What matters is whether the combination of care and employment arrangements is sufficiently workable for a mother to sustain employment. At the same time, paid work remained financially, personally or professionally meaningful for several participants. Work-care negotiation therefore involved not only responding to the constraints created by caregiving but, where possible, preserving a valued working role.

These findings should be interpreted within the boundaries of the study. The final analytic sample comprised ten mothers recruited through the third-grade classes of one elementary special support school in Japan, and participation depended on mothers choosing to return the written interview through the school-mediated recruitment process. The findings are therefore not intended to represent the experiences of all mothers of children with special needs in Japan. Written interviews also enabled participants to formulate their responses in their own time but did not allow the researchers to probe particular experiences or seek clarification. Future research could use in-depth or longitudinal interviews to examine how work-care arrangements change as children and family circumstances change and could include mothers across different occupations, employment arrangements and caregiving contexts.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# The Tawhidic Paradigm as Workplace Spirituality in Islamic Higher Education: Governance, Talent Management and Organisational Excellence

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**Abstract:** The concept of workplace spirituality is increasingly attracting scholarly attention due to its potential to foster meaningful work, ethical behavior, and organisational success. However, empirical research remains limited regarding how faith-based spirituality translates into formal organisational practices. This study explores the manifestation and institutionalization of the Tawhidic paradigm as a foundation for workplace spirituality within an Islamic higher education institution. Particular focus is placed on governance, talent management, and organisational excellence. Employing a qualitative case study approach, data were collected through semi-structured interviews and focus group discussions involving representatives from four staff associations, and subsequently analyzed using thematic analysis. Three key themes emerged from the findings: the strength of spirituality and community spirit within the Tawhidic paradigm; challenges in governance and talent management; and the integration of workplace harmony with organisational excellence. The Tawhidic paradigm was found to provide a robust foundation for spirituality and community spirit. However, concerns regarding implementation transparency, recognition, career advancement, promotion criteria, and professional competence created a gap between held spiritual values and formal organisational practices. This resulted in tension between harmony and excellence, suggesting that a supportive and comfortable work environment could contribute to complacency, resistance to change, and a lack of readiness to embrace technology and artificial intelligence (AI). By bridging the gap between values and organisational practices, this study extends the scope of workplace spirituality beyond individual and communal experiences toward a more holistic framework for sustainable organisational excellence within Islamic higher education institutions.

**Keywords:** *Tawhidic Paradigm, Workplace Spirituality, Islamic Work Ethic, Organisational Justice, Organisational Paradox Theory, Talent Management, Governance, Sustainability*

## 1. Introduction and Background

In the contemporary management landscape, institutions are increasingly shifting away from traditional economic and transactional management models toward fostering workplace spirituality. It reflects an organisational concept that promotes meaningful work, intrinsic purpose, and a deep sense of community among employees. In Islamic Institutions or religiously based Institutions, this spiritual paradigm is based on the Tawhidic Paradigm (Mhd. Sarif, 2014; Mhd. Sarif et al., 2015), which changes the concept of work management from a formal work obligation to work that is considered an act of worship carried out with a sense of accountability (amanah), behavioral excellence (ihsan) and operational efficiency (Itqan). Academic literature consistently states that a strong spiritual foundation will act as a catalyst for institutional resilience (Howard et al., 2023), foster high levels of employee motivation (Kendall, 2019), build psychological strength (Dubey et al., 2022; Sultan & Hussain, 2025), as well as interpersonal cooperation (ukhuwah) (Tigedi et al., 2024). Thus, these values function as core organisational, social and psychological capital in maintaining organisational performance and excellence (Ahmad et al., 2024; Mhd. Sarif et al., 2023; Zahrah, 2015).

However, the problem arises when there is a lack of research related to the management of organizations based on religious or spiritual values, especially their implementation, effectiveness and challenges in corporate governance. Despite the theological framework such as the practice of justice ('adl) in a meritocracy based on competence (al-qawiyy) and integrity (al-amin) (Mhd. Sarif, 2015, 2016; Mhd. Sarif et al., 2024), the gap between the values held and the practice of these values often occurs in their operational environments. It has

led to a lack of procedural and distributive justice in decision-making such as promotion decisions and succession planning. Thus, it severely erodes institutional trust and reduces the motivation of highly skilled or academically talented staff (Raza et al., 2013; Ilyana et al., 2023). Additionally, this structural inconsistency leads to an organisational paradox where an overemphasis on employee relationship harmony and conflict avoidance (ukhuwah) indirectly shapes a comfort zone mentality and culture. The organization's normalization of maintaining the status quo has weakened initiatives for strategic transformation and competitive market efforts. This poorly managed harmony-excellence conflict can hinder the organization's future readiness and innovation in shaping the global higher education transition to Education 4.0 and 5.0, which demand advanced digital fluency and Artificial Intelligence (AI) readiness. Employees in this constrained ecosystem exhibit low digital and AI capabilities, along with strong resistance to automated workflows (Akour & Alenezi, 2022; Alenezi et al., 2023; Almeida & Simoes, 2019; Duasa et al., 2020).

Although existing studies have extensively explored the psychological benefits of workplace spirituality, there has been little empirical attention paid to how faith-based institutions address the conflict between embodied spiritual values and their implementation within organisational structures, particularly in relation to governance, organisational justice, and strategic excellence. To address this gap, this study examines higher education institutions implementing faith-based workplace spirituality to investigate how spiritual values interact with formal corporate governance, talent management channels, and organisational excellence (Duasa et al., 2020). As such, it can provide ideas for actionable plans to reframe professional accountability, transparent performance measures, and technological skill enhancement not as organisational economic goals, but as direct manifestations of spirituality in organisational practices in achieving Al-Ihsan (holistic excellence) and Al-Itqan (precision and operational quality).

## 2. Literature Review

To study the implementation of faith-based organisational management or workplace spirituality practices, especially in higher education institutions, the operational reality of workplace spirituality must be assessed through multiple theoretical dimensions. This management challenge is quite complex in a religiously-based environment, where Islamic spiritual values are sometimes not aligned with the formal corporate structures of modern governance, strategic talent development and institutional performance metrics. To transform workplace spirituality from an isolated psychological phenomenon, this study attempts to position it as an organisational ecosystem that potentially contributes to different perspectives on administrative behavior and its effectiveness.

To systematically distinguish the values-practice gap, harmony-excellence paradox and technological capability gap identified in contemporary institutions, this study combines three theoretical frameworks. First, Organisational Paradox Theory serves as the primary analytical tool for examining the structural tension between a comfortable environment and a focus on performance. Second, the Islamic Work Ethic (Mhd. Sarif, 2014; Mhd. Sarif et al., 2015) provides the foundational epistemological framework for analyzing how a spiritual paradigm influences employees' intrinsic motivation and workplace relationships. Finally, Organisational Justice Theory is employed to assess the transparency, fairness, and systemic integrity regarding the institution's human capital development and evaluation. Collectively, this framework establishes a robust analytical basis for evaluating the empirical data presented in this study.

### Organisational Paradox Theory

In the study of contemporary management, an organization is not a static entity concerned solely with stability; rather, it is a dynamic structure and system that interacts with a constantly changing environment. To understand this challenge, Smith and Lewis (2011, p. 382) formulated the Organizational Paradox Theory. This theory defines a paradox as "contradictory yet interrelated elements that exist simultaneously and persist over time." This differs from a dilemma, which presents a clear choice between alternatives and seeks a resolution through synthesis. A paradox, by contrast, involves an ongoing tension where both opposing elements are essential for organizational sustainability. Smith and Lewis (2011) categorize these tensions into four key quadrants: learning (adaptation versus exploitation), organizing (control versus flexibility), performing (competing goals), and belonging (identity versus alignment). In professional institutions, the paradox between belonging and performing often manifests as a structural tension between maintaining a comfortable,

established workplace culture and supporting organizational performance that demands change. When applied to institutional governance, this framework explains how systems can become trapped in specific operational failures, particularly when organizational units remain within their respective comfort zones. If management prioritizes the preservation of internal harmony and collective identity over performance metrics, the institution risks fostering a culture of complacency. Conversely, if the focus is placed solely on performance metrics without regard for organizational harmony, employee well-being and commitment may be compromised. Therefore, Organizational Paradox Theory argues that sustainable institutional excellence requires a shift from an "either/or" stance to an acceptance of "both/and," where managers proactively address structural tensions rather than attempting to suppress them.

**Islamic Work Ethic (IWE) & The Tawhidic Paradigm**

To analyze the operational reality of Islamic Educational Institutions (IEIs), the management framework must be integrated with a fundamental understanding of the Tawhidic Paradigm. The Tawhidic Paradigm positions Tawhidic (the oneness of God) as the ultimate epistemological and ontological lens through which all human actions, including administrative governance and labor, are carried out (Fareed, 2022; Ismail & Sharif, 2011; Siddiqi, 1979). Within this paradigm, Ahmad and Owoyemi (2012) and Ali and Al-Owaihan (2008) conceptualize Islamic Work Ethics (IWE) by defining it as an orientation that shapes individual engagement in the workplace as a spiritual, moral, and social obligation. Unlike utilitarian workplace ethics that link productivity to economic incentives and organisational utility, IWE elevates professional labor to the status of worship (ibadah) (Ahmad & Owoyemi, 2012; Fareed, 2022). While secular workplace ethics practices prioritize individual ambition, career achievement, and self-actualization, IWE provides a mechanism to achieve Falah (holistic success in worldly life and the hereafter), which requires employees to view their organisational roles through the lens of amanah (trustworthiness) and ihsan (spiritual goodness and excellence).

Additionally, Islamic management literature also emphasizes that IWE practices require a balanced continuity between character and ability. This administrative balance is derived from the classical Quranic framework of personnel selection found in Surah Al-Qasas (28:26) (Al-Quran Al-Karim Mu'jam, 2020, Al-Qasas 28:26), which outlines a dual-criteria system: Al-Qawiyy (Competence and Strength) and Al-Amin (Integrity and Trustworthiness). In the form of organisational behavior, Al-Amin represents the moral foundation of honesty, dedication, and adherence to spiritual values. On the other hand, Al-Qawiyy represents professional strength, which in the contemporary era translates into teaching or work competence, pedagogical innovation, administrative capabilities, and digital literacy or Artificial Intelligence (AI). Overemphasis on Al-Amin at the expense of Al-Qawiyy results in a morally strong but structurally weak institution that suffers from talent shortages and critical technological gaps. Conversely, focusing solely on Al-Qawiyy while neglecting Al-Amin will undermine the integrity of the institution and damage the spiritual ecosystem. Modern scholars therefore argue that true IWE implementation requires an explicit organisational alignment in which spiritual devotion (ibadah) is structurally translated into professional competence, quality and continuous improvement - a state known in Islamic administration as itqan (Rofie et al., 2025; Suhendra et al., 2025).

**Organisational Justice Theory**

Although the intrinsic motivation of employees in religiously based environments is largely driven by spiritual ethics (Syahir et al., 2025), their relationship with the institution is fundamentally mediated by perceptions of justice (Abdullah & Al-Abrrow, 2023). To understand this dynamic concept, the academic literature relies on Organisational Justice Theory, pioneered by Greenberg (1987) and further refined by Colquitt (2001). This theory examines how employees evaluate the fairness of management structures and decision-making processes, as well as the psychological impact of these evaluations on workplace behavior, organisational trust, and commitment (Malla & Malla, 2023). Organisational justice is structurally divided into three main dimensions: distributive justice, procedural justice, and interactional justice.

In institutional governance, distributive justice involves the perceived fairness of the allocation of resources and outcomes, such as compensation, workload, and promotion. Employees evaluate whether the rewards they receive are consistent with their structural inputs and the efficiency of their professional outputs. Procedural justice, on the other hand, is crucial to analyzing institutional talent management, referring to the perceived fairness of the rules, policies, and mechanisms used to determine those outcomes. Colquitt (2001) emphasizes that procedural justice requires processes that are consistent, impartial, accurate, open to correction and most

importantly, transparent. Finally, interactional justice focuses on the quality of interpersonal treatment received from leadership, particularly in relation to preserving employee dignity, respect, and information transparency.

When applied in organizations, Organisational Justice Theory reveals a critical managerial weakness often referred to as the value practice gap (Chrystal et al., 2019; Eriksson et al., 2025; Petrulaitiene & Jylhä, 2015). In many religiously based organizations, leadership may explicitly champion the spiritual values of absolute justice, equity, and transparency. However, if the operating system is weak in terms of objective performance measurement - resulting in opaque succession planning, subjective promotion criteria, or unequal distribution of promotions and recognition, employees will experience a significant sense of procedural and distributive injustice. The literature suggests that religious or intrinsic motivation does not protect employees from the psychological effects of systemic injustice (Kaur, 2026; Stockkamp et al., 2023). When procedural justice is compromised, it erodes institutional trust, creates internal political friction, and reduces organisational member commitment. Therefore, ensuring structural organisational justice is not just an administrative necessity; it is a fundamental prerequisite for aligning the realities of faith-based organization operations with stated theological values.

In this regard, this study aims to explore how the Tawhid paradigm is manifested as workplace spirituality in religiously-based higher education institutions. It further examines its perceived effectiveness in supporting governance, talent management, and organizational excellence, while investigating the structural challenges faced in translating its spiritual principles into organizational practices. Particular attention is paid to the tensions between values and practices, integrity and professional competence, and organizational harmony and the pursuit of excellence.

## 3. Methodology

This study employed a qualitative case study approach to explore how the Tawhidic paradigm is manifested and institutionalised as workplace spirituality within an Islamic higher education institution. The study examined participants' perceptions of how Tawhidic values support organisational governance, talent management, and organisational excellence, as well as the challenges involved in translating these values into institutional practices.

Data were collected through semi-structured interviews and one focus group discussion involving representatives from four major staff associations, which include the Academic Staff Association, Professional Management Association, Support Staff Group Union, and General Staff Union. In total, six participants representing academic, professional, administrative, and support staff participated in the study. The Academic Staff Association session was conducted as a focus group involving three participants (current and former leaders), while the remaining three sessions were conducted as individual interviews. All these participants are in the top management of each association.

Participants were selected using purposive sampling based on their roles as representatives of their respective staff associations and their experience with staff training and development at the higher education institution. Each interview or focus group session lasted approximately one to two hours and was conducted using a semi-structured interview protocol. The interview questions explored current training and development practices, the integration of Islamic values, perceived strengths and challenges, and recommendations for developing a Tawhid-based training and development framework. All interviews were video-recorded with participants' consent and subsequently transcribed verbatim. The data were analysed using Braun and Clarke's (2006) thematic analysis, involving familiarisation with the data, initial coding, theme development, theme review, and refinement.

Following the initial coding, codes with similar meanings were compared and grouped into broader subthemes. For example, codes relating to work as *ʿibādah*, *amānah*, ethical alignment, *ukhuwah*, and mutual support formed the subthemes of spiritual meaning and workplace community. Codes concerning transparency, promotion, career progression, recognition, and competency development formed the governance and talent-management subthemes. Meanwhile, codes relating to complacency, resistance to change, technological

readiness, and competitiveness formed the harmony–excellence subthemes. These subthemes were reviewed against the coded data and subsequently consolidated into three overarching themes: spiritual and communal strengths of the Tawhidic paradigm; governance and talent-management challenges; and the integration of workplace harmony with organisational excellence. To enhance the credibility of the findings, perspectives from different staff categories but at the same level as a leader were compared to achieve data triangulation across participant groups (Table 1).

**Table 1: Participants by Staff Association and Data-Collection Method**

| Staff association | Participant code | Data-collection method | Total |
|---|---|---|---|
| Academic Staff Association | P1-P3 | Focus group discussion | 3 |
| General Staff Union | P4 | Individual interview | 1 |
| Support Staff Group Union | P5 | Individual interview | 1 |
| Professional Management Association | P6 | Individual interview | 1 |
| **Four staff associations** | | **One focus group and three individual interviews** | 6 |

## 4. Results

The main purpose of this study is to explore the operational dynamics of Workplace Spirituality in Higher Education Institutions (HEIs), with a specific focus on current and structural challenges in Governance, Talent Management and Organisational Excellence. As noted in the literature review, while the integration of spiritual paradigms yields significant communal strengths, it simultaneously introduces complex structural paradoxes and administrative tensions. Qualitative empirical data collected through semi-structured interviews and thematic analysis, offer an in-depth examination of how these dynamics play out in the institution studied. To ensure empirical consistency and readability, findings are directly organized around three core analytical themes that emerge from the data, whose relevance is precisely mapped onto the research objectives. Figure 1 illustrates the thematic network of this study, which demonstrates the progression from raw data codes to structural themes.

In this section, a reveal of findings, supported by verbatim narrative excerpts from participants (labeled as P1, P2, etc. to maintain confidentiality), is presented. This discussion synthesizes empirical data in the existing theoretical frameworks, Organisational Paradox Theory, Islamic Work Ethic (IWE), and Organisational Justice Theory. This integrated approach ensures that participants' experiences are systematically leveraged to understand the value-practice gap, future readiness, and strategic alignment of harmony and merit in the higher education landscape. The analysis began with the thorough transcription and familiarization of the raw interview data. Initial open codes were then generated by labelling specific phrases and paragraphs relating to first, workplace spirituality - sense of community, governance - competency and organisational harmony-excellence. These initial codes were subsequently clustered into broader sub-themes based on conceptual similarities. Finally, these sub-themes were conceptualized into three overarching thematic pillars that directly address the core objectives of this study. Table 2 shows the Participant-Code Mapping to Themes, Sub-Themes and Codes.

**Table 2: Participant-Code Mapping to Themes, Sub-themes, and Codes**

| Theme | Sub-theme | Code | Participants Supporting the Code |
|---|---|---|---|
| **Spiritual and Communal Strengths of the Tawhidic Paradigm** | **Spiritual meaning and ethical alignment** | Work as ibadah and service | P4, P5 |
| | | Alignment of work and religious values | P1, P2, P3, P4, P5, P6 |
| | | Spiritual awareness and sense of purpose | P1, P3, P4, P5 |
| | | Amanah, ‘adl, ihsan and accountability | P1, P5, P6 |
| | | Spiritually oriented development programmes | P3, P4, P5, P6 |

| | | | |
|---|---|---|---|
| **Governance and Talent Management Challenges** | **Sense of community and workplace cohesion** | Mutual respect and cooperation | P1, P3, P4, P5, P6 |
| | | Ukhuwah and collective identity | P3, P4, P5, P6 |
| | | Supportive and harmonious relationships | P3, P4, P5, P6 |
| | | Belonging and collegiality | P3, P4, P5 |
| | | Volunteerism and social engagement | P4, P5 |
| | **Governance and organisational justice** | Transparency in succession planning | P5 |
| | | Fairness in promotion and staff grading | P5 |
| | | Career progression opportunities | P3, P4, P5, P6 |
| | | Fair rewards and recognition | P3, P5 |
| | **Professional competency and talent development** | Espoused value - practice gap | P1, P2, P3, P4, P5, P6 |
| | | Compliance-oriented training | P2, P3, P4, P5, P6 |
| | | Unclear spirituality–competency link | P1, P3, P4, P5, P6 |
| | | Digital and AI capability gaps | P1, P2, P3, P6 |
| | | Leadership and research capability | P1, P3, P4, P5, P6 |
| | | Innovation and future-readiness | P1, P2, P3, P5, P6 |
| | **Harmony–excellence tension** | Comfort-zone mentality | P5,P6 |
| | | Complacency arising from contentment | P5, P6 |
| | | Resistance to change | P5, P6 |
| | | Weak competitiveness and innovation | P5, P6 |
| | | Limited performance striving | P6 |
| **Integrating Workplace Harmony with Organisational Excellence** | **Toward a holistic Tawhidic framework** | Ihsan and itqan as excellence | P1, P5, P6 |
| | | Continuous learning and accountability | P1, P2, P3, P4, P5, P6 |
| | | Transparent, merit-based HR systems | P3 |
| | | Leadership and innovation development | P1, P2, P3, P5, P6 |
| | | Spiritual integrity with institutional excellence | P1, P2, P3, P4, P5, P6 |

**Theme 1: Spiritual and Communal Strengths of the Tawhidic Paradigm**

The first theme extracted from the thematic analysis established the foundation of the institutional workplace culture. Participants consistently identified a deeply held spiritual framework and strong interpersonal relationships as key drivers of organisational cohesion and individual motivation in this Higher Education Institution. The qualitative data reveal that employees do not view their professional roles within the institution merely as transactional economic activities. Instead, their work is integrated into their personal spiritual identities. For instance, Participant 1 (P1), an academic leader, former leader and member, explained:

*P1: "But I think we also need to acknowledge a paradigm shift. When we talk about ibadah, it's not just that narrow definition, right? For instance, all the technical skills are there to improve our productivity, and that itself is part of fulfilling amanah (trust). If we can relate it to these broader concerns, it would be beneficial. Don't limit ibadah*

*only to discussions of Islamisation.".. "When we talk about ihsan, there's a connotation of being compassionate, empathetic, and benevolent, basically. It's also related to doing your job to the best of your ability"*
*P3: "This understanding is what I feel is lacking in training. It's essential for academic staff to have the ability to translate this understanding into practical applications. For instance, how do we communicate to students that all knowledge comes from Allah and is already aligned with Islam"*
*P2: "Or perhaps just a reminder that Islam also encompasses these values. For example, in scientific methods—if we look at Islamic sciences, like Ilmu Hadis, it's very scientific and rigorous. But people tend to forget that."…. "For me, with these training programs, we don't always need to explicitly state Islamic values because… of course, we have very beautiful Islamic values to incorporate and these values don't contradict mainstream approaches"*
This high level of intrinsic, spiritually-driven motivation is strongly reinforced by a deeply communal, supportive social environment. Participants frequently used familial terms to describe their working relationships with colleagues. Participants 4 (P4) and 5 (P5), both are department heads, noted:
*P4: "Not only are we given the chance to share our views, but Alhamdulillah, the relationship between the staff union and the top management is really good."*
*P5: "Brotherhood (ukhuwah) is also strongly emphasized... our staff- from support to academic levels worked together to assist her (outside trainer)... She was impressed by the attitude (budi-bahasa courtesy) and support provided by everyone involved."*
Similarly, Participant 6 (P6), a leader of a professional association, emphasized that this communal cohesion acts as a support mechanism among staff. *P6: "Now, they involve a number of senior staff... This is very important because they need to hear from those with experience. It's a knowledge transfer…. and they also do mentor-mentee relationships..."*

**Theme 2: Governance and Talent Management Challenges**
While the foundational baseline established in Theme 1 highlights strong spiritual equity, the second theme explores the critical administrative friction within the Higher Education Institution (HEI). The qualitative data reveals that when informal spiritual ideals are not backed by formalized corporate structures, severe challenges emerge regarding institutional governance, promotional transparency, and succession planning. Participants expressed shared concerns that the administrative processes within the HEI frequently lack the structural clarity and predictability expected of a modern higher education provider. A primary area of concern was the lack of transparent communication regarding institutional pathways for career advancement. Participants raised concerns regarding transparency, resource allocation, recognition, career progression, and promotion criteria, as reflected in the following accounts.
*P1: "We don't even know anything about the budget… . It would be good to know. And sometimes, there's this tendency to overlook our in-house experts. Actually, we have many in-house experts, but instead, we go and hire external ones."*
*P2: "And there should also be rewards….. But there needs to be support. I feel the support system is somewhat lacking."*
*P3: "So, it comes back to transparency. How much are you paying these external experts? Couldn't you allocate some of that budget to pay internal ones?"*
P4: "Since we are small, we are the smallest... when we sit together, we don't want to be seen as sidelined... We strive to make our voices heard, to be visible, so we are not left behind"
P5: "Currently, I notice our institution lacks a strong career path program for staff. While there are programs available, they are not effectively carried out. I hope these programs will be improved and implemented properly in the future."
P6: "And we still don't know how far the management looks into that profiling. We also don't know how much the training is considered when it comes to promotions, especially among administrators. We don't know what criteria are being used to move someone to the next level."

**Theme 3: Integrating Workplace Harmony with Organisational Excellence**
The final theme captures the main synthesis of the study. It addressed the explicit conflict between maintaining the communal harmony identified in Theme 1 and driving the professional excellence required by modern higher education. The data highlight how an unmanaged paradox between these two elements has created an institutional comfort zone, resulting in somewhat technological and innovation capability gaps. The participant accounts suggest a potential tension between workplace harmony and organisational excellence, although this tension was not expressed equally across all participants. It was articulated most clearly by P6, who associated

institutional comfort with reduced competition, limited performance striving, and resistance to change. Related concerns were raised by P1 regarding reluctance to engage in further learning, P3 regarding technological adaptation, and P4 regarding monitoring and attitudes towards performance. Participants admitted:

*P1: "At the academic level, there's sometimes a perception among academics that they already know everything and don't need further training. This mindset needs to change... some people prefer to stick to old-school methods. We need to instill the mindset that we should unlearn and relearn."*

*P2: "Some of the technical, technology-based, or methodological sessions are actually very effective in improving our research skills. However... many online training sessions tend to be more online-based, which, for me, is less impactful..."*

*P3: "Another issue I'd highlight is the technological gap. For us, especially from the X- generation, transitioning to technology is a struggle for some of us, right?"*

*P4: "If they don't complete the required courses or fail to meet the criteria... Then they ask, 'Why didn't we get promoted?'... we emphasize the need for serious and regular monitoring... The achievement we want to target is not reached. Why? There is an attitude problem."*

*P6: "Sometimes we need competition. Competition is really missing here because we are too comfortable with what we have now."…. P6 added: "Exactly... the concept of redha (contentment) is too much about just accepting... We need someone who can integrate all these Islamic principles while also keeping up with modernization... We have scholars speaking about values like being humble, being a good Muslim, practicing Ihsan, being A'dl, applying integrity in the workplace, and being kind. That's all good, but we're not competing."… "We need to change our curriculum… we need to change our syllabus, we need to adapt, we need to embrace... IR 4.0... and the new business landscape... You need to realise... there is no guarantee of sustainability if you're not embracing changes."… "If we still apply the same... training the same... producing the same... we shape the same... thinking the same. We are stagnan**t**, by the way."*

This protective insulation has had perceived implications on the institution's future-readiness, particularly regarding technological modernization. When asked about adaptation to contemporary educational tools, participants highlighted several gaps:

*P1: "All these training programs are designed to increase productivity and enable us to fulfil our amanah... They align with the mission of IIUM, which in turn aligns with the Tawhidic Paradigm. However... there's a need to emphasize and frame these trainings more explicitly in relation to the Tawhidic Paradigm. Not just superficially, but also focusing on how these values are practiced in real implementation."*

*P2: "There's literature in business administration that highlights the importance of incorporating Islamic values in human resource management. One key aspect is how these values help individuals improve themselves."*

*P3:" And the framework should also evolve with current needs. For example, people are now talking about AI. Technology, especially AI, is advancing rapidly... As lecturers, we need to enhance our knowledge on the use of AI... we need to be one step ahead."*

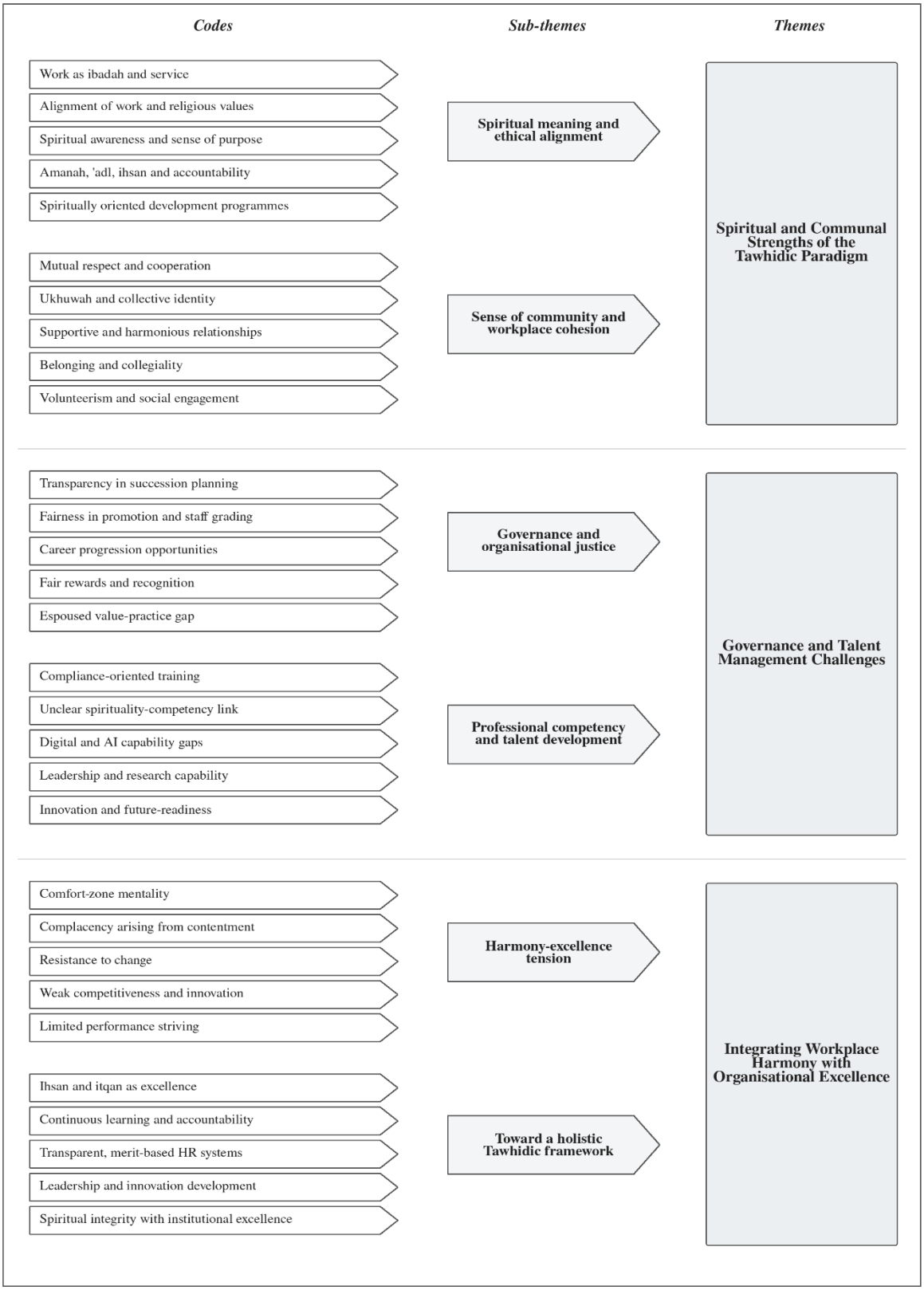
*P4: "The training provided is not always fully in the form of subjects related to Islamic topics... sometimes the training is provided by external parties, and those external parties don't come with an Islamic background or knowledge... to make it more aligned with Islamic values, maybe it's lacking... but other programs (internal parties) can supplement or balance the values that might be missing."*

*P5: "It's important to revisit and adhere to the original vision of our institution - its foundation on Islamisation, Internationalisation, and Comprehensive Excellence. These goals must align with professionalism and the strong sense of ukhuwah that this organisation was founded upon**."***

*P6:"We need someone who can integrate all these Islamic principles while also keeping up with modernization... Practicing Ihsan, being Ad'l, applying integrity in the workplace, and being kind…. that's all actually good, but we're not competing."*

As such, Figure 1 summarizes the study findings into three interrelated themes. It shows that while the Tawhid paradigm reinforces the meaning of spirituality and workplace community, the full potential of the organization is still constrained by governance and talent management challenges as well as the tension between maintaining harmony and pursuing excellence.

**Figure 1: Thematic Structure of the Tawhidic Paradigm as Workplace Spirituality in Islamic Higher Education**



## Discussion

### Spiritual and Communal Strengths of the Tawhidic Paradigm

Theme 1 demonstrates that the Tawhidic paradigm provides a robust spiritual and communal foundation within the institution. Participants conceptualize spirituality not merely as formal religious activity but as a broader understanding encompassing work, responsibilities, professional conduct, and interpersonal relationships. Participant P1's interpretation of 'ibadah' (worship) illustrates this broader perspective by linking technical skills and productivity to the fulfillment of a sacred trust ('amanah'). Similarly, 'iḥsan' is understood not only as compassion and benevolence but also as the optimal execution of responsibilities, rooted in the awareness that one acts as though Allah is constantly watching. This indicates that workplace spirituality within the Tawhidic paradigm integrates spiritual obligations with professional performance (Ahmad et al., 2024). Participants also emphasized the importance of translating Islamic principles into daily professional practice. Participant P3 highlighted the need for academic staff to understand the origins of knowledge and its connection to Allah, and how this understanding can be practically conveyed through teaching. Participant P2 also viewed Islamic values as compatible with professional and scientific practices, pointing to the rigor of Islamic scholarly traditions such as 'Ilm al-Hadith. P2 observed that Islamic values need not always be explicitly labeled, as Tawhidic principles are embedded in professional practice through underlying ethical foundations rather than merely through religious terminology.

Beyond individual spiritual significance, research findings reveal a strong sense of community and unity within the workplace. Participant P4 describes positive relationships between staff representatives and senior management, enabling employees to voice their views, while P5 emphasizes the aspect of 'ukhuwah' (brotherhood) through cooperation across various staff levels. Mutual support, courtesy, and a spirit of helpfulness—exemplified by the assistance provided to external trainers—serve as illustrations of manifested Islamic values. The strength of this communal spirit is further reflected in P6's account of senior staff involvement, mentor-mentee relationships, and knowledge sharing. Such practices demonstrate how workplace relationships can facilitate the transfer of experience, peer support, and the personal development of others. Overall, Theme 1 suggests that the Tawhidic paradigm manifests through two interconnected dimensions: spiritual significance and ethical alignment which can be reflected in the concepts of 'ibadah' – worship, 'amānah' – trustworthiness, and 'iḥsān'- excellence. Meanwhile, the application of Islamic values in professional practice, along with community and workplace unity, is evident in 'ukhuwah', mutual support, knowledge sharing, and positive organisational relationships. These spiritual and communal strengths form a vital foundation for institutionalizing the Tawhidic paradigm within the organization.

### Governance and Talent Management Challenges

Theme 2 reveals a gap between espoused values and governance and talent management practices. Although the Tawhidic Paradigm emphasizes "Al-a'dl' (Justice), 'Amanah' (Trustworthiness), 'Ihsan' (Excellence) and accountability, there is a gap between strong spiritual and institutional ethical foundations and the formal organisational systems. Participants voiced concerns regarding transparency, recognition, career progression, promotion criteria and organisational support which are not consistently translated into organisational practices.

When P1 and P3 questioned the use of external experts despite the availability of in-house expertise, with P3 specifically raising concerns about transparency in resource allocation, issues of organisational justice are clearly evident in perceptions regarding transparency and resource allocation. As for recognition, P2 emphasized the need for appropriate rewards and stronger organisational support, while P4 expressed concern that smaller groups of staff might be marginalized.

Such concerns raised by P5 and P6 further illustrate the link between organisational justice and talent management. P5 highlighted weaknesses in the existing career path system, while P6 questioned the clarity of promotion criteria and the extent to which training and staff profiling contribute to career advancement. Participants also emphasized the need to strengthen research competencies, technological and AI capabilities, leadership succession planning, and profession-specific skills.

From a Tawhidic perspective, these findings highlight the importance of balancing 'Al-Amīn' (trustworthiness, integrity, and ethical character) with 'Al-Qawiyy' (strength, capability, and professional competence). Spiritual integrity must be supported by transparent organisational systems that recognize merit, foster competence,

and provide equitable advancement opportunities. Conversely, professional competence must remain grounded in 'adl' (justice), 'amanah' (trust/stewardship), and ethical accountability. Thus, the effective institutionalization of the 'Tawhidic' paradigm requires embedding these spiritual principles into formal governance and talent management systems, thereby bridging the gap between values and practices as well as reinforcing organisational justice and professional excellence.

Overall, these views reflect concerns regarding distributive and procedural justice specifically pertaining to fair recognition, employee voice, transparency, and equitable treatment. Therefore, talent management must move beyond participation in training toward a more strategic approach that links competency development, career advancement, succession planning, and institutional needs.

**Integrating Workplace Harmony with Organisational Excellence**

Theme 3 identifies a potential tension between maintaining a harmonious, spiritually grounded workplace and the pursuit of continuous improvement, competitiveness, and organisational excellence. Generally, participants value Islamic principles such as 'ukhuwah' (brotherhood), 'redha' (contentment/acceptance of God's will), 'iḥsan' (excellence/benevolence), 'adl' (justice), 'amanah' (trustworthiness), and integrity. However, their views indicate that these values should not lead to complacency or resistance to change. This tension between harmony and excellence was most notably articulated by P6, who observed that a competitive spirit seemed to be fading due to excessive comfort with the status quo. P6 also cautioned against interpreting 'redha' merely as passive acceptance, emphasizing instead that Islamic principles must coexist with modernization and competitiveness. P6 added that when an organization repeatedly relies on the same training methods and mindsets, it risks becoming "stagnant" or failing to grow. This illustrates the potential risk of allowing workplace comfort and stability to stifle innovation and performance improvement.

Furthermore, P1 highlighted the tendency of some academics to cling to "old methods," emphasizing the need to "unlearn and relearn." Meanwhile, P3 identified the difficulties some staff members face in adapting to technological changes. These findings suggest that organisational harmony must be accompanied by a culture of continuous learning and adaptability (Duasa et al., 2020). This tension is highly relevant to the institution's future readiness. P3 emphasized the need for the framework to evolve in line with current demands—particularly advancements in artificial intelligence (AI)—while P6 stressed the importance of adapting to the Fourth Industrial Revolution (IR 4.0) and shifts in the broader environment. These perspectives suggest that the Tawhidic paradigm should not be viewed as a static framework. Instead, its spiritual principles should guide the processes of continuous learning, technological adaptation, innovation, and professional development to meet the ever-changing demands of higher education.

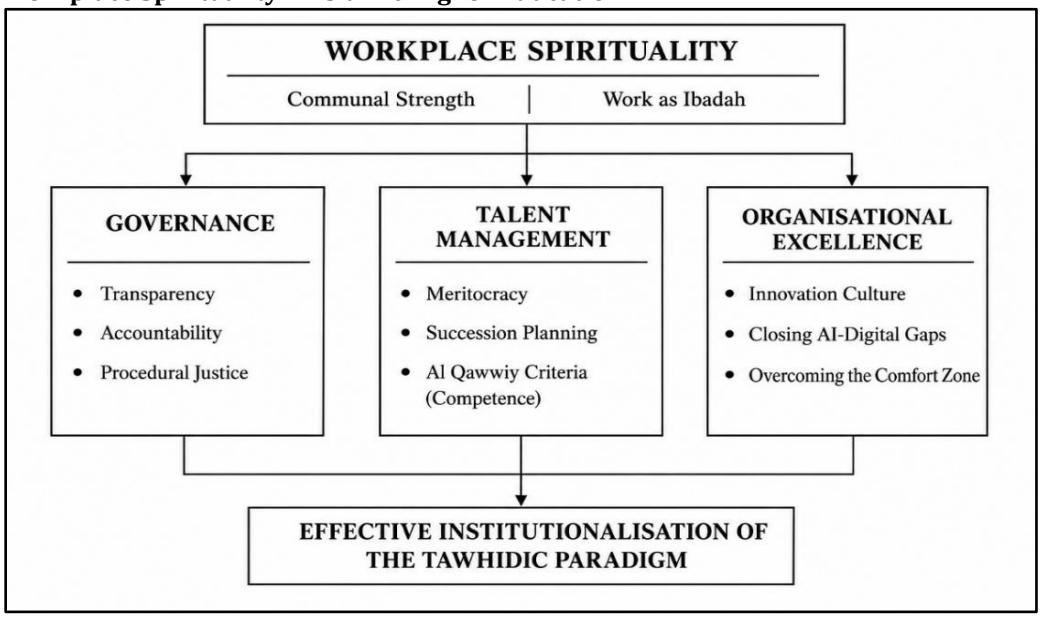
At the same time, the participants agreed on a more holistic interpretation of the Tawhidic paradigm. P1 linked it to productivity through the fulfillment of 'Amanah' (trust/stewardship), while P4 emphasized the need to balance professional training with Islamic values. P5 further argued that Islamization and holistic excellence must be aligned with professionalism and 'ukhuwah' (brotherhood/camaraderie). Collectively, these perspectives demonstrate that spirituality and professional excellence are not mutually exclusive; rather, professional competence, productivity, and continuous improvement can themselves serve as practical manifestations of responsibilities grounded in Tawhidic principles. Thus, Theme 3 indicates that workplace harmony should serve as a foundation for excellence rather than a source of organisational complacency. As a result, the effective institutionalisation of the Tawhidic paradigm requires a balance between Islamic values, including 'ukhuwah' (brotherhood), 'redha' (contentment with God's will), 'amanah' (trustworthiness), 'adl' (justice), and 'iḥsān' (excellence/virtue), and the pursuit of continuous learning, innovation, technological adaptability, professional competence, and performance enhancement. Such integration establishes the basis for a holistic Tawhidic framework capable of preserving spiritual identity while supporting sustainable organisational excellence.

The tension between harmony and excellence was not perceived equally by all six participants. The most significant evidence came from P6, while P1, P3, and P4 provided supporting evidence regarding resistance to learning, technological adaptation, and attitudes toward performance. This does not imply that all six participants explicitly viewed this as a paradox between harmony and excellence. Instead, the concept of "Towards a Holistic Tawhidic Framework" received clear support from the group. Their views centered on a

broader concept encompassing Islamic/spiritual values, professional competence, continuous learning, accountability, technology/AI, leadership, and innovation/excellence. This extracts the second sub-theme particularly in explaining how these empirical findings lead to the proposed framework for the effective institutionalization of the Tawhidic paradigm. Therefore, the study findings indicate that institutionalizing workplace spirituality requires more than the mere presence of spiritual values within an organization. While community strength and the perception of work as a form of 'ibādah' (worship) provide a solid spiritual foundation, their contribution to sustainable institutional strengthening depends on the extent to which these values are translated into organisational practices.

Consequently, the study highlights three interconnected organisational domains: governance, talent management, and organisational excellence. Organisational governance demands higher levels of transparency, accountability, and procedural justice, while talent management must prioritize meritocracy and systematic succession planning, alongside ensuring that organisational members meet professional competency criteria (Al-Qawwiy). Simultaneously, organisational excellence requires an innovation-oriented culture capable of bridging the digital-AI divide and overcoming organisational complacency. The findings suggest that workplace spirituality should not remain solely an individual or communal spiritual experience; rather, it must be embedded into organisational systems, practices, and capabilities (Mhd. Sarif, 2014; Mhd. Sarif et al., 2021; Mhd. Sarif & Ismail, 2024). Informed by the empirical findings and relevant literature on the Tawhidic paradigm, Islamic Work Ethics, organisational justice, and organisational paradox, Figure 2 proposes a framework illustrating how workplace spirituality may be institutionalised through governance, talent management, and organisational excellence. The framework represents an analytical synthesis of the findings and literature rather than an empirically validated model.

**Figure 2: Proposed Framework for the Effective Institutionalisation of the Tawhidic Paradigm as Workplace Spirituality in Islamic Higher Education**




## 5. Managerial Implications

These findings reveal several implications for the governance and management of Islamic higher education institutions. First, institutional leaders should translate the values of Tawhid from organizational statements into observable governance practices. Principles such as a'dl, amanah, ihsan, and Itqan should be reflected in transparent resource allocation, staff recognition, promotion, succession planning, and performance appraisal. Selection criteria, decision-making procedures, and career paths should be clearly communicated and consistently applied to bridge the gap between espoused Islamic values and employees' actual organizational experiences. Second, employee talent management should integrate spiritual integrity with professional

competence. In line with the principles of Al-Amin and Al-Qawiyy, employees should be developed and evaluated based on both their ethical character and their ability to perform their duties effectively. Therefore, organizational training should move beyond general or compliance-oriented programs toward structured competency development linked to employee roles, career advancement, leadership succession, and institutional priorities. Elements such as staff profiling, mentoring, knowledge transfer, internal expertise, and learning outcomes should also be systematically linked to recognition and promotion mechanisms. Third, managers or leaders should maintain workplace harmony without encouraging complacency with existing achievements and ensure that employees are always ready for current changes. Values such as ukhuwah, mutual respect, and ridha should provide the basis for relationships and collaboration to receive constructive feedback, accountability, performance improvement, and innovation. Leaders should adopt a balanced approach that maintains employee well-being and a spirit of collaboration while establishing clear performance expectations and encouraging employees to continue to learn, adapt, and pursue excellence. In this regard, ihsan and itqan should be conveyed not only as spiritual values but also as a responsibility to achieve professional quality and continuous improvement. Finally, institutional leaders should strengthen future readiness by prioritizing digital capabilities, artificial intelligence literacy, research competence, innovation and leadership development. These capabilities should be framed as practical manifestations of amanah and responsibility to the institution and its stakeholders. Periodic assessments of competency gaps, training effectiveness, employee perceptions of fairness, and alignment between institutional values and management practices will help ensure that the Tawhid paradigm is truly institutionalized. Through these steps, workplace spirituality can become a management foundation for ethical governance, capable talent, innovation, and sustainable organizational excellence.

## Conclusion

This study synthesises the empirical findings and discussions to provide practical insights and possible directions for faith-based higher education institutions, particularly Islamic higher education institutions. A qualitative analysis of Workplace Spirituality in institutions reveals that while the Tawhidic Paradigm provides deep communal strength and a highly collaborative environment (ukhuwah), participants' accounts indicate perceived gaps in governance, Talent Management and Organisational Excellence. To bridge the observed value practice gap, better manage the harmony–excellence tension and address the identified digital and AI capability gaps, institutional leadership must move beyond passive rhetoric. Thus, the proposed managerial recommendations are designed to practically institutionalize spiritual values into structured, professional and future-ready administrative protocols.

**Acknowledgment:** This research was funded and supported by the International Islamic University Malaysia (IIUM) under the Department of Business Administration (DEBA) Research Grant Scheme. The researchers gratefully acknowledge the financial assistance awarded under Project ID DEBA24-036-0042.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Event as a Temporary Community: A Conceptual Framework of Belonging in Participatory Events

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**Abstract:** Participatory events bring individuals together within shared spaces and create opportunities for interaction, collective participation and social connection. While existing event research has examined these social experiences through concepts such as communitas, social identity and belonging, the processes through which they may contribute to the formation of a temporary community remain less clearly integrated. This conceptual paper aims to develop a framework explaining how participatory events facilitate temporary community formation and a sense of belonging among participants. We conducted a focused conceptual synthesis of literature from event studies and related social theories using Scopus, Web of Science, and Google Scholar. The synthesis identified five connected dimensions: shared event space, shared symbols and identity, collective participation, social connection, and temporary belonging. Based on these dimensions, the Temporary Community Formation Framework is proposed as a sequential process through which participants may move from being present within an event environment to temporarily experiencing themselves as part of a shared social group. The paper contributes to event studies by integrating communitas, social identity and belonging within a single conceptual framework and positioning temporary community as a possible social outcome of participatory event experiences. The framework provides a basis for future empirical testing and offers event managers a social perspective for designing events that encourage shared identity, collective participation, and connection among participants.

**Keywords**: *Participatory events; Temporary community; Communitas; Social identity; Belonging*

## 1. Introduction and Background

Participatory events are more than organized gatherings. They provide temporary social spaces where people interact, participate in shared activities, and form connections with others (Getz & Page, 2020). Unlike routine social settings, events bring individuals together within a defined time and space, often around a shared purpose, interest or activity. The experience of being present and participating alongside others can create opportunities for interaction among individuals who may otherwise have little reason to meet. In this sense, the value of an event may extend beyond its program and activities to include the social connections created during the event.

Existing event research has examined participant experiences through concepts such as satisfaction, engagement, event experience and behavioral intention. These perspectives are important in understanding how participants evaluate events and whether they intend to revisit or recommend them. However, the social experience of participation also deserves attention. Participants do not experience events only as individual consumers. They are surrounded by others who share the same space, activities and, in many cases, common interests. The presence and participation of others may therefore contribute to how an event is experienced and remembered.

Social connection is particularly relevant in participatory events, where individuals actively engage with activities, spaces and other participants rather than simply observe. Group performances, collective celebrations, shared traditions and informal interactions can create opportunities for connection. Through these shared experiences, individuals may recognize similarities with others and develop a temporary sense of being part of a group. This feeling may emerge even when participants have not previously met and may not continue their relationships after the event has ended. The sense of belonging created during an event may therefore be temporary without necessarily being less meaningful.

The temporary nature of these social connections can be understood through the concepts of liminality and communitas. Event environments may allow participants to temporarily move away from everyday routines and social roles and enter a shared social setting shaped by the event (Ziakas & Boukas, 2013). Within this setting, communitas may emerge through feelings of togetherness, equality and shared experience among participants. While communitas has been used to explain collective experiences within events, the process through which participation develops into a temporary sense of community and belonging remains less clearly conceptualized.

This presents a gap in the understanding of participatory events. Existing studies have recognized the social value of events and their potential to encourage interaction, social cohesion and collective experience (Lee et al., 2016; Toraldo et al., 2019; Ziakas, 2016). However, these concepts are often examined separately or discussed as part of the broader event experience. Less attention has been given to how the conditions created within participatory events may work together to contribute to the formation of a temporary community. Understanding this process is important because participants may derive value from an event not only through the activities provided but also through the experience of feeling connected to and belonging with others.

Recent research has further connected festival experiences with belonging and community. Gedecho et al. (2023) identify belonging, togetherness, recognition and social support among the dimensions of community in diaspora festivals. Quinn and Kinnunen (2024) likewise place sharing and belonging at the centre of current event scholarship, while noting that social outcomes are not invariably positive. The present paper builds on these developments by specifying the expected outcomes of a proposed process of temporary community formation, rather than assuming that community follows from attendance.

Therefore, this conceptual paper aims to develop a framework explaining how participatory events facilitate the formation of temporary communities and a sense of belonging among participants. Specifically, the paper examines the roles of shared event space, shared symbols and identity, collective participation, and social connection in contributing to temporary belonging. The paper addresses the following research question: How do participatory events facilitate the formation of temporary community and belonging among participants? By integrating literature on event experience, communitas, social identity, and belonging, this paper proposes a conceptual framework that positions temporary community as an important social dimension of participatory event experiences.

## 2. Literature Review

### Participatory Events and the Social Event Experience

Participatory events differ from more passive event experiences because attendees are actively involved in shaping what happens during the event. Rather than simply observing a program or performance, participants may contribute through their actions, interactions and responses. The experience economy framework views participation as a continuum ranging from passive to active participation, with active participants directly influencing the experience being created (Pine & Gilmore, 1998). This perspective is particularly relevant to events because the presence and behavior of participants can contribute to the atmosphere and overall experience of the gathering.

The level of participation may also influence the social outcomes of an event. Active participation creates opportunities for individuals to interact with others, respond to shared activities, and become more involved in the event environment. As participants become more involved, the event experience may shift from individual attendance towards a shared experience shaped by the presence and actions of others. This suggests that participants may gain social value from events not only because they attend, but also through how they participate in the experience.

The importance of active involvement is also reflected in the concept of participatory experience tourism. de Bruin and Jelinčić (2016) describe participatory experiences as situations where individuals contribute creatively to the experience rather than simply consume what has been prepared for them. In an event context, this means that participants may become part of the process through which the event experience is created. Their actions, responses, and interactions with others can influence the social environment of the event.

Participation need not be understood as a strict division between active contributors and passive spectators. In live journalism, Vodanovic (2022) examines how event formats and settings shape audience engagement with news. This illustrates that participation is context-dependent. Within the present framework, collective participation includes shared responses as well as organized activities, provided that participants experience their involvement in relation to others.

Taken together, these perspectives suggest that the social experience of an event is closely connected to participant involvement. As participation becomes more active and reciprocal, opportunities for interaction and social connection may increase. Participatory events therefore provide an important context for examining how individuals move from simply attending an event to experiencing a temporary sense of connection with others. This relationship between participation and social experience provides the starting point for understanding how a temporary community may begin to form within an event setting.

**Events as Temporary Social Spaces**

Events take place within a defined time and space, creating a temporary environment that differs from participants' everyday settings. Getz and Page (2020) explain that planned events bring people into event-specific places for a limited period to participate in activities that are outside their normal routines. The temporary nature of events is important because it creates a shared setting in which participants are present at the same time and for a common purpose. This concentration of people and activities can create opportunities for interaction that may not occur in everyday environments.

The physical setting of an event also influences how participants experience and interact within the space. Pettersson and Getz (2009), in their study of the World Alpine Ski Championships, found that visitors were attracted to locations where other participants gathered. Certain areas developed into experiential hotspots as the presence of people and event activities became concentrated within particular spaces. This suggests that event space is not simply a physical location where activities are organized. The movement and presence of participants can also shape the social environment of the event.

Studies examining visitor movement have further demonstrated the relationship between event space and participant behavior. Pettersson and Zillinger (2011) found that visitor movements during the Biathlon World Championships were concentrated in particular areas and influenced by both the event program and the physical layout of the destination. Similarly, Yun and Park (2015) observed that visitors at the Sancheoneo Ice Festival gathered mainly around the entrance and central event areas, while other parts of the host destination received considerably less visitor activity. Versichele et al. (2012) also identified changing patterns of participant movement during the Ghent Festivities, demonstrating that the use of event space can shift throughout the day.

These studies show that event spaces are socially experienced rather than simply physically occupied. Participants move towards activities, attractions and, importantly, other people. As participants gather within particular spaces, opportunities for observation, interaction and shared experience increase. The event program, venue design and movement of participants therefore contribute to the creation of temporary areas of social activity. In this sense, the social environment of an event develops through the relationship between the event setting and the people who occupy it.

Recent festival research also distinguishes the event environment from the social processes occurring within it. Xie and Li (2023) examine attendee interactions, immersion and perceived emotional synchrony, showing that different elements of the festival experience operate through different pathways. Their findings support treating shared space as an enabling condition rather than a sufficient explanation of social connection; they do not directly test the space-to-identity relationship proposed here.

The temporary concentration of participants within a shared space provides an important condition for social connection. For the duration of an event, individuals are brought together within an environment shaped by common activities and a shared event purpose. However, physical proximity alone does not necessarily create a sense of belonging. Participants must also interpret and experience the event as a shared social environment.

This leads to the concepts of liminality and communitas, which help explain how event settings may temporarily change everyday patterns of social interaction.

**Liminality, Communitas and Collective Experience**

The concepts of liminality and communitas provide a useful theoretical basis for understanding social interaction within events. Liminality originates from Turner's (1974, as cited in Ziakas, 2016) work on ritual and describes a temporary condition in which individuals move away from their usual social roles and everyday structures. Within event studies, this idea has been used to explain how events create spaces that are different from ordinary daily life (Ziakas, 2016). In contemporary events such as festivals, sporting events, and celebrations, these experiences are often described as liminoid because participation is generally voluntary and takes place within secular and leisure settings.

The temporary separation from everyday routines may influence how participants interact with others. Event environments can create situations where normal social boundaries become less visible, and participants are more open to interaction and shared experiences. Ziakas and Boukas (2013) explain that the communal atmosphere created within event settings can encourage feelings of camaraderie and togetherness. Participants may temporarily experience fewer of the social expectations associated with their everyday roles, allowing them to engage with others within the shared context of the event.

Communitas describes the sense of connection and togetherness that may emerge within these temporary settings. It is commonly associated with feelings of equality, solidarity, and shared experience among individuals (Toraldo et al., 2019). Unlike formal communities that are organized around established structures or membership, communitas can emerge spontaneously through collective participation. Within events, this may occur when participants celebrate together, respond to a shared performance or become involved in common activities.

The concept has been widely applied to different event settings. Lockstone-Binney et al. (2020) highlight how sporting events can provide a temporary escape from everyday life and create a shared celebratory environment. In festival settings, Toraldo et al. (2019) found that communitas can develop through shared participation and social interaction among volunteers. Ziakas (2016) similarly argues that event environments can encourage meaningful interaction by temporarily reducing social boundaries. These interactions may contribute to stronger social networks and wider social connections.

Collective emotion offers a further explanation of shared experience. Pizarro et al. (2022) synthesize evidence linking collective effervescence with group identification and social integration across collective gatherings. Their review supports the relevance of shared emotional experience to social connection, while the diversity of settings limits any inference that the same sequence occurs in every participatory event.

The temporary character of an event remains central to this framework. Participants eventually leave the event environment and return to everyday routines and roles. Heidl (2025) distinguishes community at a festival from an event community extending beyond it through online interaction. This distinction allows temporary belonging to be examined in its own right without assuming either that it disappears immediately or that it necessarily becomes a lasting community.

While communitas explains the emergence of collective feelings within events, it does not fully explain how participants come to recognize themselves and others as part of a shared group. The development of a sense of "we" requires further consideration of social identity, shared symbols and belonging. These concepts provide the next stage in understanding how collective event experiences may contribute to the formation of a temporary community.

**Social Identity, Connection and Belonging**

The experience of communitas explains how feelings of togetherness may emerge within an event. However, a temporary sense of community also requires participants to recognize some form of connection with others. Social identity theory provides a useful perspective for understanding how individuals identify similarities

between themselves and other members of a group. Within event settings, shared interests, behaviors and symbols can help participants recognize others as belonging to the same social group (Lee et al., 2016).

Events often provide visible expressions of shared identity. Clothing, language, merchandise and particular forms of behavior can communicate an individual's connection to an event or group. Lee et al. (2016) explain that participants may use these symbols to express their experience, skills or fandom and to distinguish themselves from those outside the group. At the same time, these expressions allow participants to recognize others who share similar interests. The event therefore provides a social setting in which identity can be both expressed and recognized by others.

The process of recognizing a shared identity may contribute to a sense of belonging. Chiang et al. (2017), in their study of the Harbin Ice and Snow Sculpture Festival, applied social identity theory to explain how event values can contribute to social categorization and identification. When participants identify with others within the event environment, they may begin to experience themselves as part of a wider group. This sense of group connection may influence how participants evaluate the event and their intention to remain connected to the experience.

However, a shared identity does not always depend on formal group membership or an established label. Neville and Reicher (2011) found that individuals within crowds can experience a sense of "we" through shared emotions, symbols, actions, and experiences. Participants may feel connected to strangers because they are responding to the same situation or participating in the same activity. Within events, chanting, cheering, dancing, or collectively responding to a performance may temporarily reduce interpersonal barriers and create a sense of relatedness among participants.

Shared actions can further strengthen social connections within an event. When participants cheer, chant, dance, or respond collectively to an event activity, they become aware that others are participating in the same experience. Neville and Reicher (2011) suggest that shared action can contribute to a sense of relatedness among individuals within crowds. These collective behaviors may reduce interpersonal barriers and strengthen participants' awareness of being part of a wider group.

In some cases, the sense of identification created through events may extend beyond the event itself. Grappi and Montanari (2011) found that identification among festival participants can influence future event attendance, even where no formal membership exists. This suggests that event-based social connections may continue to influence participants after the temporary gathering has ended. Nevertheless, not all event connections develop into lasting relationships or formal communities. Participants may leave an event without maintaining contact with others while still remembering the feeling of being part of a shared experience.

Belonging within participatory events can therefore be understood as a temporary social experience created through shared identity, recognition and collective action. Participants may feel connected to others without knowing them personally or becoming permanent members of a group. This distinction is central to the argument of this paper. The temporary nature of the connection does not remove its social significance. Instead, it raises the question of whether participatory events can be understood as temporary communities that exist through shared space, identity, participation, and social connection.

Allen et al. (2021) distinguish opportunities, competencies, motivations and perceptions within an integrative account of belonging. This helps separate opportunities for contact from participants' subjective sense of inclusion: access to an event and interaction with others do not guarantee belonging. In this paper, temporary belonging therefore refers specifically to feeling accepted and included within the event-based group during the event.

**Towards the Event as a Temporary Community**

The literature discussed in the previous sections demonstrates that participatory events can create important social experiences. Participation allows attendees to become involved in shaping the event experience, while the temporary concentration of people within a shared time and space creates opportunities for interaction. Liminality and communitas explain how event environments may temporarily reduce everyday social

boundaries and encourage feelings of togetherness. Social identity and belonging further explain how participants recognize similarities with others and develop a sense of being part of a group.

However, these areas of literature are often discussed separately. Participation is commonly examined in relation to event or tourism experiences, while studies of event space focus on visitor movement and the use of physical environments. Communitas is frequently used to explain collective feelings and social bonding, whereas social identity research examines how participants identify with groups and other attendees. Each perspective contributes to the understanding of social experiences within events, but the relationship between these processes remains less clearly integrated.

This paper argues that these processes may be understood as connected stages in the formation of a temporary community. The shared event space first brings individuals together within a defined time and environment. Within this space, event-related symbols, interests and forms of identity allow participants to recognize similarities with others. Collective participation then provides opportunities for participants to act, respond and experience the event alongside one another. These shared experiences may encourage social connection and contribute to a temporary sense of belonging.

The term temporary community is used in this paper to describe a short-term sense of social belonging that develops among participants through shared presence, identity and participation within an event setting. It does not require formal membership, long-term relationships or continued interaction after the event. Participants may not know one another before attending and may never meet again once the event has ended. However, during the event, they may experience a meaningful sense of connection and recognize themselves as part of a shared social experience.

This conceptualization differs from viewing communitas as the final social outcome of an event. Communitas provides an important explanation of the feelings of togetherness and reduced social boundaries that may emerge during collective experiences. However, the concept of temporary community proposed in this paper places greater attention on the process through which event conditions, shared identity, participation, and social connection contribute to belonging. The focus is therefore not only on whether participants experience togetherness, but on how the event may create the conditions through which this sense of belonging develops. Heidl (2025) also demonstrates why temporary community should be distinguished from continuing event networks. The present framework concerns the experience of community during a bounded event; subsequent online interaction or repeated attendance is a possible extension, not a defining requirement. Likewise, Gedecho et al. (2023) examine festivals embedded in an established diaspora community, so their findings inform the relevant dimensions without demonstrating the formation of community among previously unconnected participants.

Based on this synthesis, the paper proposes that temporary community formation in participatory events develops through five connected dimensions: shared event space, shared symbols and identity, collective participation, social connection, and temporary belonging. These dimensions form the basis of the conceptual framework presented and discussed in the following sections.

## 3. Methodology

This paper adopts a conceptual research approach to examine how participatory events may contribute to the formation of temporary communities and a sense of belonging. A conceptual approach was considered appropriate because the purpose of the study is to integrate existing theoretical perspectives and research findings rather than to test relationships using primary empirical data. The paper draws together literature from event studies and related social theories to develop an explanation of how social connection and belonging may emerge within participatory event settings.

The literature was reviewed through a focused conceptual synthesis. Relevant studies were identified around five areas that directly relate to the research question: participatory event experiences, event space and time, liminality and communitas, social identity, and belonging. Literature from event and tourism research was used as the main foundation of the review, while selected studies from social psychology and related fields were

included where they provided theoretical explanations of collective identity, social connection, and shared behavior.

The review was guided by the research question rather than a systematic review protocol. Studies were examined based on their conceptual relevance to the social processes that occur within participatory events. Particular attention was given to how the literature explained the role of shared space, participant involvement, collective action, shared identity and interpersonal connection. The purpose was not to provide an exhaustive review of all research on event participation or belonging, but to identify theoretical connections between areas of literature that have often been discussed separately.

The synthesis incorporates recent literature published within 2021–2026 on belonging, collective emotion and festival communities alongside foundational event research. Sources were used to refine the conceptual distinctions, proposed mechanisms and boundary conditions, rather than as empirical validation of the complete framework. The resulting propositions express expectations for future investigation; no primary data, pooled effect estimates, or tests of the proposed sequence are reported.

The conceptual synthesis involved comparing the main ideas and relationships identified across the selected literature. Recurring concepts were grouped according to their role in explaining the development of social experiences within events. Through this process, five connected dimensions were identified: shared event space, shared symbols and identity, collective participation, social connection, and temporary belonging. The relationships between these dimensions were then interpreted using communitas and social identity as theoretical foundations.

Based on this synthesis, a conceptual framework was developed to explain the proposed process through which temporary community may form within participatory events. The framework is presented in the Results and Discussion section and is intended to provide a basis for further theoretical discussion and future empirical testing.

## 4. Results and Discussion

### Results

The conceptual synthesis identified five dimensions that contribute to explaining the formation of temporary community within participatory event settings. These dimensions are shared event space, shared symbols and identity, collective participation, social connection, and temporary belonging. Although each dimension is discussed within different areas of existing literature, the synthesis suggests that they can be connected as a sequential social process.

The first dimension, shared event space, represents the physical and temporal environment that brings participants together for the duration of an event. The second dimension, shared symbols and identity, refers to the interests, behaviors, language and visible cues through which participants may recognize similarities with others. Collective participation, the third dimension, involves shared actions and responses that allow participants to experience the event alongside others. The fourth dimension, social connection, refers to the feelings of relatedness and interpersonal connection that may develop through shared participation. The final dimension, temporary belonging, describes the short-term experience of feeling part of a shared social group within the event.

Based on these five dimensions, the Temporary Community Formation Framework is proposed, as presented in Figure 1. The framework presents temporary community formation as a connected process beginning with the shared event environment and progressing towards a temporary sense of belonging.

The framework proposes a sequential relationship between the five dimensions. Shared event space provides the setting in which participants encounter and observe others. Shared symbols and identity allow participants to recognize common interests or connections within the event environment. Collective participation provides opportunities for shared action and experience, while social connection reflects the relatedness that may develop between participants. Temporary belonging represents the final dimension of the framework and the

proposed formation of a temporary community during the event. P1–P4 specify proposed relationships between the five dimensions. P5 interprets temporary belonging within this process as the experience of temporary community; it does not introduce a sixth independently established causal stage. The sequence is a theoretical organizing device, and reciprocal relationships or alternative pathways remain possible.

**Figure 1: Temporary Community Formation Framework**

**1. Shared Event Space**
Participants are present within a shared event environment.
↓ P1
**2. Shared Symbols and Identity**
Shared cues may help participants recognize a common identity.
↓ P2
**3. Collective Participation**
Participants engage in shared activities and responses.
↓ P3
**4. Social Connection**
Shared participation may support relatedness and interpersonal connection.
↓ P4
**5. Temporary Belonging**
Participants may feel accepted and included in the event-based group.
↓ P5 (interpretive)
**Temporary Community**
Proposed interpretation of temporary belonging within the framework (P5).

Five conceptual propositions were developed from the framework:
P1: Shared event space facilitates the recognition of shared symbols and identity among participants.
P2: Shared symbols and identity encourage collective participation within the event.
P3: Collective participation strengthens social connection among participants.
P4: Social connection contributes to a temporary sense of belonging among participants.
P5: Temporary belonging, arising within the proposed process, represents participants' experience of a temporary community within participatory event settings.

Table 1 links each proposition to its expected conceptual outcome. These outcomes are theoretical expectations, not findings from this paper. Neither presence nor participation guarantees temporary community, and the proposed direction and sequence require empirical examination.

**Table 1: Propositions and Expected Conceptual Outcomes**

| ID (P1–P5) | Proposed relationship | Expected conceptual outcome |
|---|---|---|
| P1 | Shared event space → shared symbols and identity | Participants are expected to recognize common interests, symbols, and social cues, increasing their perception of a shared identity. |
| P2 | Shared symbols and identity → collective participation | Recognition of a shared identity is expected to encourage willingness to join shared activities and collective responses. |
| P3 | Collective participation → social connection | Shared actions and responses are expected to strengthen relatedness and interpersonal connection among participants. |
| P4 | Social connection → temporary belonging | Social connection is expected to support feeling accepted and included within the event-based group for the duration of the event. |
| P5 | Temporary belonging → temporary community | Within the proposed process, temporary belonging is expected to be expressed as a perception of being part of a temporary event community. This is an interpretive outcome, not a separate proven causal effect. |

Note: Arrows indicate proposed relationships. P5 specifies the community meaning of temporary belonging. The table reports no empirical results.

## Discussion

### From Shared Event Space to Shared Identity

The proposed framework begins with shared event space because participants must first be brought into a common physical and temporal environment before a temporary community can develop. Planned events create defined settings where individuals gather for a particular purpose and within a limited period (Getz & Page, 2020). However, the framework does not suggest that physical proximity alone creates a sense of community. Being present in the same venue may provide the opportunity for social interaction, but participants must also recognize some form of commonality with others.

The social use of event space may contribute to this process. Pettersson and Getz (2009) found that event participants were attracted to areas where other people gathered, creating experiential hotspots within the event environment. Similar patterns of concentrated visitor movement have been identified in other event settings (Pettersson & Zillinger, 2011; Versichele et al., 2012; Yun & Park, 2015). These findings suggest that participants do not experience event spaces in isolation. Their movements and use of space are influenced by the presence and activities of others.

Within these shared spaces, participants are exposed to event-related symbols, behaviors and social cues. Clothing, merchandise, language and visible forms of participation may communicate an individual's connection to the event or its purpose (Lee et al., 2016). These cues allow participants to observe similarities between themselves and others. A participant may not know the people around them personally but may recognize that they share an interest, identity or reason for attending the event.

This recognition is important because it begins to shift the experience from simply being among other people to perceiving oneself as being among people with something in common. Social identity perspectives suggest that individuals develop a sense of group connection by recognizing similarities with others and identifying shared characteristics (Chiang et al., 2017; Lee et al., 2016). The event space therefore provides more than a location for gathering. It creates the setting in which shared identity can become visible and socially recognized. The expected outcome of P1 is recognition of commonality, rather than social connection itself. Although Xie and Li (2023) link festival elements to collective emotion, the proposed transition from a shared setting to shared identity remains an inference requiring direct testing. The visibility and interpretation of social cues may differ between established participants and newcomers.

The first relationship in the framework is therefore expressed through the following proposition:
P1: Shared event space facilitates the recognition of shared symbols and identity among participants.
Expected outcome: Participants are expected to recognize common interests, symbols and social cues, increasing their perception of a shared identity.

### From Shared Identity to Collective Participation

Recognizing a shared identity may influence how participants engage within the event environment. When individuals perceive similarities with others, they may feel more comfortable responding to shared activities and participating alongside the wider group. Event-related symbols and behaviors can communicate that particular forms of participation are recognized and shared within the event setting.

Lee et al. (2016) highlight how distinctive dress, language and behavior can express an individual's connection to an event community. These expressions are not only personal displays of identity but can also be recognized by others. The recognition of shared identity may therefore create a social environment in which participants understand how others are engaging with the event and feel encouraged to participate in similar ways.

Collective participation can take many forms depending on the nature of the event. Participants may cheer at a sporting event, dance during a festival, sing during a concert, join a parade, contribute to a workshop, or participate in shared traditions. These actions allow individuals to express their connection to the event through visible participation. In this sense, shared identity provides a social basis for collective action.

Neville and Reicher (2011) suggest that shared symbols and a sense of common identity can influence how individuals behave within crowds. When participants perceive others as part of a shared group, interpersonal

barriers may be reduced, and collective actions become more meaningful. Participation therefore becomes more than an individual response to event activities. It can become a way of expressing and reinforcing a shared social identity.

P2 concerns readiness to act alongside others, rather than the assumption that identity always produces participation. Shared identity and participation may reinforce one another, as the collective-gathering literature suggests (Pizarro et al., 2022). Future research should therefore distinguish prior identification from identity developed during participation and examine the direction of the relationship.

The second relationship in the framework is therefore proposed as follows:
P2: Shared symbols and identity encourage collective participation within the event.
Expected outcome: Recognition of a shared identity is expected to encourage willingness to join shared activities and collective responses.

**From Collective Participation to Social Connection**

Collective participation represents the point in the proposed framework where shared identity is expressed through action. Participants move beyond recognizing similarities with others and begin to experience the event alongside them. The importance of collective participation lies not only in the activity itself but also in the awareness that others are participating in the same experience. This shared involvement may create opportunities for emotional responses, interaction, and a growing sense of connection among participants.

The social value of participation may depend on whether the experience is shared with others. An individual may be actively involved in an event without necessarily feeling socially connected to other participants. The framework proposed in this paper therefore places greater emphasis on the collective nature of participation. Social connection may be more likely to develop when participants become aware that their actions and responses are shared with those around them.

Shared actions may contribute to this awareness. Cheering, chanting, dancing, singing, or participating in group activities allow individuals to observe and respond to the behavior of others. Neville and Reicher (2011) explain that shared action can contribute to a sense of relatedness among individuals within crowds. Through these collective actions, participants may become increasingly aware of their connection to the wider group. Such experiences can temporarily reduce interpersonal distance because participants are responding to the event alongside others rather than as isolated individuals.

The relationship between collective participation and social connection can also be understood through communitas. Communitas describes the feelings of equality, solidarity, and togetherness that may emerge through shared experiences (Toraldo et al., 2019). Within participatory events, collective action may provide the conditions through which these feelings develop. Participants do not need to communicate directly or develop personal relationships for social connection to occur. The experience of acting, responding, and feeling alongside others may itself create a temporary sense of relatedness.

This distinction is important to the proposed framework. Participation alone is not treated as evidence of community formation. Instead, collective participation is proposed as a mechanism through which participants may begin to feel socially connected to others within the event environment. The movement from shared action to social connection therefore represents a shift from doing something together to feeling connected because of the shared experience.

Recent work strengthens the rationale for examining this mechanism. Xie and Li (2023) identify inter-attendee interaction as relevant to perceived emotional synchrony. Wood and Alonzo (2026), in a conceptual analysis of festivals in border regions, connect emotional synchrony and social exchange to belonging and mutual understanding. These contributions help explain why collective activity might support connection, but neither establishes P3 or the full sequence across participatory event settings.

The third relationship in the framework is therefore expressed through the following proposition:
P3: Collective participation strengthens social connection among participants.
Expected outcome: Shared actions and responses are expected to strengthen relatedness and interpersonal connection among participants.

**From Social Connection to Temporary Belonging**

Social connection reflects the sense of relatedness that may develop when participants share actions, emotions, and experiences with others. However, feeling connected during a particular moment is not necessarily the same as feeling that one belongs. The proposed framework suggests that temporary belonging develops when social connection contributes to a broader perception of being part of the event community.

Belonging involves a sense of acceptance, inclusion and connection to a wider social group. Within participatory events, this experience may develop without formal membership or established relationships. Participants may feel comfortable within the event environment because they recognize others who share similar interests and have participated in common activities. The social connections created through these experiences can contribute to a sense that the participant is not simply attending the event but is temporarily part of it.

Social identity provides an important explanation for this process. When individuals recognize similarities between themselves and others, they may begin to identify with a wider group (Lee et al., 2016). Chiang et al. (2017) demonstrate how social identification within an event setting can influence participants' responses to the event and their future behavioral intentions. Within the proposed framework, social connection strengthens this identification by adding an interpersonal and emotional dimension to the recognition of shared identity.

Communitas also contributes to understanding the movement towards belonging. Feelings of equality, solidarity and togetherness can temporarily reduce social boundaries between participants (Toraldo et al., 2019; Ziakas & Boukas, 2013). These feelings may allow participants to experience a sense of inclusion even when they do not personally know those around them. A participant may therefore feel that they belong within the event environment because of the shared social experience rather than because of an existing relationship with other attendees.

The temporary nature of this belonging is central to the framework. Participants may feel included during an event and subsequently return to their usual roles. Heidl's (2025) distinction between community at the event and the community beyond it supports examining these different temporal boundaries. The framework proposes that belonging can be socially meaningful during the event without requiring continuing relationships afterwards.

This distinction also separates temporary belonging from formal community membership. Participants do not need to maintain contact, join an organisation or develop long-term relationships for the experience of belonging to occur. Instead, temporary belonging describes the experience of feeling included within a shared social environment at a particular time. Social connection provides the relational basis through which this sense of inclusion may develop.

P4 distinguishes relational contact from subjective inclusion. Allen et al. (2021) show why opportunities for interaction need to be considered alongside individual motivations and perceptions. Accordingly, the expected outcome is a felt sense of acceptance, not merely a larger number of interactions. Exclusionary group norms or inaccessible activities may interrupt this proposed transition.

The fourth relationship in the framework is therefore expressed through the following proposition:
P4: Social connection contributes to a temporary sense of belonging among participants.
Expected outcome: Social connection is expected to support feeling accepted and included within the event-based group for the duration of the event.

**Temporary Belonging as Temporary Community**

The final relationship in the framework concerns the interpretation of temporary belonging as the formation of a temporary community. Existing event literature has used concepts such as communitas, social connectedness and social identity to explain the social experiences that occur when people gather. These concepts provide important explanations of togetherness, interpersonal connection and group identification. However, each concept tends to emphasize a particular aspect of the social experience. The concept of temporary community proposed in this paper brings these processes together within the context of participatory events.

Communitas explains the spontaneous feelings of equality and togetherness that may emerge during collective experiences (Toraldo et al., 2019; Ziakas & Boukas, 2013). Temporary community is related to communitas but is not used as an alternative term for the same experience. In the proposed framework, communitas helps explain how social boundaries may be temporarily reduced and how connection between participants can emerge. Temporary community, however, describes the wider social condition that develops when participants experience shared space, recognize common identity, participate collectively, develop social connection and ultimately experience belonging.

Similarly, social connectedness does not necessarily indicate the presence of a community. Participants may feel emotionally connected to others during a particular activity without perceiving themselves as part of a shared group. The framework therefore positions social connection as a stage in the process rather than the final social outcome. Temporary belonging represents a further shift in the participant's experience, where connection contributes to a sense of inclusion within the event's social environment.

The use of the term community requires careful consideration. Traditional understandings of community often emphasize continuity, established relationships, shared locality or formal membership. Participatory events may not meet these conditions because they are temporary and participants may have limited contact before or after the gathering. However, event participants can still experience some of the social characteristics associated with community, including shared identity, collective action, interpersonal connection and belonging. The framework therefore suggests that the duration of a social group should not be the only factor used to determine whether an experience of community has occurred.

The concept of temporary community recognizes that social belonging may be meaningful even when it is short-lived. Participants may leave an event and never interact with the same people again, but the experience of being part of a shared group may remain part of how the event is remembered. This may help explain why participants often describe particular events through collective language, referring to what "we" experienced or what "everyone" felt. The event becomes meaningful not only because of what was presented or organized but because of the participant's temporary position within a wider social experience.

The proposed framework therefore extends existing discussions of event experience by positioning temporary community as a possible social outcome of participatory events. It also connects areas of literature that are frequently examined separately. Event space explains the conditions for gathering, social identity explains the recognition of commonality, collective participation provides shared action, and communitas contributes to understanding social connection and togetherness. Temporary belonging brings these processes together as an experience of being part of an event community for a limited period.

P5 is an interpretive proposition: temporary belonging is understood as community experience when it is situated within the shared identity, participation, and connection described by the framework. Belonging and temporary community should therefore not be measured with identical items and then treated as independent causes and effects. Future research could examine participants' accounts of a shared "we" and their perception of community, alongside evidence of the preceding dimensions. This would assess whether the community interpretation is warranted rather than assume it from attendance alone.

This interpretation has implications for how participatory events are understood and designed. If temporary community is considered a possible social outcome, the role of event management extends beyond delivering activities and satisfying individual participants. Event environments may also be designed to create

opportunities for shared identity to become visible, collective participation to occur, and social connection to develop. The framework therefore shifts attention from the participant as an individual consumer towards the participant as a temporary member of an event-based social group.

The final relationship in the framework is expressed through the following proposition:
P5: Temporary belonging, arising within the proposed process, represents participants' experience of a temporary community within participatory event settings.
Expected outcome: Within the proposed process, temporary belonging is expected to be expressed as a perception of being part of a temporary event community. This is an interpretive outcome, not a separate proven causal effect.

## 5. Managerial Implications and Recommendations

The proposed framework provides several directions for event management practice and future research. Event organizers should consider social connection and belonging as possible outcomes of the event experience rather than focusing only on participant satisfaction and program delivery. This requires attention to how event spaces, activities and communication encourage participants to recognize shared interests and engage with others.

Event spaces may be designed to increase opportunities for shared presence and interaction. Areas where participants naturally gather, observe others or participate in common activities can contribute to the social environment of an event. Organizers may also consider how event-related symbols, language, dress and traditions communicate a shared identity. These elements should not be treated only as branding tools but as social cues that may help participants recognize commonality with others.

Opportunities for collective participation should also be intentionally considered in event design. Activities that encourage participants to act, respond, or contribute alongside others may support the development of social connection. However, participation should not be forced or assumed to create belonging automatically. The design of participatory activities should consider the event context and provide different levels of involvement for participants.

The expected outcomes in Table 1 offer provisional design aims: make shared cues understandable, enable voluntary collective activity, support interaction, and assess whether participants actually feel included. Quinn and Kinnunen (2024) caution against assuming uniformly positive social effects. Organizers should therefore seek feedback from newcomers and less involved participants as well as enthusiastic regular attendees; these recommendations remain implications of the conceptual framework, not interventions validated by this paper. Future research should examine the proposed relationships using distinct measures of perceived shared identity, collective participation, social connection and temporary belonging. Repeated observations before, during, and after events could help establish temporal order, account for prior relationships and identification, and test reciprocal or alternative pathways. P1–P4 can inform relational hypotheses; P5 requires assessment of whether temporary belonging is meaningfully experienced as community, rather than an automatic additional path between overlapping constructs.

Qualitative research may also provide a deeper understanding of how participants describe temporary community experiences. Interviews, participant observation and event ethnography could examine the moments when participants begin to feel connected to strangers or perceive themselves as part of a wider group. Such research may be particularly useful in identifying event-specific rituals, symbols and collective behaviors that contribute to belonging.

Ziakas and Boukas (2014) provide a methodological rationale for examining event meanings through phenomenology. Such an approach could explore how participants distinguish a momentary connection from feeling part of a temporary community. The framework should also be examined across different event contexts, including festivals, sporting events, cultural celebrations, community events and business events. The strength and sequence of the proposed relationships may differ according to event size, duration, purpose and

level of participant involvement. Comparative research may therefore help determine whether temporary community formation is consistent across event types or shaped by particular event conditions.

Finally, future research should consider the duration and possible longer-term effects of temporary belonging. Although the framework focuses on community formation during the event, the experience of temporary belonging may influence event memories, future attendance, event identification, and continued engagement. Examining what remains after the temporary community has ended may provide a fuller understanding of the social value of participatory events.

## Conclusion

This conceptual paper proposes the Temporary Community Formation Framework to explain how participatory events may support temporary community and belonging. Its contribution is to connect five dimensions—shared event space, shared symbols and identity, collective participation, social connection and temporary belonging—and to specify the expected outcome of each proposition. The framework retains communitas and social identity as complementary explanations of the social experience of events.

Taken together, P1–P5 describe an expected progression from shared presence to perceived community. Shared event space is expected to make common symbols and identity more recognizable (P1). Recognition of shared identity is expected to encourage collective participation (P2), which may strengthen relatedness and interpersonal connection (P3). Such connection is expected to support feeling accepted and included in the event-based group during the event (P4). When this belonging is situated within the preceding dimensions, it is interpreted as participants' experience of a temporary community (P5). P5 therefore expresses the integrative social outcome of the framework, rather than a separate empirically established causal effect.

These outcomes are conditional. Physical proximity, visible symbols or collective activity alone need not produce inclusion, and participants may experience the same event differently. The proposed sequence may be interrupted by exclusion, limited opportunities to interact, or a lack of perceived commonality. Reciprocal relationships are also possible. Temporary community is consequently presented as a possible event-based experience, without requiring formal membership, enduring relationships or continuation after the event.

The framework advances the conceptual argument by making the relationship between event conditions, shared action, social connection and belonging explicit. For organizers, it directs attention to opportunities for voluntary participation and inclusion alongside program delivery. For researchers, it provides a set of differentiated expectations and a clear distinction between the proposed mechanisms and the interpretation of temporary community.

No empirical confirmation of P1–P5 is claimed. Recent and foundational research informs the rationale, but does not validate the complete framework. Future studies should examine the direction and timing of P1–P4, assess whether the community interpretation in P5 is supported by participants' experiences, and compare alternative pathways across event contexts. This would establish whether, for whom, and under what conditions temporary community emerges.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Professional Scepticism and Tax Ethical Judgement among Malaysian Tax Practitioners: The Moderating Role of Audit Firm Type

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**Abstract:** This study examines whether professional skepticism is associated with tax ethical judgement among Malaysian tax practitioners and whether the association differs across audit-firm settings. The paper uses archived data and preserved statistical outputs from a broader postgraduate research project completed in 2016, comprising 140 usable responses from practitioners in Big Four and non-Big Four audit firms. Professional skepticism was measured using an adapted 30-item Hurtt scale, while two scenario-specific case scores were retained as separate outcomes. Archived hierarchical regression results show a positive association between professional skepticism and the case outcomes in both scenarios (Case 1: B = 0.133, p = 0.012; Case 2: B = 0.069, p = 0.038). Audit firm type also moderates the relationship (Case 1: B = -0.220, p = 0.034; Case 2: B = -0.305, p = 0.007), with archived firm-specific regressions showing stronger positive slopes among Big Four practitioners. Social Cognitive Theory is used to interpret professional skepticism as a personal/cognitive factor operating within an organizational environment. Because the underlying observations are historical and the respondent-level raw data are no longer available, the findings should not be interpreted as estimates of current Malaysian practice or as newly revalidated measurement evidence. Instead, they provide historical empirical evidence on the relationship among professional skepticism, organizational context and scenario-based tax ethical judgement, considered alongside more recent tax-practice and professional-skepticism research.

**Keywords:** *Professional Skepticism, Tax Ethical Judgement, Audit Firm Type, Tax Practitioners, Malaysia*

## 1. Introduction

Tax practitioners frequently make professional judgements under incomplete or contested information. A client's explanation may appear plausible but remain weakly supported, two tax treatments may both be technically arguable, or additional documentation may materially change the interpretation of a transaction. Tax practice is therefore not only a technical exercise; it also requires evidence evaluation and ethical judgement.

The contemporary professional environment reinforces this point. The International Ethics Standards Board for Accountants' tax-planning standards became effective on 1 July 2025 and require professional accountants to apply a principles-based ethical framework, including consideration of whether a proposed arrangement has a credible basis in laws and regulations and of broader consequences associated with the arrangement (IESBA, 2025). In Malaysia, Section 380 of the Malaysian Institute of Accountants' By-Laws, effective from the same date, similarly addresses tax-planning services within the fundamental principles and conceptual framework (MIA, 2025). These developments do not make the empirical observations in this study contemporary; rather, they show that ethical professional judgement in tax practice remains a current concern. Professional skepticism is relevant where judgement depends on the credibility and sufficiency of information. Hurtt (2010) conceptualizes trait professional skepticism as a multidimensional individual characteristic reflected in a questioning mind, suspension of judgement, search for knowledge, interpersonal understanding, self-confidence and self-determination. Nelson (2009) focuses on skeptical judgement and action when a professional assigns a heightened possibility that an assertion may be incorrect. Although these perspectives were developed mainly in auditing, the underlying problem is also present in taxation: practitioners must evaluate client-provided information, consider ambiguity and determine whether the available evidence supports the proposed treatment.

Recent evidence supports the continuing relevance of skepticism while also indicating that context matters. Khalid et al. (2023) found significant direct and indirect effects of skepticism on the professional judgement of 176 Malaysian tax officers. Shirowzhan and Fakhari (2024) reported a positive effect of professional skepticism on auditors' judgement and decision-making quality. Xu and Yang (2025) describe skepticism as a sensemaking

process that develops through interactions with clients and audit-team members. Conversely, Yulianto and Sari (2025) found that professional skepticism did not independently overcome obedience pressure in an ethical audit-opinion setting. Together, these studies caution against assuming that a skeptical disposition produces an identical effect in every professional environment.

The employing firm is one plausible source of contextual variation. Shafer and Simmons (2011) showed that organizational ethical culture can influence tax practitioners' ethical decisions. Lynch and McCullagh (2024), using an international survey of 1,061 tax experts and follow-up interviews with 68 practitioners, identify the employing firm as a significant site of influence on tax practitioners' risk attitudes and show that firm influence is not reducible to firm size alone. Brazel et al. (2025) similarly demonstrate that supervisory expectations can shape whether appropriate professional skepticism is rewarded. These findings support examining organizational setting without assuming that one firm category is inherently more ethical than another.

The present article uses archived data and preserved statistical outputs from a broader postgraduate research project completed in 2016. The exact fieldwork month is not recoverable from the surviving documentation, but the project was completed in June 2016. The current article narrows the broader study to professional skepticism and asks two questions: whether professional skepticism is associated with scenario-based tax ethical judgement, and whether that association differs across Big Four and non-Big Four audit-firm settings. The contribution is therefore deliberately bounded. First, the study extends professional skepticism beyond conventional audit-evidence settings into tax ethical judgement. Second, it treats audit firm type as a contextual moderator rather than as evidence of the ethical standing of either firm category. Third, it places historical Malaysian evidence alongside more recent research on professional judgement in taxation, firm influence and supervisory reinforcement. The study does not claim that the archived sample describes current levels of professional skepticism or ethical judgement among Malaysian tax practitioners.

The remainder of the paper proceeds as follows. Section 2 reviews tax ethical judgement, professional skepticism, audit-firm context and Social Cognitive Theory. Section 3 explains the archived research design, measurement and analytical constraints. Section 4 reports the preserved statistical results and discusses their interpretation. Section 5 concludes with implications, limitations and directions for future research.

## 2. Literature Review

### Tax Ethical Judgement

Ethical judgement concerns the evaluation of whether a proposed action is right, acceptable or defensible. Rest (1986) treats ethical judgement as one stage of ethical decision-making, distinct from recognizing an ethical issue, forming an intention and acting. The distinction is useful in tax practice because professionals may agree that a client's request raises an ethical issue yet differ in whether they regard the proposed treatment as professionally acceptable.

Tax advice sits at the intersection of legal interpretation and professional responsibility. Under the IESBA tax-planning framework, professional accountants are expected to consider whether an arrangement has a credible basis and to take account of broader consequences associated with the advice (IESBA, 2025). MIA's Section 380 applies the fundamental principles and conceptual framework to tax-planning services while also requiring compliance with relevant tax laws and regulations (MIA, 2025). Ethical judgement therefore cannot be reduced to technical legality alone.

Prior research also indicates that tax-related ethical judgements are embedded in organizational and professional contexts. Shafer and Simmons (2011) found that organizational ethical culture affected tax practitioners' behavioral intentions. Johnes Abit et al. (2023), using Malaysian tax agents, reported significant relationships between personal and professional ethics and perceptions of tax evasion. Lynch and McCullagh (2024) subsequently identified the employing firm as an important influence on tax practitioners' risk attitudes. These findings support considering both individual and environmental factors when examining tax ethical judgement.

**Professional Skepticism**

Professional skepticism is a questioning and critically evaluative orientation toward evidence. Hurtt (2010) conceptualizes it as a multidimensional individual characteristic that may operate as a relatively stable trait or as a situational state. The six characteristics underlying the trait construct are questioning mind, suspension of judgement, search for knowledge, interpersonal understanding, self-confidence and self-determination. The final Hurtt instrument contains 30 items designed to measure overall trait professional skepticism.

Nelson (2009) emphasizes the judgement process and the heightened possibility that an assertion may be incorrect. Nolder and Kadous (2018) caution against equating professional skepticism with indiscriminate distrust and instead locate it in mindset and attitude. This distinction is important in tax work: a skeptical practitioner need not presume client dishonesty, but should recognize inconsistencies, seek appropriate support and avoid premature closure when evidence is insufficient.

Recent research also shows that professional skepticism is shaped by context. Shirowzhan and Fakhari (2024) found that professional skepticism positively affected judgement and decision-making quality among independent auditors, while Xu and Yang (2025) describe skepticism as emerging through actions and interactions with clients and team members. Brazel et al. (2025) show that supervisors' expectations influence whether appropriate skeptical behavior is rewarded. The common implication is that an individual disposition may matter, but the work environment can influence how that disposition is expressed.

**Professional Skepticism and Tax Ethical Judgement**

The proposed relationship follows from how skepticism changes the treatment of supporting information. A practitioner who questions an explanation, postpones a conclusion when evidence is incomplete and searches for additional support may be more likely to identify inconsistencies that alter the ethical assessment of a tax arrangement. This mechanism is relevant even when a position is technically arguable, because professional judgement may turn on assumptions, evidential sufficiency and consequences that are not resolved by legal permissibility alone.

Direct tax evidence remains limited, but Khalid et al. (2023) found that skepticism significantly influenced the professional judgement of Malaysian tax officers and also operated through the intensity of fraud indicators. Tax officers and tax advisers have different institutional roles, yet both evaluate assertions and evidence under uncertainty. The positive association between professional skepticism and judgement quality reported by Shirowzhan and Fakhari (2024) points in the same direction. The first hypothesis therefore examines whether the archived Malaysian practitioner evidence is consistent with this reasoning.

**H1:** Professional skepticism is positively associated with tax ethical judgement among Malaysian tax practitioners.

**Audit Firm Type as a Contextual Moderator**

Professional skepticism is measured at the individual level, but practitioners exercise it inside organizations. Firm settings can differ in review processes, access to consultation, technical resources, training, commercial pressures and supervisory reinforcement. The present study does not assume that these features are uniformly stronger in one firm category, nor does it equate Big Four status with superior ethical culture. Rather, audit firm type is treated as an observable contextual indicator.

This distinction is important because Lynch and McCullagh (2024) show that the employing firm is a significant site of influence on tax practitioners' risk appetite while also finding that firm influence is not simply a function of firm size. Similarly, Brazel et al. (2025) demonstrate that supervisors can reward or discourage appropriate skeptical behavior. These findings make it plausible that the same skeptical disposition could have different associations with judgement across organizational settings even when the underlying mechanisms are not directly measured. Accordingly, the moderation test concerns the strength of the professional-skepticism relationship across firm contexts, not the ethical standing of Big Four or non-Big Four practitioners.

**H2:** Audit firm type moderates the relationship between professional skepticism and tax ethical judgement.

**Social Cognitive Theory**

Social Cognitive Theory (SCT) explains human functioning through reciprocal relationships among personal

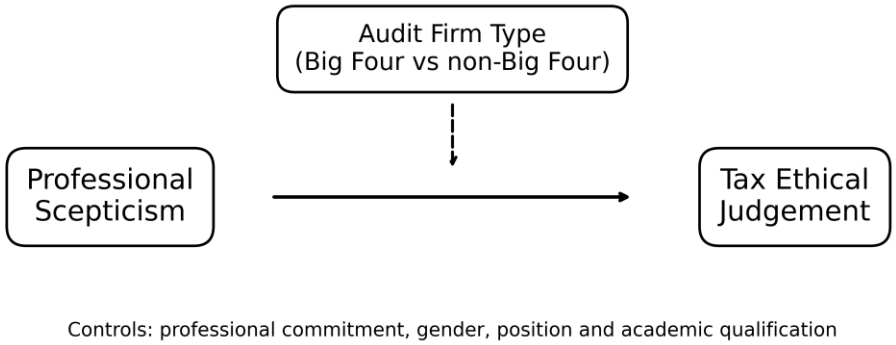
factors, behavior and environmental influences (Bandura, 1986). This framework is useful because the focal individual characteristic in the present study is expected to operate within, rather than apart from, an organizational context.

Within this framework, professional skepticism represents the personal and cognitive component. A skeptical practitioner is more inclined to question information, suspend judgement when evidence is incomplete, seek additional knowledge, and consider alternative explanations. These characteristics shape the cognitive process preceding professional judgement. Tax ethical judgement represents the behavioral or decision-related outcome. Audit firm type represents an observable feature of the organizational environment in which the practitioner works.

The mapping requires an important qualification. The study did not directly measure ethical culture, supervisory support, consultation quality, incentive structures, client pressure or other organizational mechanisms. Audit firm type therefore cannot be interpreted as a direct measure of those mechanisms. It is used only as a contextual indicator that permits testing whether the observed professional-skepticism slope differs across two organizational settings.

SCT consequently supports a person-environment interpretation of H2 rather than a deterministic claim. Professional skepticism may provide the cognitive disposition to question client information, while the extent to which that disposition is reflected in judgement can vary with environmental cues and constraints. The mechanisms underlying any observed difference remain untested and should be measured directly in future research.

**Figure 1: Research Framework**




Source: Developed from the study hypotheses and Social Cognitive Theory.

## 3. Methodology

### Research Design and Archival Source

The present paper uses archived data and preserved statistical outputs from a broader postgraduate research project completed in 2016. The original project used a quantitative, cross-sectional, scenario-based survey of Malaysian tax practitioners working in Big Four and non-Big Four audit firms. The surviving dissertation confirms completion in June 2016 but does not preserve the exact month of fieldwork. Accordingly, the revised manuscript does not report an unsupported collection date.

The current paper focuses on professional skepticism, audit firm type, and the scenario-based ethical-judgement components of that broader study. No new respondent-level analysis has been conducted for this revision because the original raw dataset and analysis syntax are no longer available. All statistical results reported below are drawn from archived outputs preserved in the original dissertation. This distinction is maintained throughout the paper.

**Sample and Recruitment**

The target population comprised tax practitioners employed in Big Four and non-Big Four audit firms in Malaysia. The archived methodology records the distribution of 200 hard-copy research instruments. Instruments were personally distributed to participating practitioners in Selangor, while instruments for practitioners outside Selangor were sent by courier to the respective audit firms. Follow-up telephone calls were made after mailing, and respondents were given 20 days to complete and return the instrument.

Of the 200 instruments distributed, 145 were returned. Five were excluded because of incomplete data, leaving 140 usable responses, equivalent to a 70 per cent usable response rate. The final sample comprised 80 Big Four and 60 non-Big Four practitioners. The surviving documentation does not identify every state represented outside Selangor and does not preserve information that would permit formal testing for non-response bias.

The dissertation also contains an inconsistency in the description of sample selection: it refers to 150 practitioners as having been randomly selected while separately documenting distribution of 200 instruments. Because the original sampling frame can no longer be reconstructed, the present article does not claim probability sampling or population representativeness. It reports the recruitment procedure that can be verified from the archived record and treats the final sample as a field sample of Malaysian tax practitioners in the two audit-firm settings.

**Table 1: Respondent Profile**

| Characteristics | Category | n | % |
|---|---|---|---|
| Audit firm type | Big Four | 80 | 57.1 |
| | Non-Big Four | 60 | 42.9 |
| Position | Manager | 9 | 6.4 |
| | Assistant manager | 15 | 10.7 |
| | Senior executive | 57 | 40.7 |
| | Executive | 59 | 42.2 |
| Experience | < 3 years | 100 | 71.5 |
| | 4-6 years | 32 | 22.9 |
| | 7-10 years | 7 | 4.9 |
| | > 10 years | 1 | 0.7 |
| Qualification | Postgraduate | 5 | 3.6 |
| | Accounting degree | 64 | 45.7 |
| | Non-accounting degree | 15 | 10.7 |
| | Professional qualification | 51 | 36.4 |
| | Diploma | 5 | 3.6 |

Source: Archived study documentation. Note: N = 140. Percentages may not total 100 exactly because of rounding.

**Measures**

**Professional Skepticism**

Professional skepticism was measured using an adapted version of Hurtt's (2010) 30-item trait professional-skepticism scale. Hurtt conceptualizes professional skepticism as multidimensional, with six underlying characteristics, while the 30-item instrument is designed to yield an overall trait measure. The original postgraduate study adapted the response format to a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) and analyzed an overall professional-skepticism score. Higher archived composite scores indicate greater professional skepticism.

The present paper retains that archived overall score because respondent-level data are unavailable to re-estimate a six-factor structure. This should not be interpreted as evidence that the construct is unidimensional. The response-format adaptation and inability to re-estimate the six-dimensional measurement structure are therefore treated as limitations rather than as new validation evidence.

**Scenario-Based Tax Ethical Judgement**

Tax ethical judgement was represented by two tax scenarios adapted from Shafer and Simmons (2011) and

contextualized to the Malaysian setting. The scenarios were kept separate because they differed in the practitioner's role and degree of agency. In Case 1, a tax preparer knowingly included a service-fee provision even though the associated company had not provided the stated services. In Case 2, a tax practitioner proposed a cross-jurisdictional arrangement that shifted profits to lower-tax locations and then prepared a Malaysian tax return reporting very low profits.

Each scenario contained one direct ethical-judgement item asking respondents to rate, on a seven-point scale, the likelihood that the practitioner acted unethically. That item was followed by ten seven-point items concerning the organizational ethical context, including management discipline of unethical behavior, enforcement of penalties, ethical standards of top management, ethical norms, rewards and obedience to authority.

The archived dissertation reports continuous case-level scores used as the regression outcomes (Case 1 overall M = 3.70; Case 2 overall M = 3.65). However, the original scoring syntax is no longer available, so the precise item-level transformation used to derive these archived case scores cannot be independently reconstructed. The revised paper therefore describes the dependent variables as archived scenario-based case composites and does not claim that they constitute newly validated unidimensional measures of tax ethical judgement. Treating the two cases separately preserves their substantive differences and avoids assuming that the two scenarios are interchangeable.

**Table 2: Scenario Structure and Archived Outcome Use**

| Elements | Case 1 | Case 2 |
|---|---|---|
| Core tax situation | False service-fee provision used to reduce taxable profit; practitioner knows services were not provided. | Profit-shifting arrangement through lower-tax locations; practitioner proposes the arrangement and prepares a low-profit Malaysian return. |
| Direct judgement item | Likelihood that Mr. Karim acts unethically (1 = strongly unlikely; 7 = strongly likely). | Likelihood that Mrs. Sara acts unethically (1 = strongly unlikely; 7 = strongly likely). |
| Additional items | Ten organizational ethical-context items on 7-point agreement scales. | Ten organizational ethical-context items on 7-point agreement scales. |
| Archived regression outcome | Case-level continuous composite preserved in the dissertation (overall M = 3.70). | Case-level continuous composite preserved in the dissertation (overall M = 3.65). |

Source: Archived questionnaire and statistical outputs. The original scoring syntax is no longer available.

**Audit Firm Type and Control Variables**

Audit firm type was coded 0 for Big Four and 1 for non-Big Four. The regressions retained professional commitment, gender, position, and academic qualification from the broader original specification. Professional commitment was measured with ten items and is treated here as a statistical control rather than a focal construct. In the archived coding, male = 0 and female = 1; manager, assistant manager and senior executive positions were grouped as 1 and executive as 0; professional qualification was coded 1 and other academic-qualification categories as 0.

**Measurement Evidence and Archival Constraints**

The archived professional-skepticism score had a mean of 6.67 and a standard deviation of 0.268. The high mean and limited dispersion raise a legitimate concern about restricted variance and a possible ceiling effect. Preserved normality statistics report skewness of -0.354 and kurtosis of -0.478. These values do not themselves rule out ceiling effects. The archived item-level table shows substantial variation across the 30 item means before item-direction adjustment (means from 1.24 to 6.24; standard deviations from 0.426 to 0.864), reflecting the mixture of positively and negatively worded items.

Because the respondent-level dataset is no longer available, the percentage of respondents at the scale maximum, histograms, alternative scoring specifications, and sensitivity analyses cannot be reconstructed. Restricted variance may attenuate correlations or affect regression estimates, so the coefficients are

interpreted cautiously.

Internal consistency for the archived professional-skepticism score was Cronbach's alpha = 0.815. The Kaiser-Meyer-Olkin statistic was 0.759, and Bartlett's test of sphericity was significant (chi-square = 4179.710, df = 435, $p < 0.001$). The dissertation states that retained item loadings exceeded 0.50, but the full loading matrix and a six-factor solution are not preserved. Accordingly, these statistics are reported as reliability evidence and preliminary evidence of factorability only; they are not presented as definitive evidence of the dimensional validity of the Hurtt construct.

**Table 3: Archived Measurement and Distribution Evidence**

| Construct/statistic | Value |
|---|---|
| Professional skepticism: items | 30 |
| Professional skepticism: mean | 6.670 |
| Professional skepticism: SD | 0.268 |
| Professional skepticism: skewness | -0.354 |
| Professional skepticism: kurtosis | -0.478 |
| Professional skepticism: Cronbach's alpha | 0.815 |
| Professional skepticism: KMO | 0.759 |
| Professional skepticism: Bartlett | chi-square = 4179.710, df = 435, $p < 0.001$ |
| Big Four professional skepticism | M = 6.633, SD = 0.278 |
| Non-Big Four professional skepticism | M = 6.724, SD = 0.248 |
| Professional commitment (control): Cronbach's alpha | 0.896 |
| Professional commitment (control): KMO | 0.825 |

Source: Archived statistical outputs. KMO = Kaiser-Meyer-Olkin measure of sampling adequacy.

**Data Analysis**

The hypotheses were evaluated using archived hierarchical multiple-regression outputs for Case 1 and Case 2. Model 1 contained demographic controls. Model 2 added professional commitment, professional skepticism, and audit firm type. Model 3 added the interactions Professional Commitment x Audit Firm Type and Professional Skepticism x Audit Firm Type. The focal moderation term in the present paper is Professional Skepticism x Audit Firm Type.

The archived p-values reported in the original output correspond to the displayed t-statistics and are presented here as two-tailed values. Because Big Four was coded 0 and non-Big Four was coded 1, a negative Professional Skepticism x Audit Firm Type coefficient indicates that the professional-skepticism slope is weaker in the non-Big Four category than in the Big Four reference group. The formal interaction is interpreted alongside archived firm-specific regressions and the interaction plots preserved in the original study. No new PROCESS, bootstrap, or respondent-level simple-slope analysis was possible without the raw dataset.

## 4. Findings and Results

**Correlations**

Professional skepticism was positively correlated with both archived case outcomes, although the relationships were small (Case 1: $r = 0.181$; Case 2: $r = 0.165$). Professional skepticism was also positively correlated with audit firm type ($r = 0.169$). The reported bivariate correlations were low in magnitude, providing no indication of severe pairwise multicollinearity among the focal variables.

**Table 4: Selected Pearson Correlations**

| Relationship | r |
|---|---|
| Professional skepticism - Case 1 | 0.181* |
| Professional skepticism - Case 2 | 0.165* |
| Professional skepticism - audit firm type | 0.169* |
| Professional commitment - professional skepticism | 0.154* |
| Audit firm type - Case 1 | -0.188* |
| Audit firm type - Case 2 | -0.255** |

Source: Archived statistical outputs. Audit firm type: 0 = Big Four, 1 = non-Big Four. * $p < 0.05$; ** $p < 0.01$.

**Direct Association of Professional Skepticism**

For Case 1, the control-only model accounted for 7.7 per cent of the variance. After professional commitment, professional skepticism and audit firm type were added in Model 2, R-squared increased to 0.252 (adjusted R-squared = 0.218; F = 10.257, p < 0.001). Professional skepticism had a positive coefficient (B = 0.133, SE = 0.052, t = 2.556, p = 0.012).

Case 2 showed the same direction. Model 2 explained 24.2 per cent of the variance (adjusted R-squared = 0.208; F = 11.708, p < 0.001), and professional skepticism again had a positive coefficient (B = 0.069, SE = 0.033, t = 2.099, p = 0.038). H1 is therefore supported in both archived case models. The result is interpreted as an association with the archived scenario-based case composites, not as a newly reconstructed direct ethical-judgement score.

**Table 5: Main-Effects Regression Results - Case 1**

| Variables | B | SE | t | p |
|---|---|---|---|---|
| Gender | -0.043 | 0.027 | -1.586 | 0.115 |
| Position | 0.018 | 0.017 | 1.023 | 0.308 |
| Academic qualification | -0.128 | 0.030 | -4.261 | <0.001 |
| Professional commitment | 0.053 | 0.030 | 1.776 | 0.078 |
| Professional skepticism | 0.133 | 0.052 | 2.556 | 0.012 |
| Audit firm type | -0.139 | 0.031 | -4.537 | <0.001 |

Source: Archived Model 2 output. R = 0.502; R-squared = 0.252; adjusted R-squared = 0.218; F = 10.257, p < 0.001.

**Table 6: Main-Effects Regression Results - Case 2**

| Variables | B | SE | t | p |
|---|---|---|---|---|
| Gender | -0.037 | 0.030 | -1.248 | 0.214 |
| Position | 0.016 | 0.019 | 0.857 | 0.393 |
| Academic qualification | -0.117 | 0.033 | -3.576 | <0.001 |
| Professional commitment | 0.138 | 0.057 | 2.416 | 0.017 |
| Professional skepticism | 0.069 | 0.033 | 2.099 | 0.038 |
| Audit firm type | -0.165 | 0.034 | -4.919 | <0.001 |

Source: Archived Model 2 output. R = 0.492; R-squared = 0.242; adjusted R-squared = 0.208; F = 11.708, p < 0.001.

**Moderating Role of Audit Firm Type**

Model 3 tested whether the professional-skepticism relationship varied by audit firm type while retaining the original control structure. In Case 1, the Professional Skepticism x Audit Firm Type coefficient was negative and statistically significant (B = -0.220, SE = 0.102, t = -2.145, p = 0.034). R-squared increased from 0.252 in Model 2 to 0.313 in Model 3, giving a change in R-squared of 0.061. Case 2 produced the same pattern: the interaction coefficient was B = -0.305 (SE = 0.112, t = -2.721, p = 0.007), while R-squared increased from 0.242 to 0.309, a change of 0.067. H2 is supported in both archived case models.

The full Model 3 coefficients are reported in Table 7. The professional-commitment interaction is retained because it formed part of the original model specification, although it is not the focal relationship in this article. Because non-Big Four firms were coded 1, the negative interaction terms indicate weaker professional-skepticism slopes in the non-Big Four category relative to the Big Four reference group. Archived firm-specific regressions provide a direct interpretation. Among Big Four practitioners, professional skepticism was positively associated with the case score in Case 1 (B = 0.228, SE = 0.062, p < 0.001) and Case 2 (B = 0.269, SE = 0.069, p < 0.001). The non-Big Four slopes were close to zero and not statistically significant in Case 1 (B = 0.004, SE = 0.100, p = 0.967) or Case 2 (B = -0.038, SE = 0.102, p = 0.708). These firm-specific regressions are archived slope estimates rather than newly generated formal simple-slope tests. The preserved interaction plots are reproduced in Figure 2 to show the pattern visually.

**Table 7: Full Archived Model 3 Moderation Results**

| Variables | Case 1 B | SE | t | p | Case 2 B | SE | t | p |
|---|---|---|---|---|---|---|---|---|
| Gender | -0.037 | 0.026 | -1.401 | 0.163 | -0.031 | 0.029 | -1.090 | 0.278 |
| Position | 0.017 | 0.017 | 0.989 | 0.325 | 0.014 | 0.018 | 0.737 | 0.463 |
| Academic qualification | -0.127 | 0.029 | -4.379 | <0.001 | -0.115 | 0.032 | -3.635 | <0.001 |
| Professional commitment | -0.027 | 0.039 | -0.685 | 0.495 | 0.264 | 0.070 | 3.754 | <0.001 |
| Professional skepticism | 0.226 | 0.064 | 3.525 | 0.001 | -0.011 | 0.043 | -0.256 | 0.799 |
| Audit firm type | 0.269 | 0.732 | 0.368 | 0.714 | 0.824 | 0.801 | 1.028 | 0.306 |
| PC x Audit Firm Type | 0.168 | 0.058 | 2.928 | 0.004 | 0.167 | 0.063 | 2.665 | 0.009 |
| PS x Audit Firm Type | -0.220 | 0.102 | -2.145 | 0.034 | -0.305 | 0.112 | -2.721 | 0.007 |

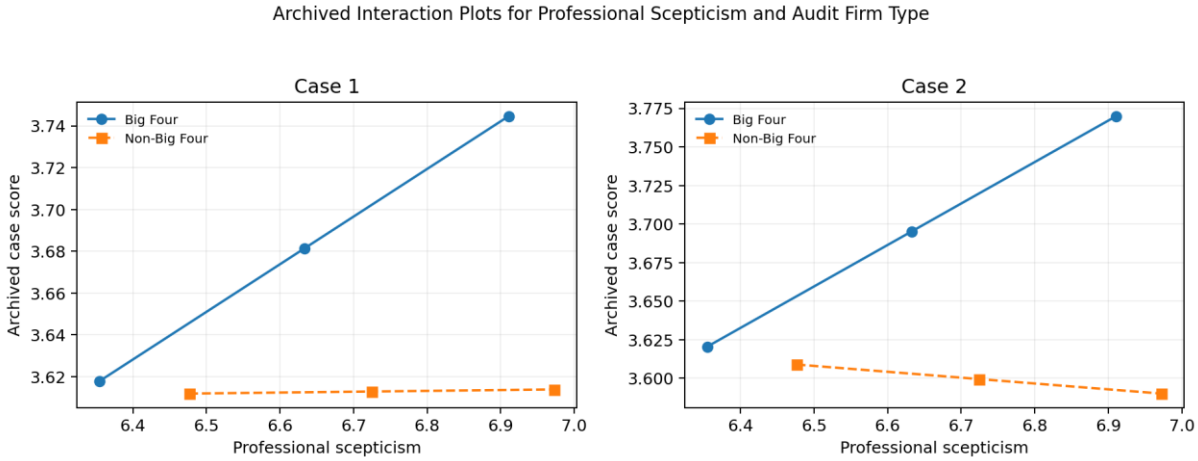
Source: Archived Model 3 output. Case 1: R = 0.560, R-squared = 0.313, adjusted R-squared = 0.271, F = 5.843 (p = 0.004), change in R-squared from Model 2 = 0.061. Case 2: R = 0.556, R-squared = 0.309, adjusted R-squared = 0.267, F = 6.393 (p = 0.002), change in R-squared from Model 2 = 0.067. Intercepts omitted for compactness. PC = professional commitment; PS = professional skepticism.

**Table 8: Archived Firm-Specific Professional Skepticism Slopes**

| Case | Firm type | PS B | SE | p |
|---|---|---|---|---|
| Case 1 | Big Four | 0.228 | 0.062 | <0.001 |
| Case 1 | Non-Big Four | 0.004 | 0.100 | 0.967 |
| Case 2 | Big Four | 0.269 | 0.069 | <0.001 |
| Case 2 | Non-Big Four | -0.038 | 0.102 | 0.708 |

Source: Archived firm-specific regressions. These estimates interpret the significant formal interaction terms; they are not newly estimated simple-slope tests.

**Figure 2: Archived Interaction Plots for Professional Skepticism and Audit Firm Type**




Source: Reproduced from predicted points preserved in the original study. The figure is descriptive of the archived interaction pattern.

**Discussion**

The archived results show a positive association between professional skepticism and both scenario-based case outcomes. The finding extends professional skepticism into a tax setting where the professional task involves evaluating the acceptability of a tax position rather than issuing an audit opinion. This interpretation is consistent with Khalid et al. (2023), who found a significant relationship between skepticism and professional judgement among Malaysian tax officers, and with Shirowzhan and Fakhari (2024), who reported a positive association between professional skepticism and judgement quality among auditors.

The moderation result indicates that the archived skepticism-judgement relationship differed across firm settings. Professional skepticism was positively associated with the case outcomes within the Big Four subsample, whereas the archived non-Big Four slopes were not statistically significant. SCT helps interpret this as a person-environment pattern: an individual disposition can have different observable relationships with judgement across organizational environments. The result does not establish which organizational mechanisms produced the difference.

This distinction is important because the study measured only audit firm type, not ethical culture, consultation access, supervisor reinforcement, performance incentives or client pressure. Explanations involving these mechanisms must therefore remain speculative. Recent evidence supports their plausibility without proving that they caused the observed pattern. Lynch and McCullagh (2024) identify the employing firm as an important influence on tax practitioners' risk attitudes, while Brazel et al. (2025) show that supervisors' own expectations can affect whether appropriate skeptical behavior is rewarded. Xu and Yang (2025) similarly emphasize interactions with clients and team members in the exercise of skepticism.

The wider literature also cautions against treating skepticism as uniformly effective. Yulianto and Sari (2025) found that professional skepticism alone did not significantly alter ethical audit decisions under obedience pressure. Such findings strengthen the contextual interpretation of the present moderation result: professional skepticism may be relevant, but its relationship with judgement should not be assumed to be invariant across organizational conditions.

The age of the dataset requires a final interpretive boundary. The empirical observations pre-date current tax-planning standards and contemporary digital tax-administration developments. They therefore cannot be used to estimate present-day Malaysian practitioner attitudes or to claim that current Big Four and non-Big Four environments operate in the same way. The more defensible contribution is historical: the archived results document a person-context relationship that remains theoretically relevant and is broadly consistent with newer evidence showing that skepticism and firm-level influences continue to matter in professional judgement.

## 5. Conclusion and Recommendations

This study reports archived evidence from 140 Malaysian tax practitioners showing that professional skepticism was positively associated with two scenario-based case outcomes and that the association differed by audit firm type. The formal interaction was significant in both case models, while archived firm-specific regressions showed positive slopes in the Big Four subsample and non-significant slopes in the non-Big Four subsample.

The findings broaden the discussion of professional skepticism beyond conventional audit-evidence evaluation and support a social-cognitive interpretation in which an individual disposition operates within an organizational environment. The results should not be read as evidence that Big Four practitioners are inherently more ethical or that non-Big Four firms have weaker ethical environments. The study did not measure the organizational mechanisms necessary to make those claims. For practice, the historical pattern, considered alongside recent evidence on firm influence and supervisory reinforcement, suggests that organizational arrangements allowing appropriate questioning to be expressed constructively may be valuable. Examples include structured consultation, documentation of unresolved concerns, review processes that recognize appropriate challenge and scenario-based ethics training. These are implications for future practice and research rather than causal prescriptions derived from the archived data alone.

Future studies should move beyond a binary Big Four/non-Big Four indicator and measure ethical culture, consultation quality, supervisory reactions, review intensity, performance incentives, client pressure and professional socialization directly. Contemporary replication with a larger and more experienced Malaysian practitioner sample would allow researchers to determine whether the historical interaction persists under current tax-planning ethics requirements and organizational practices.

**Limitations and Future Research**

Several limitations materially qualify the findings. First, the dataset is historical. The underlying postgraduate research was completed in 2016 and the exact fieldwork month is not recoverable from the surviving documentation. Consequently, the results should not be presented as evidence of current prevalence, current practitioner attitudes or current organizational conditions in Malaysia.

Second, the original respondent-level dataset and statistical syntax are no longer available. The revised article therefore relies on archived tables, descriptive statistics, regression outputs and interaction figures preserved in the dissertation. New frequency-based ceiling-effect analyses, histograms, alternative scoring specifications, confirmatory factor analysis, six-factor re-estimation, bootstrap inference, and new formal simple-slope tests cannot be produced. Third, professional skepticism had a very high archived mean (6.67 on the adapted seven-point scale) and low standard deviation (0.268). Although archived skewness and kurtosis are not extreme, these values do not rule out restricted variance or a ceiling effect. Restricted variance may have affected correlations and regression coefficients.

Fourth, the professional-skepticism measure adapted Hurtt's 30-item instrument to a seven-point response format, and the original analysis used an overall score. The full loading matrix and six-dimensional factor structure are not preserved. Cronbach's alpha, KMO and Bartlett's test provide useful reliability and factorability information but do not establish the dimensional validity of the adapted scale. Fifth, the two scenario outcomes require caution. Each case contained one direct ethical-judgement item followed by ten organizational ethical-context items, and the archived case-level composite scores were used in the regressions. The scoring syntax cannot now be independently reconstructed. The outcomes are therefore best understood as archived scenario-based case composites rather than newly validated unidimensional measures of tax ethical judgement.

Sixth, the sample is modest and relatively inexperienced: 71.5 per cent of respondents had fewer than three years of taxation experience. The original sampling frame cannot be reconstructed, and the archived documentation contains an inconsistency between a statement that 150 practitioners were randomly selected and the documented distribution of 200 instruments. The present article therefore does not claim probability sampling or representativeness, and non-response bias cannot be assessed retrospectively. Finally, the design is cross-sectional and scenario-based. Audit firm type is only a broad contextual proxy and does not directly measure ethical culture, supervision, consultation, incentives, or client pressure. The results establish associations and differences in slopes, not causality or untested organizational explanations.

**Data Availability:** The study relies on archived statistical outputs and instrument documentation from a postgraduate research project completed in 2016. The original respondent-level dataset and analysis syntax are no longer available. The full citation to the underlying dissertation can be provided to the editor and restored after blind review if required.

**Acknowledgement:** The author gratefully acknowledges UNITAR International University for institutional support in the publication of this article.

**Declaration of Competing Interest:** The author declares no competing interests.

**Funding:** This research received no external funding.

**Declaration of Generative AI Use:** Generative AI tools were used to assist with language refinement, structural organization, and preparation of the revision. The author reviewed and verified the analysis, interpretation, references, and final content and takes full responsibility for the manuscript.

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**Appendix A: Archived Item-Level Descriptive Statistics for Professional Skepticism**

The following descriptive statistics are reproduced from the archived dissertation. Items include both positively and negatively worded statements; the table reports the original item wording and unadjusted item means as preserved. The original respondent-level scoring syntax is unavailable.

| Items | Mean | SD |
|---|---|---|
| I often accept other people's explanations without further thought | 1.24 | .426 |
| I feel good about myself. | 6.22 | .832 |
| I wait to decide on issues until I can get more information. | 6.21 | .794 |
| The prospect of learning excites me. | 6.09 | .864 |
| I am interested in what causes people to behave the way that they do. | 6.15 | .813 |
| I am confident of my abilities. | 5.76 | .748 |
| I often reject statements unless I have proof that they are true. | 5.94 | .784 |
| Discovering new information is fun. | 5.99 | .749 |
| I take my time when making decisions. | 6.19 | .776 |
| I tend to immediately accept what other people tell me. | 1.50 | .502 |
| Other people's behavior does not interest me. | 1.24 | .426 |
| I am self-assured. | 5.99 | .749 |
| My friends tell me that I usually question things that I see or hear. | 6.19 | .776 |
| I like to understand the reason for other people's behavior. | 6.24 | .764 |
| I think that learning is exciting. | 6.17 | .822 |
| I usually accept things I see, read, or hear at face value. | 1.29 | .457 |
| I don't feel sure of myself. | 1.48 | .529 |
| I usually notice inconsistencies in explanations. | 1.41 | .535 |
| Most often I agree with what the others in my group think. | 1.50 | .502 |
| I dislike having to make decisions quickly. | 6.22 | .832 |
| I have confidence in myself. | 6.21 | .794 |
| I don't like to decide until I've looked at all of the readily available information. | 6.09 | .864 |
| I like searching for knowledge. | 6.15 | .813 |
| I frequently question things that I see or hear. | 5.76 | .748 |
| It is easy for other people to convince me. | 1.41 | .535 |
| I seldom consider why people behave in a certain way. | 1.50 | .502 |
| I like to ensure that I've considered most available information before making a decision. | 5.99 | .749 |
| I enjoy trying to determine if what I read or hear is true. | 6.19 | .776 |
| I relish learning. | 6.24 | .764 |
| The actions people take and the reasons for those actions are fascinating. | 6.17 | .822 |

Source: Archived dissertation descriptive-statistics table.

**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Interlinking Experiential Learning, Adaptability and Entrepreneurial Mindset in Higher Education: An Adaptive Experiential Learning Framework

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**Abstract:** Experiential pedagogies are increasingly used in entrepreneurship education to develop the entrepreneurial mindset. However, participation in entrepreneurial activities does not automatically result in meaningful entrepreneurial learning. This conceptual paper explores how entrepreneurial experiences may foster the development of an entrepreneurial mindset through processes of adaptability. This paper proposes an Adaptive Experiential Learning Framework for Entrepreneurial Mindset Development through an integrative review of the literature on entrepreneurial mindset, experiential learning, and adaptability. The framework proposes four dominant developmental associations based on Kolb's experiential-learning cycle: concrete experience with emotional adaptability, reflective observation with cognitive adaptability, abstract conceptualization with strategic adaptability, and active experimentation with behavioral adaptability. These associations are not presented as exclusive or sequential causal pathways; rather, emotional, cognitive, strategic and behavioral adaptability are conceptualized as interlinked processes operating recursively across repeated experiential-learning cycles. Five conceptual propositions are offered as guides for future empirical investigation. The framework advances entrepreneurship education by highlighting the role of adaptiveness as a developmental mechanism linking entrepreneurial experience with entrepreneurial mindset, and by differentiating among various types of adaptive change that take place during experiential learning. It also implies that experiential activities should be designed and assessed not just based on participation or successful entrepreneurial outputs but based on learners' ability to regulate responses to uncertainty, rethink assumptions, reframe strategies and change subsequent behavior. The framework is still conceptual and needs to be empirically validated through longitudinal, mixed-methods, and experimental research.

**Keywords**: *Entrepreneurial mindset; Experiential learning; Entrepreneurship education; Adaptability; Emotional adaptability; Cognitive adaptability; Strategic adaptability; Behavioral adaptability.*

## 1. Introduction

Higher education institutions are increasingly expected to prepare graduates for environments characterized by uncertainty, technological change, and evolving market conditions. Within this context, entrepreneurship education has expanded beyond preparing students to establish new ventures towards developing capabilities that enable individuals to recognize opportunities, solve problems, and act effectively under uncertain conditions. This shift has placed increasing emphasis on the development of an entrepreneurial mindset (EM) as an important educational outcome.

Entrepreneurial mindset influences how individuals interpret uncertain situations, recognize possibilities, and translate judgments into action. The concept extends beyond cognition alone. Kuratko, Fisher, and Audretsch (2021) identify three distinct aspects in the literature: entrepreneurial cognition, entrepreneurial behavior, and entrepreneurial emotion. Recent work also shows continuing conceptual diversity in entrepreneurial-mindset scholarship, reinforcing the need for integrative explanations of how such a mindset develops (Kuratko et al., 2021; Molaei et al., 2026).

Within higher education, entrepreneurial mindset development is increasingly considered in relation to the wider educational environment rather than as a simple outcome of exposure to entrepreneurship content. Recent diagnostic work treats entrepreneurial mindset across individual, institutional, and ecosystem levels and reports associations involving experiential-learning curricula and entrepreneurial outcomes. This reinforces the importance of examining not merely whether entrepreneurship education is offered, but how

educational experiences contribute to mindset development (Kosti et al., 2026).

Entrepreneurship education has consequently moved from predominantly didactic approaches towards experiential pedagogies that expose learners to problems, decisions, and uncertainties resembling entrepreneurial practice. Experiential approaches enable learners to participate actively in entrepreneurial processes and develop skills and mindsets through experience rather than merely learning about entrepreneurship. Educational theory further suggests that such learning depends on how experience is interpreted, reflected upon, and transformed (Bell & Bell, 2020).

Kolb's experiential learning theory provides an influential foundation for understanding this developmental process. Learning is conceptualized as a recurring cycle involving concrete experience, reflective observation, abstract conceptualization, and active experimentation. Experience provides material for reflection; reflection enables examination of what occurred; conceptualization transforms observations into revised understanding; and experimentation enables learners to test that understanding through subsequent action (Kolb, 1984).

However, participation in entrepreneurial experience does not necessarily produce entrepreneurial learning or mindset development. Students may participate in venture projects, simulations, pitching exercises, or customer-development activities without fundamentally changing how they interpret uncertainty or respond when assumptions prove inaccurate. Experience creates an opportunity for learning, but learners must still recognize feedback, reconsider assumptions, and modify their responses.

This problem is especially important because entrepreneurial activity frequently occurs under uncertainty and changing task conditions. Adaptability provides a useful psychological lens for examining responses to such circumstances. Martin et al. (2012) conceptualize adaptability as constructive regulation of psycho-behavioral functioning in response to novelty, change, and uncertainty, with cognitive-behavioral and affective components. Within entrepreneurship, Haynie and Shepherd (2009) describe cognitive adaptability as the capacity to remain dynamic, flexible, and self-regulating in cognition under uncertain task environments (Martin et al., 2012; Haynie & Shepherd, 2009).

Adaptation within entrepreneurship is not solely cognitive. Entrepreneurial learning also involves emotion and action. Negative experiences can create emotions that either stimulate higher-order learning or encourage retreat, while appropriate pedagogical scaffolding can support sensemaking, cognitive reframing, entrepreneurial mindset development, and resilient behavior. Behavioral entrepreneurial mindset research likewise demonstrates the importance of translating entrepreneurial learning into action (Crosina et al., 2024; Cui & Bell, 2022).

Existing frameworks provide important but incomplete explanations of this process. Bell and Bell (2020) integrate experiential learning with constructivism, reflection-in-action, and transformative learning to strengthen the pedagogical foundations of experiential entrepreneurship education. More recently, Nzembayie et al. (2026) develop Action Design Learning as an entrepreneurship-specific experiential pedagogy centred on action, design, entrepreneurial artefacts, reflection, and metacognitive development. These approaches demonstrate the importance of experiential pedagogy but leave room for a more differentiated explanation of the adaptive changes occurring within learners.

The theoretical problem is therefore not an absence of research on entrepreneurial mindset, experiential learning, or adaptability individually. Rather, these bodies of knowledge remain only partially integrated within entrepreneurship education. It remains insufficiently explained how different adaptive processes may operate across experiential-learning stages to facilitate entrepreneurial mindset development. An unexpected entrepreneurial outcome may trigger an emotional response; reflection may require cognitive reconsideration; interpretation of the experience may require formulation of an alternative strategy; and effective response ultimately requires behavioral change.

Against this background, this paper addresses the following conceptual research question: How can experiential learning develop entrepreneurial mindset through interconnected emotional, cognitive, strategic, and behavioral adaptability processes?

To address this question, the paper proposes an Adaptive Experiential Learning Framework for Entrepreneurial Mindset Development. Building upon Kolb's experiential-learning cycle, the framework integrates four interrelated adaptive processes: emotional adaptability, cognitive adaptability, strategic adaptability, and behavioral adaptability. Concrete experience is proposed to be predominantly associated with emotional adaptability, reflective observation with cognitive adaptability, abstract conceptualization with strategic adaptability, and active experimentation with behavioral adaptability. These are dominant developmental associations rather than exclusive causal pathways.

The contribution of the paper is threefold. First, it contributes to experiential-learning perspectives in entrepreneurship education by introducing adaptability as a mechanism through which entrepreneurial experiences may contribute to the development of an entrepreneurial mindset. Second, it identifies four types of adaptation and describes their prevailing relationships with stages of experiential learning, while allowing for interaction among them. Third, it offers a conceptual foundation for educators to design experiential activities that allow learners to experience entrepreneurial uncertainty but also to regulate emotional responses, reconsider assumptions, reformulate possible strategies and change subsequent behavior.

## 2. Literature Review

### Entrepreneurial Mindset in Higher Education

Entrepreneurship education has moved from teaching knowledge of venture creation to creating people who can think and act entrepreneurially in uncertain environments. This shift has led to a greater emphasis on entrepreneurial mindset as an educational objective. The entrepreneurial mindset is a multidimensional concept that encompasses the way people think, behave and emotionally react to business circumstances (Kuratko et al., 2021).

The cognitive dimension is particularly important, as entrepreneurship involves decision-making under incomplete knowledge and uncertain outcomes. Therefore, entrepreneurial cognition is not only knowledge that is relevant, but also the ability to adapt that knowledge to changing circumstances. Cognitive adaptability is the ability to be dynamic, fluid, and self-regulating in cognition in uncertain and changing task settings (Haynie and Shepherd, 2009). Later research has shown that metacognitive abilities and feedback affect the adoption of entrepreneurial decision policies (Haynie et al., 2012).

Entrepreneurial mindset also has a behavioral dimension because entrepreneurial cognition ultimately requires translation into action. Within higher education, entrepreneurship education can encourage initiative, experimentation, and action in response to opportunities. Evidence among university students indicates positive relationships between entrepreneurship education activity, behavioral entrepreneurial mindset, and subsequent entrepreneurial intentions and behavior (Cui & Bell, 2022).

Emotional dimensions are equally important because entrepreneurial activity exposes individuals to uncertainty, rejection, setbacks, and discrepancies between expected and actual outcomes. Entrepreneurship education therefore creates opportunities not only for cognitive and behavioral learning but also for developing learners' capacity to respond constructively to adversity. Research on resilience and emotional resilience in entrepreneurial education emphasizes the relevance of affective regulation when learners are faced with uncertainty and challenge (González-López et al., 2019; Ávila & Davel, 2024).

Together, these perspectives suggest that the development of an entrepreneurial mindset involves interrelated changes in thinking, emotion, and action. Contemporary research into experiential entrepreneurship further indicates that metacognition, emotional sensemaking and behavioral adjustment are not stand-alone educational outcomes but may develop interactively during entrepreneurial activities (Crosina et al. 2024; Nzembyaie et al. 2026).

This multidimensional understanding is an important tie-in to adaptability. If entrepreneurial mindset is about how people think, feel, and act in uncertain entrepreneurial environments, then the ability to change these responses when circumstances change becomes central in explaining how entrepreneurial mindset develops.

**Experiential Learning in Entrepreneurship Education**

Experiential learning provides an appropriate pedagogical foundation for entrepreneurial mindset development because entrepreneurship itself involves action, uncertainty, feedback, and iterative adjustment. Rather than positioning students as passive recipients of entrepreneurial knowledge, experiential entrepreneurship education engages learners directly with entrepreneurial problems and decisions. Activities such as venture creation, customer interaction, simulations, prototyping, and pitching can provide opportunities for students to experience consequences arising from their decisions and subsequently learn from those consequences (Bell & Bell, 2020).

Kolb's experiential-learning theory conceptualizes learning as a recurring cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Learners encounter an experience, reflect upon its consequences, formulate or revise concepts based on that reflection, and subsequently test those concepts through further action. The resulting action generates new experience and continues the learning cycle (Kolb, 1984).

Experience alone, however, does not guarantee learning. Entrepreneurial experiences can reinforce existing assumptions just as easily as they can challenge them if learners do not critically interpret what has occurred. Reflection therefore plays an important role in transforming experience into learning. Bell and Bell (2020) show how reflection-in-action and related educational perspectives can enrich entrepreneurship education by enabling learners to question reasoning and adjust while activity is still unfolding.

Contemporary experiential entrepreneurship education extends this perspective by placing greater emphasis on interaction among action, reflection, social learning, and entrepreneurial artefacts. Action Design Learning, for example, integrates action learning and design learning into an entrepreneurship-specific pedagogy in which emergent entrepreneurial artefacts focus learning and reflection. Its application across university settings highlights metacognitive development as a central entrepreneurial-mindset outcome (Nzembayie et al., 2026).

The significance of experiential learning for the present study therefore lies not simply in exposing students to entrepreneurship. Its greater value lies in creating feedback loops in which learners encounter consequences, reconsider assumptions, and test revised responses. These feedback loops provide conditions within which adaptability can develop.

**Adaptability as a Mechanism of Entrepreneurial Learning**

Adaptability offers a more extensive psychological basis for comprehending reactions to entrepreneurial unpredictability. Martin et al. (2012) define adaptability as the ability of individuals to effectively manage their psychological and behavioral responses in the face of new experiences, alterations, and unpredictability. Their empirical framework differentiates between cognitive-behavioral and emotional elements within a superior adaptability construct. Despite being formulated outside the realm of entrepreneurship education, this differentiation offers a recognized foundation for perceiving adaptability as a multifaceted construct rather than a singular, uniform reaction to change (Martin et al., 2012).

When experiences create gaps between expectations and the emerging reality, the importance of adaptability in entrepreneurial learning is increased. Learners may find that customers do not value a proposed product, that an intended strategy cannot be implemented, or that assumptions underpinning a business idea are wrong. In such cases, effective learning requires more than gaining new information; the learner must be able to change emotional, cognitive, strategic and behavioral responses. Under such circumstances, effective learning requires more than acquiring additional information; learners must be capable of modifying emotional, cognitive, strategic, and behavioral responses.

*Emotional Adaptability*

Entrepreneurial learning can generate significant emotional demands because setbacks and uncertainty may produce disappointment, frustration, anxiety, or stress. Earlier entrepreneurship-education research emphasized the importance of helping learners manage emotions associated with entrepreneurial failure, while later research indicates that entrepreneurship education can foster resilience in responding to adversity

and uncertainty (Shepherd, 2004; González-López et al., 2019).

More recent research brings this issue directly into entrepreneurial education. Emotional resilience can be developed through educational practices that help learners engage with emotionally challenging situations, while longitudinal research on experiential entrepreneurship education shows that negative experiences and emotions can become inputs to sensemaking, cognitive reframing, entrepreneurial mindset development, and resilient behavior when supported by pedagogical scaffolds (Ávila & Davel, 2024; Crosina et al., 2024). In the present framework, emotional adaptability therefore refers to the learner's capacity to regulate and adjust affective responses so that uncertainty and setbacks remain available as material for learning rather than becoming barriers to continued engagement.

*Cognitive Adaptability*

Cognitive adaptability has a more established theoretical foundation within entrepreneurship research. Haynie and Shepherd (2009) position cognitive adaptability within entrepreneurial metacognition and emphasize an individual's ability to remain dynamic, flexible, and self-regulating when confronting uncertain tasks. Haynie et al. (2012) subsequently demonstrate that metacognitive ability and feedback influence individuals' capacity to adapt decision policies during entrepreneurial tasks (Haynie & Shepherd, 2009; Haynie et al., 2012). This process is highly compatible with experiential learning because experience generates feedback against which assumptions can be evaluated. Reflection enables learners to compare expectations with outcomes, identify discrepancies, and reconsider how they interpret entrepreneurial situations. Cognitive adaptability therefore provides a mechanism through which reflection becomes revised understanding rather than merely retrospective description.

*Strategic Adaptability*

Cognitive reconsideration does not necessarily determine what an individual should subsequently do. A learner may recognize that an existing interpretation is inaccurate but still needs to formulate an alternative course of action. This provides the basis for distinguishing strategic adaptability from cognitive adaptability.

Strategic adaptability concerns the capacity to reconsider and switch strategies when circumstances indicate that an existing approach is no longer appropriate. Research on strategic adaptability provides evidence that the capability can be developed through training, supporting its treatment as a potentially learnable capability rather than merely an organizational response to environmental change. Entrepreneurial adaptation research likewise conceptualizes adaptation as involving cognitively derived, action-oriented strategic choices that contribute to adaptive capabilities (Basu et al., 2022; Heunis et al., 2025).

Within entrepreneurial learning, strategic adaptability therefore concerns translating revised interpretation into alternative possibilities. The distinction is analytically useful: cognitive adaptability concerns revising how a situation is understood, whereas strategic adaptability concerns revising the course of action formulated in response to that understanding.

*Behavioral Adaptability*

Adaptation ultimately requires changes in action. For the present framework, behavioral adaptability refers to the learner's capacity to translate revised understanding and strategic alternatives into modified behavior. The term is used here as a conceptual label rather than implying that behavioral adaptability already constitutes a universally established construct within entrepreneurship-education literature.

Existing research nevertheless supports a behavioral component of entrepreneurial mindset. Entrepreneurship education activity has been associated with behavioral entrepreneurial mindset, entrepreneurial intentions, and behavior, while experiential pedagogies provide opportunities for learners to modify artefacts, decisions, and actions as evidence accumulates (Cui & Bell, 2022; Nzembayie et al., 2026). Behavioral adaptability therefore represents the point at which adaptive learning becomes observable through changed action. A learner may recognize that an assumption is incorrect and identify an alternative strategy, but adaptation remains incomplete until the revised response is enacted and exposed to further feedback.

**Integrating Experiential Learning, Adaptability and Entrepreneurial Mindset**

The preceding literature indicates considerable conceptual compatibility among experiential learning, adaptability, and entrepreneurial mindset. Experiential learning explains how learners engage with experience through reflection, conceptualization, and experimentation; adaptability explains how responses change when experience challenges existing assumptions; and entrepreneurial mindset describes cognitive, behavioral, and emotional orientations relevant to entrepreneurial action. Considered together, these perspectives suggest that adaptability may provide an explanatory mechanism connecting entrepreneurial experience with mindset development.

Existing experiential entrepreneurship frameworks nevertheless emphasize somewhat different aspects of this process. Bell and Bell (2020) integrate educational theories to explain the pedagogical foundations and facilitation of experiential entrepreneurship education, while Nzembayie et al. (2026) integrate action and design learning to provide an entrepreneurship-specific experiential pedagogy directed towards entrepreneurial mindset development. Both make important contributions, but neither is primarily organized around differentiating adaptive processes occurring within learners across stages of experiential learning.

The present study therefore occupies a complementary conceptual space. Rather than proposing that experiential learning automatically produces entrepreneurial mindset, it positions emotional, cognitive, strategic, and behavioral adaptability as interconnected developmental processes through which learners respond to entrepreneurial experience.

## 3. Conceptual Review Method

This study adopts an integrative conceptual review approach to develop a theoretical framework linking experiential learning, adaptability, and entrepreneurial mindset development within higher education. Integrative literature reviews are particularly appropriate when the objective is to synthesize established and emerging bodies of knowledge to generate new theoretical perspectives or conceptual frameworks rather than to estimate cumulative effects or exhaustively catalogue all published studies (Torraco, 2005, 2016; Snyder, 2019).

The review was organized around three principal bodies of literature: entrepreneurial mindset, experiential learning in entrepreneurship education, and adaptability. Kolb's experiential-learning theory provided the initial organizing structure because of its established four-stage learning cycle. Complementary perspectives concerning reflection, metacognition, resilience, strategic adaptation, behavioral entrepreneurial mindset, and contemporary experiential entrepreneurship pedagogy were incorporated where they contributed directly to explaining how learners respond to entrepreneurial uncertainty.

Literature identification was purposeful and iterative rather than exhaustive. Relevant literature was identified through academic search engines, publisher platforms, institutional repositories, and the reference lists of highly relevant studies. Searches were guided by combinations of terms relating to entrepreneurial mindset, entrepreneurship education, experiential learning, adaptability, cognitive adaptability, emotional adaptability, strategic adaptability, behavioral adaptability, resilience, metacognition, reflection, and entrepreneurial learning. Priority was given to peer-reviewed studies that contributed directly to conceptualizing the constructs or relationships under examination, while seminal theoretical works were retained where necessary to establish intellectual foundations. Consistent with an integrative-review approach, literature selection was driven by theoretical contribution to the synthesis rather than by an assumption of exhaustive coverage (Torraco, 2005; Snyder, 2019).

The synthesis proceeded by comparing the functional role of each experiential-learning stage with forms of adaptation identified in the literature. Relationships were retained where plausible theoretical correspondence could be established without claiming that prior studies had directly tested the proposed stage-to-adaptability association. This distinction is important because the framework is conceptual: existing studies establish the component constructs and adjacent relationships, whereas the specific mapping developed here represents the paper's theoretical synthesis.

## 4. Proposed Adaptive Experiential Learning Framework

The proposed Adaptive Experiential Learning Framework integrates Kolb's experiential-learning cycle with four adaptive processes: emotional, cognitive, strategic, and behavioral adaptability. It does not assume that each experiential-learning stage exclusively develops one form of adaptability. Instead, the proposed relationships are dominant developmental associations: each stage is linked to the adaptive process theoretically most salient at that point while allowing recursive interaction with the other processes.

### Concrete Experience and Emotional Adaptability

Concrete experience exposes learners directly to entrepreneurial situations in which outcomes are not necessarily predetermined. Activities involving customers, venture projects, simulations, pitching, or collaborative problem solving may confront students with rejection, uncertainty, disagreement, or evidence contradicting expectations. Such encounters are not emotionally neutral and may generate disappointment, anxiety, frustration, or stress.

Entrepreneurship-education research provides support for treating emotional adaptation as an important developmental process. Work on failure, resilience, and emotional resilience indicates that challenging experiences can become learning opportunities when learners are able to process and regulate affective responses. Longitudinal evidence from experiential entrepreneurship education further shows that negative emotions can lead either to retreat or to higher-order learning depending on sensemaking and pedagogical support (Shepherd, 2004; González-López et al., 2019; Ávila & Davel, 2024; Crosina et al., 2024).

The proposed relationship does not imply that difficult entrepreneurial experiences automatically produce emotional adaptability. Exposure to setbacks could instead generate withdrawal or defensive persistence. The developmental opportunity arises when learners regulate their emotional response sufficiently to engage with feedback and continue the learning process.

**Proposition 1 (P1): Concrete experience in experiential entrepreneurship education is positively associated with the development of emotional adaptability, particularly when learners encounter uncertainty, setbacks, and disconfirming feedback.**

### Reflective Observation and Cognitive Adaptability

Reflective observation provides us with a chance to compare expectations with results, to identify inconsistencies and to question the assumptions that underline previous decisions. Reflection, therefore, shifts the learner from merely experiencing an outcome to interpreting what that outcome means. This process corresponds closely with cognitive adaptability. Entrepreneurial metacognition research emphasizes the need to be dynamic, flexible and self-regulated in the face of uncertain task conditions. Empirical evidence suggests that metacognitive ability and feedback affect entrepreneurial decision policy adaptation (Haynie & Shepherd, 2009; Haynie et al., 2012).

This cognitive reappraisal can be done via an educational mechanism called reflection. Learners can examine why an expected outcome did not materialize, determine whether their assumptions remain defensible, and consider alternative interpretations. Cognitive adaptability therefore links reflective observation to revised understanding.

**Proposition 2 (P2): Reflective observation in experiential entrepreneurship education is positively associated with the development of cognitive adaptability by encouraging learners to reassess assumptions, interpretations, and decision processes in response to experience and feedback.**

### Abstract Conceptualization and Strategic Adaptability

Recognizing that an existing interpretation is inadequate does not necessarily indicate what should be done instead. Abstract conceptualization enables learners to transform reflected experience into revised explanations, principles, and possible courses of action. In entrepreneurial learning, this stage creates an opportunity to move from recognizing a problem with an existing approach towards conceptualizing alternatives.

The present framework associates this process with strategic adaptability. Strategic adaptability concerns switching or reformulating strategies when circumstances require it, and research provides evidence that such adaptability can be developed through training. Entrepreneurial adaptation research also emphasizes cognitively derived, action-oriented strategic choices, providing a basis for distinguishing revised interpretation from revised strategic response (Basu et al., 2022; Heunis et al., 2025). Abstract conceptualization is therefore proposed as the stage at which strategic reformulation becomes especially salient. This does not imply that prior studies have directly tested an Abstract Conceptualization-to-Strategic Adaptability relationship. Rather, the mapping is the present paper's theoretical synthesis based on the established functions of the two constructs.

**Proposition 3 (P3): Abstract conceptualization in experiential entrepreneurship education is positively associated with the development of strategic adaptability by enabling learners to translate reflected experience into revised strategic interpretations and alternative courses of action.**

**Active Experimentation and Behavioral Adaptability**

The experiential-learning cycle ultimately returns revised understanding to action. Active experimentation enables learners to test concepts, strategies, and assumptions generated through previous experience, reflection, and conceptualization. Within entrepreneurship education, this may involve modifying a prototype, changing a customer segment, revising a value proposition, testing a different sales approach, or pivoting from an earlier idea.

For the present framework, behavioral adaptability refers to the learner's capacity to translate revised understanding into modified action. Existing research identifies a behavioral dimension of entrepreneurial mindset and reports positive relationships between entrepreneurship education activity, behavioral entrepreneurial mindset, and subsequent entrepreneurial intentions and behavior (Cui & Bell, 2022). Active experimentation provides the setting in which behavioral adaptation becomes observable. Experiential entrepreneurship research describes iterative modification of entrepreneurial artefacts and decisions as learners engage with feedback. Behavioral adaptability is therefore not an endpoint: changed action generates new concrete experience and feeds the next experiential cycle (Nzembayie et al., 2026).

**Proposition 4 (P4): Active experimentation in experiential entrepreneurship education is positively associated with the development of behavioral adaptability by requiring learners to enact and test revised responses under changing entrepreneurial circumstances.**

**Adaptability as an Interconnected Developmental Process**

The four propositions should not be interpreted as four independent linear relationships. Entrepreneurial learning rarely proceeds through psychologically isolated stages. A single episode of customer rejection, for example, may simultaneously generate disappointment, prompt reconsideration of assumptions, encourage development of another strategy, and produce an immediate behavioral response.

This recursive interpretation is compatible with contemporary experiential entrepreneurship research showing that metacognitive, emotional, and behavioral processes interact during entrepreneurial learning. It is also consistent with evidence that negative emotions can trigger sensemaking and cognitive reframing that subsequently influence resilient behavior. Adaptability should consequently be understood as a system of mutually influencing processes operating throughout repeated experiential-learning cycles (Crosina et al., 2024; Nzembayie et al., 2026).

Over repeated cycles, learners may progressively become better able to regulate emotional responses, reconsider interpretations, reformulate strategies, and alter behavior when circumstances change. The proposed contribution is therefore not simply the addition of four labels to Kolb's cycle, but the positioning of adaptive processes as mechanisms through which entrepreneurial experience may contribute to entrepreneurial mindset development.

**Proposition 5 (P5): Emotional, cognitive, strategic, and behavioral adaptability operate as interconnected developmental processes through which repeated experiential learning contributes to entrepreneurial mindset development.**

**Positioning the Proposed Framework**

The proposed framework is intended to complement rather than replace existing experiential entrepreneurship education frameworks. Bell and Bell (2020) integrate educational theories to explain how experiential entrepreneurship education can be theoretically structured and facilitated. Their primary contribution concerns pedagogical and learning architecture. Action Design Learning addresses a related but different problem by integrating action learning and design learning into an entrepreneurship-specific experiential pedagogy. It emphasizes first- and second-person learning, entrepreneurial artefacts, critical reflection, and metacognitive development. Its primary focus is how entrepreneurial experiential pedagogy can be designed to cultivate an entrepreneurial mindset (Nzembayie et al., 2026).

The Adaptive Experiential Learning Framework addresses a narrower developmental question: what adaptive processes may occur within learners as entrepreneurial experience is transformed into entrepreneurial mindset development? Its contribution therefore lies at the mechanism level rather than in proposing an alternative pedagogical system.

**Table 1: Comparison of Experiential Entrepreneurship Education Frameworks**

| Framework | Primary focus | Principal question |
|---|---|---|
| Bell & Bell (2020) | Educational theory and experiential pedagogy | How can experiential entrepreneurship education be theoretically structured and facilitated? |
| Action Design Learning | Entrepreneurship-specific experiential pedagogy | How can action and design learning cultivate entrepreneurial mindset? |
| Adaptive Experiential Learning Framework | Adaptive developmental mechanisms | How can experience develop entrepreneurial mindset through emotional, cognitive, strategic, and behavioral adaptation? |

**Discussion**

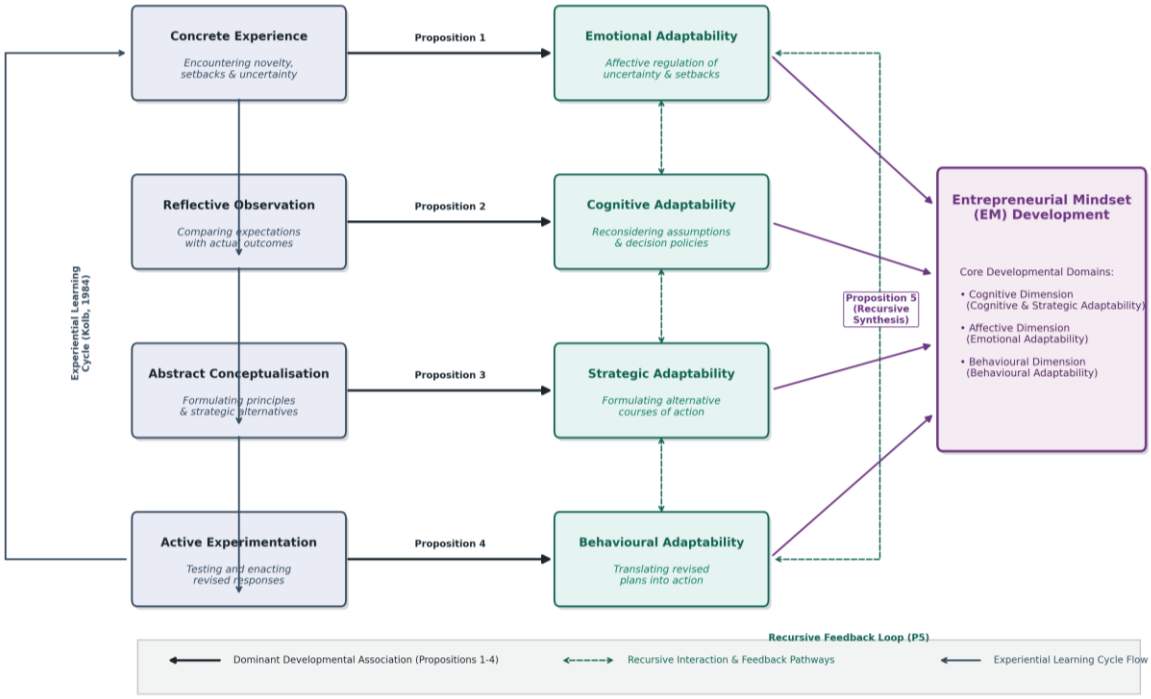
**From Entrepreneurial Experience to Adaptive Learning**

The framework changes the analytical focus of experiential entrepreneurship education from participation to response. The educational significance of an entrepreneurial activity lies not only in how authentic or action-oriented it is, but also in what learners do when experience challenges their expectations. This directs attention to the quality of their response to feedback, uncertainty, and discrepancy.

Two learners can therefore pass through much the same entrepreneurial experience and come away with different developmental outcomes. Customer rejection might lead one to defend the original assumption and another to question it, formulate an alternative, and try something different. From this perspective, variation in adaptive response is not noise around the learning process; it is part of what needs to be explained.

This interpretation is consistent with experiential-learning perspectives that emphasize transformation rather than experience alone and with entrepreneurship research showing that difficult experiences may be followed by either retreat or higher-order learning. The framework extends this reasoning by specifying adaptability as a developmental mechanism through which such divergent responses can be examined (Bell & Bell, 2020; Crosina et al., 2024).

**Figure 1: The Adaptive Experiential Learning Framework for Entrepreneurial Mindset Development**




*Note: Solid arrows represent proposed dominant developmental associations (P1-P4). Dashed arrows represent mutual interaction among adaptive processes. The system of adaptive processes recursively contributes to final Mindset development (P5).*

**Extending Experiential-Learning Theory**

Kolb's experiential-learning cycle provides a useful explanation of how experience can move through reflection, conceptualization, and experimentation. However, the four stages primarily describe a learning process and provide less differentiation concerning the types of adaptive change that may occur within learners as the process unfolds.

The proposed framework extends the cycle by associating its stages with dominant adaptive processes. Concrete experience is particularly salient for emotional adaptability; reflective observation provides a focal point for cognitive adaptability; abstract conceptualization creates opportunities for strategic adaptability; and active experimentation provides opportunities for behavioral adaptability. The principle of dominant association is important because the framework does not suggest four psychologically isolated processes. Reflection may regulate emotion as well as cognition; experimentation may prompt immediate strategic reconsideration; and behavioral change may generate new cognitive and emotional responses. The theoretical extension therefore lies not in modifying Kolb's stages themselves, but in specifying what forms of adaptive development may become particularly salient as learners move through and between those stages.

**Theoretical Contributions**

The first theoretical contribution is positioning adaptability as a developmental mechanism linking experiential learning and entrepreneurial mindset. Instead of a general Experiential Learning-to-Entrepreneurial Mindset relationship, the framework provides a more complex explanation: Experiential Learning-to-Adaptive Processes-to-Entrepreneurial Mindset Development. It is a conceptual mechanism, not an empirically based mediation model.

The second contribution is to distinguish adaptability into emotional, cognitive, strategic and behavioral processes. This distinction enables the framework to separate changes that would otherwise be considered jointly as learning from experience. Emotional adaptability refers to the regulation of response to uncertainty and setbacks; cognitive adaptability refers to the reconsideration of interpretations and assumptions; strategic

adaptability refers to the formulation of alternative courses of action; and behavioral adaptability refers to the enactment of revised responses.

This distinction between cognitive and strategic adaptability is especially relevant. Research on entrepreneurial cognition points to cognitive flexibility and metacognitive adaptation, while research on strategic adaptability emphasizes the ability to switch strategies when current strategies are no longer fitting. The proposed framework integrates these literatures by distinguishing between changing how a situation is understood and changing the strategy formulated in response to that understanding (Haynie & Shepherd, 2009; Haynie et al., 2012; Heunis et al., 2025).

The third contribution is the principle of dominant association of development. This allows for theoretically meaningful relations between experiential-learning stages and adaptability dimensions without assuming exclusive one-to-one correspondence. The framework is thus situated between the extremes of rigid stage-outcome mapping and the undifferentiated claim that all forms of adaptation are equally distributed across experiential learning.

**Implications for Entrepreneurship Education**

The framework suggests that entrepreneurship educators should evaluate experiential activities not merely according to whether students are doing something entrepreneurial, but according to whether those activities create opportunities for meaningful adaptation. A simulation or venture project may qualify as experiential pedagogy while producing relatively little adaptive learning if outcomes are predetermined, feedback is superficial, or students have no opportunity to reconsider and revise their responses.

Activities capable of supporting adaptive development should contain opportunities for learners to encounter manageable uncertainty, receive meaningful feedback, critically reconsider assumptions, formulate alternative responses, and subsequently test those alternatives. Failure and unexpected outcomes may possess educational value when they create discrepancies between expectation and reality that learners can productively examine (Shepherd, 2004; González-López et al., 2019; Crosina et al., 2024).

This does not imply that educators should manufacture unnecessary failure or deliberately expose learners to excessive emotional stress. The pedagogical objective is supported adaptation rather than adversity itself. Educators can facilitate this process through structured reflection, constructive feedback, opportunities for revision, and learning environments in which unsuccessful attempts can be examined without automatically being treated as educational failure.

**Implications for Assessment**

The framework also challenges entrepreneurship education assessment that focuses predominantly on final outputs such as business plans, prototypes, pitches, or venture performance. Such outcomes provide useful evidence of achievement but may not reveal how much entrepreneurial learning occurred during the process. From an adaptive-learning perspective, a learner who substantially revises an initially unsuccessful approach after engaging with credible evidence may demonstrate meaningful entrepreneurial development. Conversely, a successful outcome does not necessarily demonstrate adaptability if the learner encountered little uncertainty or had no reason to reconsider an initial approach.

Reflective journals, decision logs, iterative prototypes, records of stakeholder feedback, and documented justifications for pivots or strategic changes could provide evidence of learning trajectories. Assessment can therefore shift part of the question from whether the entrepreneurial idea succeeded towards how effectively the learner interpreted and adapted to evidence concerning the idea.

## 5. Limitations and Future Research

The suggested framework has several drawbacks. Of greatest importance is the conceptual rather than empirically established derivation of the relationships denoted by P1-P5. Previous research has shown the importance of emotional regulation, cognitive adaptability, strategic adjustment and behavior change for entrepreneurial learning but does not provide the proposed stage-to-adaptability relationships or their causal

direction.
A second limitation is the reliance on Kolb's experiential-learning cycle as the dominant organizing framework. Kolb provides a widely recognized basis for experiential education, but entrepreneurial learning can also be explained by reflection-in-action, transformative learning, action learning and design learning. Future research should examine the continued utility of the four adaptive processes when experiential entrepreneurship education is conceptualized through alternative learning frameworks (Bell & Bell, 2020; Nzembyaie et al., 2026).

Third, the conceptual difference between the four dimensions of adaptability needs empirical scrutiny. Cognitive and strategic flexibility may be particularly hard to distinguish, because strategic reformulation necessarily involves cognition. The willingness to change behavior may be affected by emotional regulation, and behavioral experimentation generates further cognitive and emotional responses. Fourth, the authenticity, uncertainty, emotional intensity, stakeholder interaction, and consequences of entrepreneurial experiences vary. The adaptive demands of a structured classroom simulation may differ from those of a live venture with real customers. As such, the framework does not assume that all experiential entrepreneurship activities lead to the same developmental effects.

Fifth, adaptive development can be significantly conditioned by educational facilitation. Not all difficult experiences result in constructive learning; learners may push back against feedback, rationalize failure or disengage. Structured reflection, psychological safety, and feedback and opportunities for revision from educators may therefore be important boundary conditions (Ávila & Davel, 2024; Crosina et al., 2024). Sixth, learners' individual characteristics may affect the perception of the same entrepreneurial experiences. Depending on an individual's prior entrepreneurial experience, self-efficacy, tolerance for ambiguity, and other individual differences, uncertainty can be perceived as a threat or an opportunity to learn. These antecedent conditions are beyond the scope of the present framework but may be important moderators.

Seventh, the framework has been mainly developed for entrepreneurship education in higher education. Its applicability to practicing entrepreneurs, vocational education, corporate entrepreneurship programs or community-based entrepreneurship training cannot be assumed. Finally, the literature to support the framework was found using a purposeful integrative conceptual review, not an exhaustive systematic review. There may be, therefore, relevant theoretical perspectives or empirical evidence outside the literature included in this paper. Future systematic reviews may provide an even more extensive coverage of adaptability in entrepreneurship education.

**Future Empirical Examination**
Due to the developmental nature of adaptability, longitudinal studies would be the most suitable. Researchers might observe students in an experiential entrepreneurship program and study reactions to critical incidents such as customer rejection, failed prototypes, team conflict, or unexpected market feedback. Mixed-method designs may be particularly helpful. Changes in adaptability and entrepreneurial mindset could be measured quantitatively, while adaptive processes could be understood through interviews, observations, reflective journals, and decision logs. Such designs would also provide evidence of whether learners meaningfully differentiate between cognitive reconsideration and strategic reformulation.

Experimental or quasi-experimental studies could compare experiential activities with structured reflection, feedback, and opportunities for revision to activities that do not include these mechanisms. This would give a better test of the main idea of the paper, which is that experience alone is not enough and that adaptive processing helps turn experience into entrepreneurial growth. Future studies could also examine whether adaptability serves as a mechanism mediating between experiential entrepreneurship education and entrepreneurial mindset. This test could either model the four dimensions of adaptability separately or test whether they were part of a broader multidimensional adaptive capability. The five propositions developed here constitute an initial grounding for this empirical program.

**Conclusion**
This paper develops an Adaptive Experiential Learning Framework to explain how entrepreneurial experience may contribute to entrepreneurial mindset development in higher education. The framework responds to a

conceptual gap between experiential-learning theory, entrepreneurial-mindset scholarship, and adaptability research by positioning adaptability as a developmental mechanism connecting experience with changes in how learners feel, interpret, strategize and act.

Building on Kolb's experiential-learning cycle, the framework proposes dominant associations between its four stages and emotional, cognitive, strategic, and behavioral adaptability. These associations are not treated as exclusive; the adaptive processes are conceptualized as interconnected and recursive across repeated experiential cycles. The framework therefore shifts attention from whether students merely participate in entrepreneurial activities towards whether those activities produce meaningful adaptive demands. For educators, this implies designing experiences that generate credible feedback, supporting learners as they process uncertainty, and assessing how learners revise assumptions, strategies, and actions. For researchers, the framework offers five propositions that can be examined through longitudinal, mixed-method, experimental, and cross-context research.

The framework remains conceptual and should not be interpreted as a validated causal model. Its value lies in providing a theoretically differentiated explanation of how experiential entrepreneurship education may contribute to entrepreneurial mindset development and in creating a basis for subsequent empirical refinement.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Examining the Impact of Compensation Benefits, Training & Development, Work Environment and Reward & Recognition on Employee Retention in the Medical Industry: A Conceptual Study

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**Abstract:** The challenge of retaining employees is an essential issue in the health care setting worldwide, where turnover directly affects the quality of patient care, organisational financial welfare, and institutional stability. In the context of the Malaysian healthcare industry, namely, in public and private hospitals in Klang Valley, Selangor, this master's thesis proposal will quantitatively study the effect of four human resource management practices, including Compensation and Benefits, Training and Development, Work Environment, and Reward and Recognition, on employee retention in the medical sector. The research is based on the Hierarchy of Needs developed by Maslow and the ERG Theory by Alderfer and includes the use of a cross-sectional survey design and a structured questionnaire based on validated instruments. SPSS version 30.0 will be used to perform the data analysis, where descriptive statistics, Pearson correlation and multiple linear regression will be used to find out the predictive power of each independent variable on employee retention. The proposed study will result in an evidence-based and hierarchical retention driver model, which will enable healthcare administrators and policymakers to implement a strategic model to efficiently allocate resources to minimize turnover and increase the sustainability of the employee workforce in Malaysia.

**Keywords:** *Training and development, compensation, work environment, reward and recognition, employee retention, medical industry*

## 1. Introduction and Background

The long-term success and efficacy of any healthcare system depend on the stability and competency of the employee staff. Employees are the most crucial professionals in charge of taking care of patients and making sure they get the treatment they need. They are also the most significant people for the reputation of the institution, patient satisfaction, and clinical outcomes. Because of this, the most essential strategic goal for healthcare companies all over the world is to keep employees who are skilled and professionally engaged. Keeping employees is more than simply a number on a human resources report; it is a complicated organizational issue that affects the quality of treatment, the ability to keep operations running, and the organization's finances.

The healthcare business all over the world has a hard time keeping enough employees on staff. This is made worse by an older workforce, companies fighting for trained personnel, and the high levels of stress that come with working in healthcare environments. Retention is an organization's strategic capacity to keep its people for a long period by using policies that foster commitment and lower the likelihood that they will leave (Anilkumar & Pravitha, 2024). Many things can change it. Researchers believe that these elements come from many different domains, such as economics, psychology, and organizations. Some examples are fair pay, opportunity to advance in your career, a decent place to work, and meaningful acknowledgment (Vijayakumar, 2020). In high-pressure jobs like healthcare, where things like supervisor support, work-life balance, and job features are particularly crucial to an employee's decision to stay or leave (Nadeem & Malik, 2021), these elements all work together very strongly.

In Malaysia, research on employee retention has proliferated across diverse sectors, encompassing manufacturing, services, and finance. Nonetheless, focused academic research on the issues affecting employee retention in the domestic healthcare industry remains in its nascent phase. The healthcare system in the area is different from others since it has both public and private services, people from different cultures, and

national health policies that change. These things could influence how universal retention factors work. Research has addressed general retention issues (Zainal et al., 2022), yet a significant deficiency exists in identifying and prioritizing the most critical strategic human resource management (HRM) levers, namely Training and Development, Compensation and Benefits, Work Environment, and Reward and Recognition, that most significantly influence Malaysian employees' intentions to remain in their positions.

The effective healthcare system is built on a solid and efficient workforce. But the medical sector is facing an epidemic of high turnover rates among employees, and it is a costly problem worldwide. This effect leads to a vicious circle of higher operating costs related to frequent recruitment and training, loss of organizational knowledge, low employee morale, and, most importantly, worsened patient safety and care quality (Al-Suraihi et al., 2021; Anilkumar & Pravitha, 2024).

This crisis is not spared in the Malaysian healthcare system. In spite of the vital contribution of employees in the delivery of services, the healthcare institutions in Malaysia still struggle with high levels of employee shortages and retention. Other antecedents of turnover that have been found in previous research are unfavourable working conditions, the perceived lack of fair compensation, poor career advancement opportunities, and insufficient organisational support (Kudtho et al., 2022; Zainal et al., 2022). However, these results are still in pieces and mostly descriptive, which provides minimal guidance on practical intervention in the strategy.

Particularly, there is a critical research gap: to date, no empirical research has ever been carried out to quantitatively assess and compare the concomitant predictive effect of four strategic HRM levers upon employee retention in the Malaysian healthcare setting, namely Compensation and Benefits, Training and Development, Work Environment, and Reward and Recognition. Although the importance of these factors at the individual level has already been determined in international studies (Alshamrani et al., 2023; Kumari, 2022; Geetha and Muthukumar, 2022), their interdependence and the rank of their effectiveness in one integrated model have not been studied in Malaysia. As a result, healthcare administrators and policymakers do not have an evidence-based framework to use in the allocation of resources. In the absence of this knowledge, interventions will be generic, misplaced, and eventually ineffective in dealing with the unique system and cultural processes of the Malaysian employee workforce.

## 2. Literature Review

The literature review is structured and analytical, and covers in detail the academic literature on the topic of employee retention, considering specifically the four independent variables of this study: compensation and benefits, training and development, work environment, and reward and recognition. The main objective is threefold: firstly, to contextualize these constructs theoretically within known models of organizational behaviour and human resource management; secondly, to synthesize existing research findings on the effects of these constructs in global and regional studies; and finally, to determine the missing links in the literature, especially in the Malaysian context, thus proving the need and relevance of the study.

### Employee Retention

Employee retention refers to the capacity of a healthcare organization to retain its employees throughout the years. This very significant outcome could be influenced by many factors, such as job satisfaction, organizational loyalty, work-life balance, and the above-mentioned HR strategies (Biason, 2020). Retention of employees is related to improved patient outcomes, reduced costs, and sustained presence of organizational knowledge.

This study outlines employee retention as the effective organizational outcome of having a stable and competent employee workforce over a period of time. It is the most important dependent variable that indicates the level of success in the collaboration of management and human resources. Retention is not merely the absence of turnover, but rather an understanding that employees are willing to remain with the organization and that they are devoted to it (Holtom et al., 2008). It is a multi-dimensional construct, which is dependent on a complex interaction of the independent factors already discussed.

According to Bashir et al. (2023), the negative effect of workplace violence on the sustainable performance of employees is directly identified as impaired social well-being. This is aggravated by unhealthy workplaces, with Wu et al. (2020) identifying a critical role of the work environment in workplace violence, burnout and work attitudes among hospital employees. Moreover, Rony et al. (2023) relate work-life imbalance to unhappiness and family spillovers, and Oliveira et al. (2021) investigate the effect of the primary health care setting on employee motivation and stress.

Theoretically, these reasons have a potent disruptive effect on the foundational levels of Maslow's hierarchy and the ERG theory by Alderfer, resulting in an effective trigger of turnover. The safety issues and workplace violence directly assault the basic safety and security needs of Maslow's model, which creates a climate of both psychological and physical danger that must be solved first; then higher needs can be met.

At the same time, unfavourable working conditions, high workload, and work-life balance significantly undermine the relatedness needs of Alderfer not only by destroying the team relationships and support networks but also by frustrating the needs of growth because the conditions of burnout and stagnation instead of professional advancement are created. This loss of relatedness and development is a simultaneous hindrance to the realization of Maslow's esteem needs (the absence of respect and recognition) and self-actualization (the impossibility of finding significant professional satisfaction).

The mechanism of retention of the employees therefore occurs through a vital process: the lack of safety and relatedness results in burnout and affects well-being and motivation, which eventually dominate the rest of the retention processes and ignite exit intentions. Thus, the top-level threats to safety and belonging should be the main priority and urgent in the context of employee retention strategies aimed at a stable base on which high-order retention drivers such as recognition or development are to be implemented.

**Compensation and Benefits**

Competitive pay is a noteworthy problem that influences job satisfaction and the ability to retain employees. A proper level of financial compensation can ensure economic stability and organizational credit for their hard work (Suryadi et al., 2022). Compensation and perks satisfaction is usually a crucial yet unnoticed feature in an employee's decision to remain with a company (Fitri, 2024). Healthcare-related organizations interested in retaining qualified employees in their staff must understand the impact of compensation on them (Samosir et al., 2021).

Employees can get paid in various forms, including a basic salary, shift bonuses, overtime, bonuses, and complete benefits in the form of health, pension, and paid leave (Prakash and Philimis, 2022). A fair and competitive pay system is closely related to how inclined employees are to justice, as well as how satisfied they are with their jobs in general (Nor et al., 2024). The more the magnitude of work performed by employees is compensated and rewarded, the better the quality of work they are capable of and the greater the stakes involved in employee as a profession, the more employees will feel valued and remain in the organization (Watkins and Fusch, 2022). Yet, health caregivers often leave their jobs since they are not satisfied with the salary (Macaraig et al., 2024).

Studies have continued to confirm that competitive pay is a key driver in employee retention. The research conducted in various countries indicates that employees who believe that their wages are reasonable in relation to their colleagues and the living standards have a higher chance of remaining in the job (Alshamrani et al., 2023). Strategic pay management is thus an important feature of an all-inclusive rewards system that is expected to make employees come, stay, and work hard.

Compensation and benefits are a very important aspect of the job market and are usually regarded as a significant element in maintaining and inspiring employees. Competitive compensation plays two roles in the employee field, which is highly stressful with great responsibility and a shift-based work setting; it not only ensures employees have a sense of financial stability but also acts as a signal that the organization values and appreciates the employee role (Suryadi et al., 2022).

Maslow's Hierarchy of Needs and Alderfer ERG theory are two constructive concepts that can be applied in explaining this variable. To Maslow, the basic physiological and safety requirements of an employee (e.g., a paycheck, job security) are to be fulfilled first, before the further needs of esteem and self-actualization can come into play and be motivating. The theory of ERG, which is a simplified and more adaptable version, assumes that the needs of Existence (material and physiological well-being), Relatedness (social and esteem needs through relationships), and Growth (personal development) may be fulfilled in parallel. In case of the frustration of higher-level needs, people can even revert to more intensive attention to the lower-level ones.

These theories put the key centrality of equity into perspective. Employees will never evaluate the reasonableness of their contributions (work, ability, education) against the results (pay, perks, recognition) of their colleagues, both in and out of their company. This analogy strikes the Relatedness and Esteem needs. The misperceptions of those who feel ill-treated make them frustrated in terms of their need to have their needs fairly met and to be treated with respect, which results in their dissatisfaction and wish to quit. Moreover, salary is regarded as a pillar hygiene factor or Existence need; the lack or supposed lack of it leads to significant dissatisfaction. Although proper remuneration does not ensure motivation, it is crucial to ensure that employees are not actively unhappy and that they stay in the organization because otherwise, they will have to jump back to satisfying only their existence needs, which will cut off the contact with the higher goals of a workplace (Fitri, 2024).

**Training and Development**

It is evident that retaining employees on staff and providing them with consistent training and career development are correlated. Such possibilities assist employees in performing their work better, learning to work with new technologies, and moving up the career ladder. This will leave them happier and more dedicated to their jobs (Kumari, 2022). In the medical field, where things evolve fast, continuous learning is not just convenient but also vital to maintain your skills and confidence levels (Fabian, 2024).

Healthcare training and development programs are well-organized means through which employees receive more knowledge, advance their skills, and perform excellently in their professions (Prakash and Philimis, 2022). Such efforts indicate that the company is concerned with the development of its staff, which makes them feel important and part of the team. Access to career ladders, specialized certifications, and leadership training is also an excellent way to retain ambitious employees (Nguyen and Duong, 2021).

A positive learning environment in which skill development is promoted must be established to retain employees. The reason is that it has a direct influence on their capability to deliver safe and effective care and seek professional fulfilment (Ojediran & Adebayo, 2022).

The Company is also making long-term investment in the growth of its employees in terms of Training and Development. This is not just another in-service training for employees. It implies that the clinical workers are fully committed to the lifelong learning process, professional development, and career advancement. This variable is founded on the assumption that the prospect of advancement is an effective non-financial inducement and an important approach to ensure that professionals do not become disengaged and leave their jobs.

Based on the theory of human motivation put forward by Maslow, according to which people are motivated by a hierarchy of needs, this technique contends that training and education in corporations go beyond merely upskilling the employees; they also satisfy even more basic psychological needs such as achievement, recognition, and growth (esteem and self-actualization). The eventual result of meeting these needs is a more productive, creative, as well as a more committed workforce.

It also agrees with Alderfer ERG Theory, which asserts that growth needs, or the need for personal growth, meaningful success, and increased skill, are especially important. Organizations meet these basic needs when they make people flourish.

It is a common observation that people tend to make remarks regarding the differences between training and other forms of learning. Training usually involves the conduct of short, structured seminars aimed at improving

short-term job performance and providing competence in some clinical skills, new technologies, or safety laws. All development is about improvement in a way that would benefit you in your work in the long term. It is a leader-level preparation of employees for future roles, sponsorship of advanced degrees (e.g., Master's or Doctorate in medical Practice), and definite clinical ladder programs that employ better skills and reward them (Prakash and Philimis, 2022).

**Working Environment**

Employees are motivated to remain in the job due to the work environment they have. It entails such elements as having enough workers, a culture of respect, teamwork, and physical safety. A healthy working environment can help employees become less burned out, happier with their professional activities, and have more intentions to remain (Alshamrani et al., 2023).

According to Xuecheng et al. (2022), for tasks to be bearable, the presence of the right equipment and materials, efficient communication, and positive relations with colleagues and superiors are important. One of the main factors that impact employee turnover is a toxic or non-supportive workplace environment with increased stress levels, conflict, and resource limitations (Prakash and Philimis, 2022). Healthcare institutions must therefore ensure that the workplaces of their employees are safe, clean, and conducive.

The most appropriate way to consider the working environment of employees is as a complex ecosystem comprising structural, relational, and cultural components that work together. It is probably the most complicated and powerful independent variable that affects retention, since it directly affects the daily experienced reality of the employee's practice. A good working environment is a valuable asset that contributes to less stress on the job, whereas a bad environment is a leading source of burnout and turnover (Alshamrani et al., 2023).

Such is the type of climate that cannot be seen, yet it is based on common principles. It has a culture of safety (with no fear of being punished because of a mistake), professional autonomy (with no interference with clinical judgment), organizational justice (equitable policies and decisions), and an overwhelming belief that the organization is indeed interested in the well-being of its employees (Xuecheng et al., 2022).

**Reward and Recognition**

Formal and informal recognition of employees in their work is among the most valuable things that can be done to ensure their engagement and retention in the job. The reward and recognition systems demonstrate the effort of employees and may increase their motivation and commitment to the organization (Prakash and Philimis, 2022).

Perks can be monetary (such as bonuses or promotions) or nonmonetary (such as prizes, recognition, and new vacancies). Proper recognition helps employees feel valued at work, particularly when things do not go well, and it motivates them to perform the right things (Noordin et al., 2021). It is not necessarily the biggest factor leading to people quitting, but employees might seek employment elsewhere in case they do not feel valued (Thompson and Muda, 2021).

Reward and Recognition is a process of a firm formally and informally demonstrating to employees that the firm appreciates and values their efforts, contributions, and their devotion. Such approaches are highly significant to employees, as at times their job can be emotionally draining, and it is difficult to observe the impact. They expressed gratitude to the organization by fulfilling essential emotional and social needs that are impossible to buy with money (Prakash and Philimis, 2022).

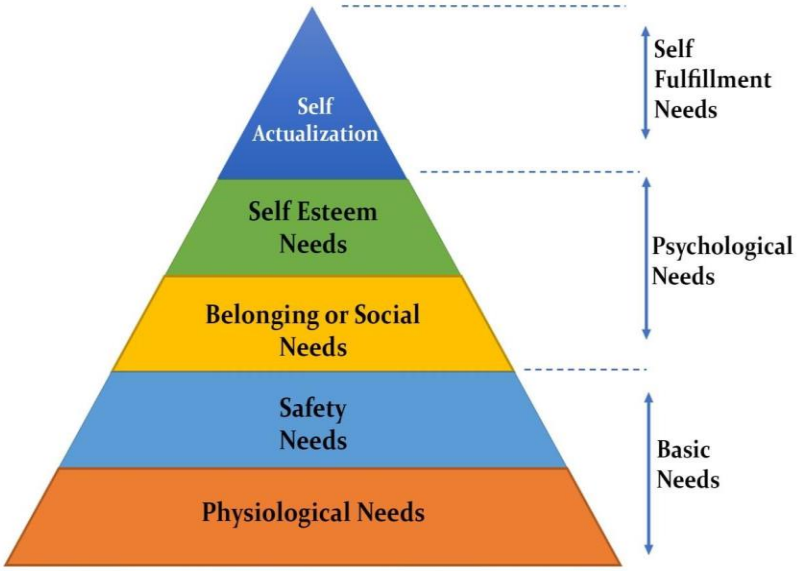
Reward and recognition have always been found to be major retention factors, as shown empirically. Their benefits include the article by Tirta and Enrika (2020), which examines the effect of "Reward and Recognition" on millennial retention with the help of job satisfaction. Moreover, Alsakarneh et al. (2023) associate talent management practices, which involve reward systems by default, with retention, and Sorn et al. (2023) consider the efficiency of compensation (as one of the most important types of rewards) in employee retention.

The conceptual insight here is the way in which these practices satisfy different yet complementary psychological needs. Money and payment are the main ways to satisfy the esteem needs of Maslow's hierarchy, namely, the lower part of this category that requires respect of others, status, and the real feeling of accomplishment with the use of fair and competitive financial recognition (Watkins and Fusch, 2022; Hansail and Pallangyo, 2020). At the same time, non-monetary appreciation and a supportive work environment directly address Alderfer's relatedness needs and Maslow's higher-level esteem needs. They meet the human need to belong and be appreciated and validated by supervisors and colleagues, creating a sense of belonging and status through respect (Naz et al., 2020; Andriani et al., 2022).

The convergence of these two-way streets, where external esteem and stability are ensured by financial rewards, and interpersonal relatedness and internal esteem are determined by social recognition, is usually combined into greater job satisfaction, which is a strong and well-established mediator of employee retention (Kiran et al., 2024; Tirta & Enrika, 2020).

**Underpinning Theories**

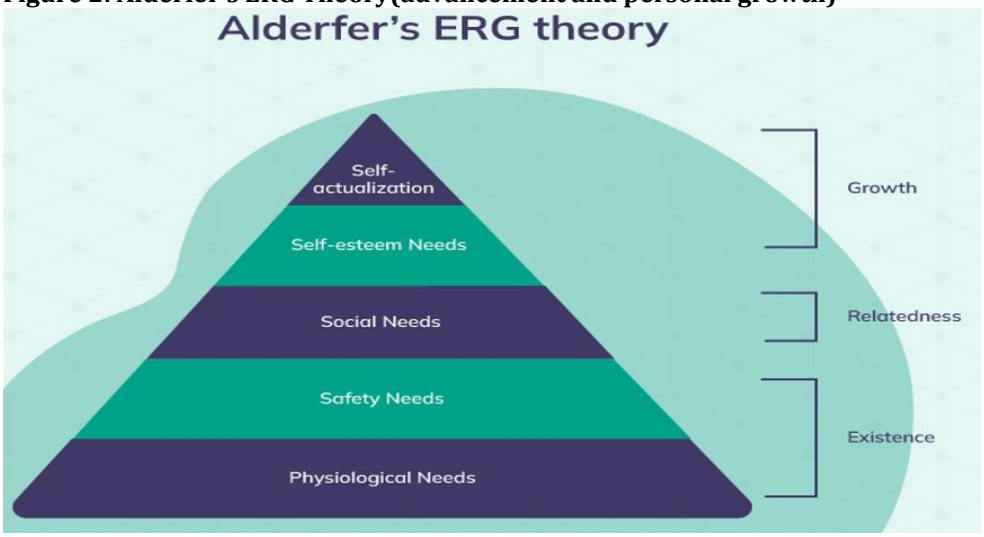
**Figure 1: Maslow's Hierarchy of Needs Theory**




The Hierarchy of Needs Theory (1943) of Abraham Maslow is a primitive psychological theory on the basis of what motivates people and how motivation influences their behaviour, including choices in areas of occupation such as retaining employees. Maslow argued that human needs are organized in a pyramid that comprises lower-level deficiency needs, which one must fulfil before they motivate one to fulfil higher-level growth needs (Maslow, 1943). This theory provides an organized framework for how various organizational practices address needs on some level and affect an employee's choice to continue working with a particular employer.

The concept is based on the idea that the maximum retention is the one that involves all the levels of the organization systematically. When a hospital pays effectively (physiological), is safe (safety), but lacks a supportive team (belonging) or the possibility to ascend (esteem/self-actualization), the employees will experience frustration-regression and go in search of jobs that will accommodate these higher-order desires. The hierarchy is suitable to the variables of the study: compensation is associated with lower-order needs of deficit, the Work Environment is related to needs of safety and belonging, Recognition is related to esteem needs, and Training and Development is connected to self-actualization and esteem needs. Although contemporary observations note the fact that the hierarchy is not universally rigid, its persuasive viability in correlating particular HR practices with the fundamental human motivations has been extremely important in formulating an integrated retention strategy.

**Figure 2: Alderfer's ERG Theory(advancement and personal growth)**




This theory explains how employees remain at the job: competitive pay and safe working conditions satisfy their wants for existence; good working relationships and the support provided by their boss satisfy their needs for relatedness; training and opportunities to advance in their careers satisfy their needs for growth. Whenever their higher-order needs are not provided, people are more likely to pay attention to their lower-order needs. That is why employees may go despite the good pay they get: they have no opportunity to develop.

The ERG Theory (1969) by Clayton Alderfer narrows down and restructures Maslow's hierarchy in a more adaptable and empirically based model of human motivation, which consists of three chief categories of needs: Existence (E), Relatedness (R), and Growth (G). The given theory is especially applicable to the active and stressful healthcare setting, since it allows following multiple needs at the same time and explains the phenomenon of frustration regression, when a person who cannot fulfil a higher-level need can turn to the intensification of his or her attention to a lower one (Barat, 2022). This is what makes it a powerful platform to examine the complex factors that lead employees to stay in the job.

This is demonstrated in needs such as the desire to grow, to be successful, to be skilled, and to be creative. They coincide with the concepts of Maslow regarding the self-actualization and the internal component of esteem. It is in this way that companies can help the staff to improve. When the employees get a chance to enhance their competences, keep learning, specialize, and develop their work, they may reach their potential, feel satisfied, and learn to exploit their abilities (Fabian et al., 2024). The publicity, the reward, or the augmented freedom or responsibility can also be a pointer to the progress and accomplishment that will satisfy this aspect of the requirement even further. Connection to Retention and Theoretical Integration with Maslow:

ERG Theory explains the behaviour of employees in a more holistic way. Compared to the rigid hierarchy of Maslow, ERG believes that an employee could be aided by growth needs (such as receiving a certification) without their relatedness needs (such as arguing with their manager) being satisfied completely. The overall idea of frustration-regression is, however, quite simple. When the growth needs of an employee are not considered regularly (that is, there is no opportunity to grow in that place), he or she can revert to the needs of relatedness (finding a better team elsewhere) or existence (demanding more pay). On the other hand, the existence needs would be at stake (e.g., when staffing is in danger) and the concerns about relatedness or development would be secondary. Maslow and Alderfer theories are complementary to each other in a way that they create a multi-layered, effective framework to be applied in this investigation.

They justify the choice of the four independent variables used by them by matching them with the basic human needs: Elements of the Work Environment and Compensation are related to Existence/Safety; Recognition and Relational Work Environment are related to Relatedness/Belonging-Esteem; Training and Development, along with achievement-oriented Recognition, are related to Growth/Self Actualization.

In this theoretical framework, it is assumed that the retention rates among employees will be maximized when healthcare organizations employ comprehensive measures that address all three categories of ERG needs or all five tiers of needs and therefore, eliminate the frustration-regression process which contributes to turnover.

**Hypothesis Development**

***H1: Compensation and Benefits have a positive relationship with Employee Retention***

The hypothesized assumption of the first one is that compensation and benefits are basic hygiene factors (Herzberg) or Existence needs (Alderfer). The physiological and safety needs, both of which are highly fulfilled by well-compensated employees, job security, and all-inclusive benefits, must be fulfilled properly before considering the motivators of a higher order (McLeod, 2024; Barat, 2022). Within the framework of the ERG theory by Alderfer, compensation directly responds to the requirement of material and physical health, and it is the lower layer of the employment exchange (Barat, 2022).

This relationship is empirically supported by a considerable amount of research. The researchers determined that equitable and competitive compensation has a direct relationship with job satisfaction and, therefore, retention (Suryadi, Utomo, and Setiorini, 2022). On the same note, both Fitri (2024) and Samosir et al. (2021) have shown that strategic compensation management is not only an administrative issue but a crucial tool in decreasing turnover intentions. This was further supported by Alshamrani et al. (2023), who discovered that employees who are determined to have a fair salary in comparison to the market standards demonstrate much greater organizational commitment.

On the other hand, the lack of satisfaction with remuneration is always listed as one of the main triggering factors of voluntary turnover since employees tend to express their desire to join other organizations with a better financial package (Macaraig, Hong, and Lay, 2024; Sorn et al., 2023; Prakash and Philimis, 2022). Hence, according to the overlap of the motivational theory and the consistent empirical validation, this study asserts that a competitive and equitable compensation package is a necessary condition for employee retention.

***H2: Training and Development have a positive relationship with Employee Retention.***

The second hypothesis is based on the so-called Growth part of the ERG Theory developed by Alderfer that suggests that the intrinsic urge of a person to develop, master, and gain some meaningful accomplishment is one of the most potent motivators (Barat, 2022). In the Maslowian system, training and development will meet higher needs, namely the Esteem need that is fulfilled through greater competence and recognition, and the Self-Actualization need that is fulfilled through the fulfilment of professional potential. By investing in formal training, specialized licenses, and defined career advancement opportunities, healthcare organizations indicate their long-term investment in the value and future of the employee, thus developing psychological attachment and loyalty.

This relationship is strongly supported by empirical research in different industries. Both Nguyen (2020) and Kumari (2022) indicated that the availability of professional development opportunities has a strong positive effect on employee retention, mediated by augmented job satisfaction and perceived organizational support. In a systematic literature review, Fabian et al. (2024) found that effective implementation of training and career development interventions is strongly related to improved company performance due to the large extent of employee retention and skills competence. Alajlani and Yesufu (2022) and Alsakarneh et al. (2023) applied the findings to the service and education sectors, which proves that talent management practices that include training are central to retention. Although a small proportion of the research in particular settings (e.g., food manufacturing; Jiang and Po, 2023) showed no significant direct correlation, the bulk of the evidence, especially in knowledge- and caring-intensive professions such as employee, supports a positive correlation. This research therefore supports the hypothesis that the perceived investment in professional development has a direct negative effect on turnover intention.

***H3: The Working Environment has a positive relationship with Employee Retention.***

The third hypothesis deals with the complexity of the working environment that includes physical safety, sufficient resources, adequacy of staffing, supervisor support, and collegiality. In theory, this variable is quite specific since it caters to several categories of needs in both the Maslow and Alderfer framework. A safe and

well-equipped workplace will meet the needs of Safety (Maslow) and Existence (ERG), whereas a supportive, respectful, and collaborative culture will meet the needs of Belongingness (Maslow) and Relatedness (ERG) (Barat, 2022; Xuecheng, Iqbal, and Saina, 2022).

Employee retention is continuously determined by the work environment, which has been established as one of the strongest factors. Alshamrani et al. (2023) and Zainal et al. (2022) also verified that good working conditions are positively yet significantly related to an employee's choice to remain. In healthcare, Wu et al. (2020) were able to show that work environments negatively affect workplace violence and burnout, which, in turn, directly harms retention. On the same note, Bashir et al. (2023) and Oliveira et al. (2021) emphasized that a malign or under-invested setting undermines social welfare and professional drive.

The effect of the surroundings is so vast that it may nullify the positive effect of competitive salary or training when employees feel unsafe, unsupported, or disrespected in their day-to-day life (Prakash & Philimis, 2022; Andriani et al., 2022). Therefore, the hypothesis of this study is that a relationally supportive, safe, conducive work environment is a key predictor of the intention of an employee to stay.

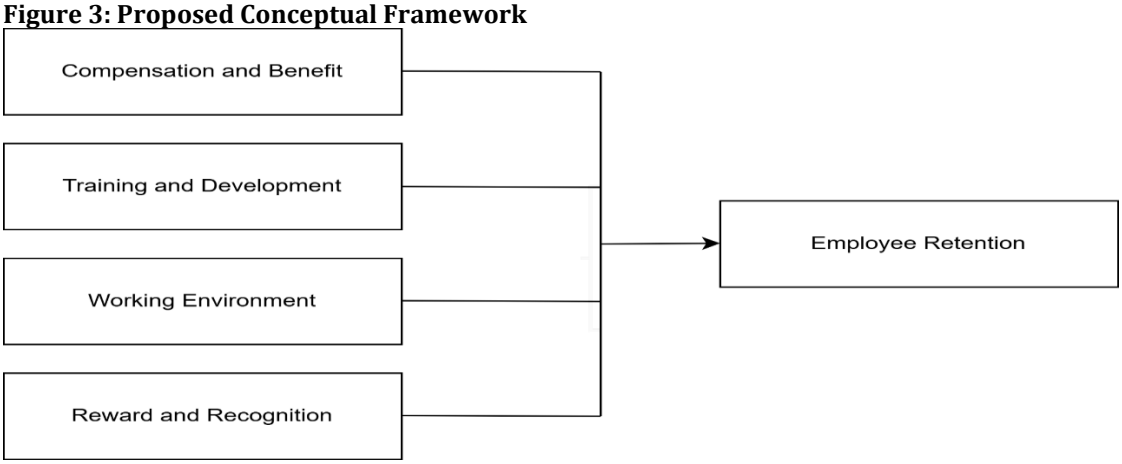
***H4: Reward and Recognition have a positive relationship with Employee Retention***

The fourth hypothesis is developed on the assumption that reward and recognition systems are critical to serve the need for Esteem needs (Maslow) and need for Relatedness (Alderfer). Existence is met through compensation and psychological needs are met through recognition, where one wants to feel valued, respected and appreciated by others. The esteem needs include self-esteem (competence, achievement) and the esteem of other people (status, recognition) (McLeod, 2024). According to the ERG theory by Alderfer, the need to receive interpersonal recognition and external validation has to be considered an essential element of Relatedness (Barat, 2022).

On a case-by-case basis, however subtle, recognition and retention are empirically related. Caredo et al. (2022) and Syed Noordin et al. (2021) have discovered that both monetary and non-monetary recognition have a considerable impact on employee retention, compensating the employee with a feeling of value and equity in the organization. The authors of the study by Nor et al. (2024) and Geetha and Muthukumar (2022) confirmed that an effective recognition program increases job satisfaction and organizational commitment, which in turn decreases turnover. Tirta and Enrika (2020) particularly noted recognition to be one of the primary drivers of millennial retention and that it works through the mediating variable of job satisfaction. It is necessary to note, though, that this relationship is contingent.

In their Khyber Medical College investigation, Shah et al (2021) discovered that there was a non-significant correlation between recognition programs and their perceived authenticity, equitability and alignment with the organizational culture. Although this is a caveat, empirical evidence and theoretical reasoning paint a more favourable picture of a positive relationship. Thus, the hypothesis of the proposed research is that reward and recognition systems implemented in a meaningful and equitable way can play a crucial role in the emotional attachment of an employee towards the organization and their intention to remain in the organization.

**Figure 3: Proposed Conceptual Framework**



The conceptual framework of the study is that four independent variables, namely, Compensation and Benefits (CB), Training and Development (TD), Working Environment (WE), and Reward and Recognition (RR), have a direct impact on the dependent variable, Employee Retention (ER).

All the theoretical and empirical relationships presented in the previous literature review are combined into the conceptual framework of this research to create an integrated research model. According to it, four key independent variables related to strategic human resource management practices, such as Compensation and Benefits (CB), Training and Development (TD), Working Environment (WE), and Reward and Recognition (RR), have a direct impact on Employee Retention (ER) as the primary dependent variable.

## 3. Research Methodology

The way this chapter is presented is meant to help the reader understand how research is done step by step. It starts by stating the reason why the selected study design and method are the most appropriate. Then, the population of the study is indicated with clarity, and the sample size and sampling procedure are provided in detail. The questionnaire, which is the information-gathering tool, is then explained. This involves the way it has been made, the components that it comprises, and the scales that were applied in the quantification of each variable. Next, procedures for ensuring that the tool works and is correct are examined. The chapter goes on to discuss how the data will be considered and what statistical tests will be applied to determine whether the hypotheses are accepted.

### Research Design

The correlational research design is quantitative and is applied to observe the correlation among the variables without any manipulation. Our methodology is a cross-sectional survey.

The research design used in this study is that of a quantitative, correlational research design and the survey methodology is cross-sectional. The chosen methodological approach is the most suitable decision because it best allows examining and quantifying the strength and direction of the relationships between the independent variables (Training and Development, Compensation, Work Environment, Reward and Recognition) and the dependent variable (Employee Retention) without affecting the environment or the variables in any way (Singh, Vadakedath, and Kandi, 2023).

This quantitative method is necessary to collect numerical data on a large sample of the population to be able to conduct a statistical analysis that would objectively examine the suggested connections. This research method falls under the positivist paradigm, which focuses on objectivity, generalization, and theoretical confirmation. In this case, it appraises the motivational theories of Maslow and Alderfer regarding retention (Sekaran and Bougie, 2016).

The correlational design is suitable because the researcher can establish the existence and the strength of systematic correlations between the variables. It is used to determine the association between the variation in employee retention and the variation in the four predictor variables. This design is selected on purpose over an experimental design since the interest is to comprehend the present perceptions and associations of the situation in a naturalistic environment instead of determining cause-and-effect through manipulation (Fulk, 2023).

The cross-sectional survey approach also allows you to get the information from all the employees at a given time. The method is effective and can be selected to create a snapshot of the views, attitudes, and behavioural intentions prevalent within the employee community of Klang Valley, Selangor, at the time the study will take place. A longitudinal design may monitor changes over time, whereas the most helpful and suitable for answering the main research questions and testing the research hypotheses is the cross-sectional design. (Mulisa, 2023).

This quantitative, correlational, and cross-sectional design is not a novel approach to management and HRM research, which is confirmed by the fact that it has been used in other works on retention in different industries, including healthcare, services, and logistics (e.g., Alshamrani et al., 2023; Zainal et al., 2022; Syed Noordin et

al., 2021). Such a mixture of quantitative, correlational, and cross-sectional designs is not new in management and HRM studies, having been adopted in related research in numerous industries, such as healthcare, services, and logistics (e.g., Alshamrani et al., 2023; Zainal et al., 2022; Syed Noordin et al., 2021). It offers the systematic, evidence-based guideline that is required in the realization of the research aims.

**Population**

The population of the study will include employees who are currently working in full-time clinical roles in designated public and private hospitals and medical centres in the Klang Valley, Selangor area of Malaysia. The professions are challenged by numerous healthcare needs and requirements in this area. With such an easy-to-reach, yet very essential group, we can better understand what retains employees in a high-pressure and urban hospital scenario. The findings can benefit many employees in the country.

The healthcare facilities will be selected strategically to ensure that there is a variety of types of places, i.e., public and private hospitals and private medical centres and clinics. In this way, a wider range of management styles, corporate culture, and potential methods of retaining people will be observed.

**Sampling Technique**

The sampling strategy adopted in this study was a non-probability, convenience approach, and it was used to select the participants in the target population. Mulisa (2023) adds that in non-probability sampling approaches, such as the convenience sampling technique, the units are selected based on their ease of access, willingness to participate, and accessibility to the researcher. This is unlike in a random selection process, whereby all the individuals in the population have a known probability of getting selected.

The selection of such a methodology is determined by multiple practical and contextual limitations of conducting research in working local healthcare facilities:

Uncomplicated and achievable: It may be difficult and time-consuming to secure the consent of institutions to exercise random sampling in many of the busy hospitals and clinics. Convenience sampling also presents great ease of access to the data collection of the employees who are willing and able to participate when it is convenient, during their shifts or breaks.

The sampling strategy will entail the researcher (or assigned assistants) going to the sampled institutions, seeking on-site permission from unit administrators, and personally requesting the employees on duty and not attending to critically ill patients to fill out the survey. It is not a method that ensures the sample is statistically representative of the whole population, which is a significant weakness that must be considered in the context of the study, but it is an acceptable and often used approach in the exploratory and correlational research of social sciences, including studies on healthcare workforce problems (Mulisa, 2023; Alshamrani et al., 2023).

The research is going to be based on the multi-site approach across the four hospitals given in Table 3 in both the government and non-government sectors, which will help remove the risk of bias and increase sample diversity. The given technique is intended to embrace the range of experiences and perspectives, and this will render the findings more applicable in the healthcare context of the Klang Valley, Selangor.

**Justification for Convenience Sampling**

Both the considerations of the practical and the methodological essence give the rationale to the choice of a non-probability convenience sampling method as an instrument of this study that can be justified in the framework of healthcare workforce research.

To begin with, accessibility and institutional gatekeeping. There is a high challenge in acquiring access to employees in active clinical settings. Medical centres and hospitals are high-stakes environments where research participation is unimportant to patient care. Getting formal permission to perform random sampling on different shifts, units, and institutions is usually time-consuming and administratively difficult to get through (Mulisa, 2023). Convenience sampling will allow the researcher to sample data from participants who are readily available and are on duty and are willing to participate during specified breaks without interfering with clinical activities.

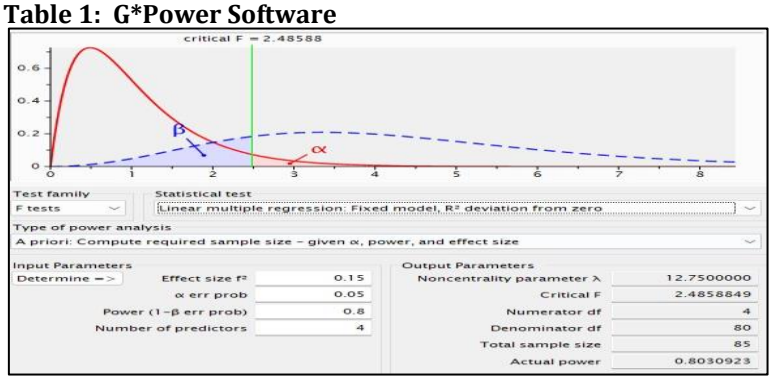
Second, it is resource- and time-efficient. The given research is conducted in the framework of the master's degree programme, which has strict timeframes and financial limitations. Convenience sampling is a feasible and practical way of getting a sufficient sample size in the necessary amount of time, and at the same time, one can conduct a robust statistical analysis (Sekaran and Bougie, 2016). The fact that the sample size is determined using Krejcie and Morgan (1970) sample size determination table also confirms that the sample that is obtained is statistically adequate to perform a multiple regression analysis.

Third, methodological precedents in the field of healthcare and retention research. In quantitative research on employee retention, job satisfaction and organisational behaviour, convenience sampling is highly used and accepted by academicians in healthcare and service sectors. Many peer-reviewed articles referenced in this proposal have been effective in applying this method to produce valuable and publishable results (Alshamrani et al., 2023; Syed Noordin et al., 2021; Zainal et al., 2022; Jiang and Po, 2023). Therefore, its use in this case is consistent with the methodological practice.

Fourth, heterogeneity using multi-site sampling. In an aim to reduce the limitation in nature of low generalisability, the current study utilises a multi-site sampling design in four different healthcare institutions, both state and privately owned hospitals. The strategy will increase the sample diversity as it will cover the variation in compensation systems, management approaches, organisational cultures, and demographics, and will make the findings more representative of the population of the Klang Valley employees (Islam et al., 2022; Mulisa, 2023).

**Sample Size**

**Table 1: G*Power Software**




The selection of the appropriate sample size is of great importance to ensure that the findings of the study are both statistically valid and reliable. With the accepted methodological principles of a quantitative study, it was followed by a rigorous a priori power analysis was conducted to determine the necessary minimum sample size (Sekaran and Bougie, 2016; Singh, Vadakedath, and Kandi, 2023).

To perform a multiple linear regression (F-test) of the data, we used the GPower 3.1.9.4 software. The parameters were configured in the following way:
Statistical Test: Linear multiple regression, fixed model, and increase in R2.
Effect Size (f2): 0.15 (a medium effect size, by standard criteria).
The probability of an alpha error (a) is 0.05, and it implies that 5 percent of the time the outcome is significant.
Power (1 - b): 0.80 (an 80 percent probability of rejecting an incorrect null hypothesis).
Quantity of Predictors: 4 (the independent variables: CB, TD, WE, and RR).

The G*Power estimate indicated that no less than 85 people will be required to complete the poll. It is the minimum number of surveys that should be completed to have an 80 percent probability of identifying a statistically significant effect of the independent variables on employee retention, given that an effect of medium magnitude in the population exists. Therefore, the aim was to obtain data from at least 85 employees so as to ensure that the study has sufficient statistical power to test hypotheses with reliability. A sample size that exceeds this minimum is more likely to increase the reliability and validity of the results in the context of the defined population.

The unit of analysis of the study is the individual employee. This methodological term is the basic word that defines the main object or thing where data are collected, compiled, and eventually conclusions are reached. The use of the individual as the unit of analysis is a deliberate outcome of the research questions, theory, and objectives of the study (Sekaran and Bougie, 2016).

The research aims to explore how the differences in the perceptions of individual employees about compensation, training, working environment, and recognition relate to the corresponding variation in their behavioural intention to stay with or leave their employer. Constructs that are being tested, including perceived fairness of compensation, satisfaction with growth opportunities, feeling of safety and support, and feeling of being valued are all psychological and subjective, and located in the individual. The research should be conducted on the individual level to adequately evaluate the proposed linkages according to the motivational theories (Alderfer, ERG Theory, and Maslows, Hierarchy).

This choice is enormous in the establishment of the research. It requires a data collection tool (the questionnaire) which will evaluate the perception and intentions of individual employees. It also indicates that correlation and multiple regression are the primary tests that will be applied in statistics to find out how the various variables observed in the units under consideration are related to one another. The primary objective of the research is not a comparison of the organizations, although the employees are employed in various healthcare organizations. Rather, it is to learn enough about the fundamentals of the psychology behind retention amongst individuals in this population group. Consequently, the individual employee will be the most significant element of the future analysis and interpretation of the results.

## 4. Implications of the Study

The Medical Industry

This study will have important effects on the medical field since it goes beyond anecdotal evidence and provides a theoretical framework based on real-world data for understanding employee retention. It will make three significant contributions that help fill in gaps in theory, practice, and context.

*Theoretical Significance:* The research plays a proactive role in assessing and improving the predetermined organizational concepts in the specific setting of healthcare. This proposal will explore how the Hierarchy of Needs and ERG Theory, as developed by Maslow and Alderfer, can be applied to the Malaysian employee population, and whether these well-known frameworks of motivation can be used to predict behaviour in a highly stressful, self-sacrificing profession. The results will be able to add to the scholarly discussion as they will either support the universal applicability of the frameworks or point out essential contextual remodels of the healthcare industry, which will benefit the theoretical body of knowledge of health services management and organizational psychology.

*Contextual and Methodological Significance:* It will address a notable deficiency in location-specific literature. While the factors leading to turnover are thoroughly analysed in Western settings, there is a lack of robust, quantitative research focused on the Malaysian employee workforce. This study will give a full, data-driven look at a healthcare system that is changing quickly. It will give insights that consider the cultural, economic, and institutional factors in the area. Methodologically, it will demonstrate the use of stringent multivariate analysis to address a complex human resource issue in healthcare, serving as a model for future localized studies in similar contexts.

*Practical and Strategic Importance:* This study will provide hospital administrators, employee directors, and healthcare policymakers with a practical, prioritized diagnostic tool. It does not just give a general list of "important factors." Instead, it seeks to explain how much each one (compensation, training, environment, recognition) counts. This evidence-based hierarchy is immediately valuable because it gives leaders data on where to devote limited resources to get the best results for retention. If, for instance, the work environment is the most important aspect, it would strongly suggest that strategic expenditures in leadership training and staffing ratios are preferable to, say, separate bonus plans. This study will provide a paradigm for building sustainable workforce stability, a crucial prerequisite for great patient care and institutional resilience.

## 5. Conclusion

The study has provided an elaborate background, which has placed the research in the strategic human resource management field. An accurate problem statement is a formulation of a research gap: no quantitative study has been conducted to compare the concomitant predictive value of Compensation and Benefits, Training and Development, Work Environment, and Reward and Recognition on Employee retention in the context of the Malaysian healthcare setting. Based on this gap, five research objectives and five research questions are developed. The scope presents the limits of the study, which is limited to employees in some chosen public and private hospitals in the Klang Valley, Selangor, and applies a quantitative, cross-sectional correlational research design. The importance of the research is expounded in three aspects: theoretical (a validation of motivational theories in the Malaysian healthcare setting), practical (it offers the healthcare administrator an evidence-based hierarchical retention framework), and methodological (it fills a contextual gap in the localised retention research).

This project is thus situated at the confluence of a significant global health concern and a critical local research deficiency. It seeks to go beyond basic discussions about turnover by looking closely at the link between certain HRM practices and keeping employees in Malaysia. This study aims to clarify the strength and importance of relationships by collecting empirical data from employees in specific healthcare facilities in Klang Valley, Selangor. The results are intended to transition from theoretical knowledge to practical application, providing hospital managers and policymakers with evidence-based guidance on formulating focused and effective retention programs. Not only will this add to academic debate, but it will also serve the wider goal of making the Malaysian healthcare system stronger by having a happier and more stable employee workforce.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Selected Motivational Factors and Job Performance Among Lembaga Tabung Angkatan Tentera (LTAT) Staff

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**Abstract:** This study examined the relationships between selected motivational factors—namely pay and benefits, working environment, training and development, and promotion—and job performance among Lembaga Tabung Angkatan Tentera (LTAT) staff. A quantitative research approach was employed, involving 115 respondents from LTAT. Data were collected using a structured questionnaire and analyzed using descriptive statistics, reliability analysis, and multiple regression analysis. The findings revealed that the regression model was statistically significant and explained 44.8% of the variance in job performance. Among the selected motivational factors examined, training and development was the only factor that demonstrated a significant positive relationship with job performance. In contrast, pay and benefits, working environment, and promotion were not significantly related to job performance. These findings indicate that employees who perceive greater access to training and development opportunities are more likely to demonstrate higher levels of job performance. The study highlights the importance of employee development initiatives in enhancing employee competencies, skills and workplace effectiveness. The findings provide valuable insights for organizational leaders and human resource practitioners in designing human resource strategies that support employee development and improve organizational performance. It is recommended that organizations continue investing in training and development programs to strengthen workforce capabilities and achieve long-term organizational success.

**Keywords:** *Job Performance, Pay and Benefits, Working Environment, Training and Development, Promotion*

## 1. Introduction

Job performance is considered a crucial component of an organization's effectiveness, productivity, and long-term sustainability. Employees who perform their job functions effectively complete tasks and solve problems that enable the organization to achieve its set goals and objectives. Thereby contributing to the organization's overall success. Consequently, organizations continuously seek strategies to enhance job performance, with motivation being regarded as one of the most important determinants of workplace performance. Motivated employees are generally more committed, productive, and engaged in their work, whereas inadequate motivation may lead to lower job performance, reduced job satisfaction, and higher turnover intentions (Robbins & Coulter, 2007; Gillet et al., 2013).

Previous studies have identified several motivational factors associated with job performance, including pay and benefits, working environment, training and development, and promotion opportunities. Fair compensation and benefits can enhance employee satisfaction and organizational commitment, while a supportive working environment promotes employee well-being and productivity (Ranta & Ylinen, 2024; Zhenjing et al., 2022). Similarly, training and development programs help employees acquire the knowledge, skills, and competencies required to perform their jobs effectively, whereas promotion opportunities provide recognition and career advancement prospects that may encourage higher levels of performance (Noe, 2023).

Despite the extensive literature on motivation and job performance, the relative importance of different motivational factors may vary across organizational settings. Understanding these relationships is critical for organizations to develop HR strategies to improve the performance of their workforce. This study will examine the impact of the selected motivators - compensation and benefits, work environment, training and development, and promotion opportunities - on the job performance of employees of Lembaga Tabung

Angkatan Tentera (LTAT). The outcome of this study is intended to provide valuable insights for organizations in designing motivational practices that enhance job performance and support organizational success.

## 2. Literature Review

### Employee Motivation and Selected Motivational Factors

Employee motivation refers to the forces that initiate, direct, and sustain work-related effort towards achieving individual and organizational goals. Motivated employees are more likely to demonstrate commitment, persistence, and productive work behavior, whereas insufficient motivation may reduce engagement and job performance (Robbins & Coulter, 2007; Gillet et al., 2013). Motivation may arise from intrinsic sources, such as achievement and personal growth, or extrinsic sources, such as financial rewards, supportive working conditions, development opportunities, and career advancement.

In the present study, the term 'selected motivational factors' refers to four organizational and human resource practices—pay and benefits, working environment, training and development, and promotion—that may encourage staff to exert greater effort and perform their duties effectively. Pay and benefits represent extrinsic rewards and perceived fairness, as explained by Equity Theory (Adams, 1965). A supportive working environment can motivate staff by providing favorable physical and psychosocial conditions. Training and development can strengthen competence, confidence, and opportunities for professional growth, while promotion provides recognition and valued career outcomes consistent with Expectancy Theory (Vroom, 1964). These considerations provide the basis for examining pay and benefits, working environment, training and development, and promotion as factors associated with job performance.

Motivation itself was not measured as a separate construct or tested as a mediating variable. Rather, the study examined the direct relationships between the four selected motivational factors and job performance. This distinction is important because the findings indicate whether each organizational practice is associated with performance, but they do not establish the psychological mechanism through which employee motivation may produce that relationship.

### Job Performance

Job performance refers to the extent to which employees effectively carry out their assigned duties and responsibilities, thereby contributing to the achievement of organizational goals. It encompasses various aspects of work behavior, including task completion, productivity, quality of work, problem-solving ability, and overall effectiveness in performing job-related activities (Kamaruddin et al., 2021). Job performance is widely recognized as a critical determinant of organizational effectiveness, productivity, and competitiveness, making it an important area of interest among researchers and human resource practitioners (Tamunomiebi & Oyibo, 2020).

An employee is considered to have achieved satisfactory job performance when assigned tasks are completed effectively and efficiently with minimal workplace constraints (Bashir et al., 2020). Previous studies have shown that job performance is influenced by various organizational and individual factors, including motivation, compensation, workplace environment, training, leadership, and employee engagement. As valuable organizational assets, employees' productivity, competencies, and work behaviors significantly contribute to organizational success (Thevanes & Mangaleswaran, 2018).

Organizations seeking to improve job performance should provide fair compensation, supportive working conditions, and opportunities for employee development. Research has shown that employee welfare, compensation, and organizational support positively influence motivation, job satisfaction, and performance (Ranta & Ylinen, 2024). Therefore, identifying and understanding the factors that contribute to job performance remains an important concern for organizations and human resource practitioners. Such understanding enables organizations to develop appropriate strategies and workplace practices that support employees in performing their jobs effectively.

**Pay and Benefits**

Pay and benefits are important motivational factors that influence employees' attitudes and job performance. Employees generally expect fair compensation in return for their effort, skills, and contributions to the organization. When employees perceive that they are fairly rewarded, they are more likely to be motivated, satisfied, and committed to their work.

The relationship between pay and job performance can be explained through Equity Theory (Adams, 1965), which suggests that employees evaluate the fairness of their compensation by comparing their contributions with the rewards they receive and those received by others in similar positions. Fair and equitable compensation is associated with higher levels of motivation and job satisfaction, whereas perceived inequity may lead to dissatisfaction, reduced motivation, and lower performance.

Recent studies have highlighted the importance of compensation in enhancing job performance. Competitive salaries, attractive benefits, and transparent reward systems have been found to positively influence employee motivation and work performance (Ardianto et al., 2024; Ranta & Ylinen, 2024). Similarly, Nurpribadi et al. (2024) reported that compensation significantly contributes to job performance when employees perceive rewards as fair and aligned with their contributions. Therefore, pay and benefits remain an important motivational factor associated with employees' job performance.

**H1:** *There is a relationship between pay and benefits and job performance.*

**Working Environment**

The working environment refers to the physical and non-physical conditions that influence employees' behavior, well-being, and job performance (Kohun, 1992). It includes workplace facilities, organizational culture, interpersonal relationships, management practices, and working conditions. A supportive working environment enables employees to perform their duties effectively while enhancing motivation and productivity.

A positive working environment promotes collaboration, knowledge sharing, and employee well-being, which may contribute to improved job performance (Benner, 2004). Previous studies have shown that employees who work in safe, comfortable, and supportive environments are more likely to demonstrate higher levels of motivation and performance (Bushiri, 2014). Recent evidence also suggests that the workplace environment positively influences employee performance through enhanced commitment, well-being, and achievement-oriented behavior (Zhenjing et al., 2022). Similarly, Mohd Nasurdin et al. (2022) found that supportive organizational resources and favorable workplace conditions contribute positively to employee motivation and job performance.

The relationship between working environment and job performance can be explained through Social Exchange Theory (Blau, 1964), which suggests that employees tend to reciprocate favorable treatment from their organisation through positive work attitudes and behaviors. Therefore, a supportive working environment remains an important motivational factor associated with higher levels of job performance.

**H2:** *There is a relationship between working environment and job performance.*

**Training and Development**

Training and development are important human resource practices that enhance employees' knowledge, skills, and competencies, enabling them to perform their jobs more effectively. According to Holton and Baldwin (2000), the effectiveness of training depends on the successful transfer of acquired knowledge, skills, and behaviors to the workplace. Effective transfer of training enables employees to apply newly acquired competencies in their daily work, thereby improving job performance.

Training equips employees with the knowledge and skills required to perform their duties effectively, adapt to changing work requirements, and respond to organizational challenges (Noe, 2023). In addition, training and development opportunities contribute to employees' confidence, competence, and professional growth, which may positively influence job performance.

Recent evidence suggests that organizational resources and supportive workplace practices play an important role in enhancing employee performance through increased motivation and capability development. In the Malaysian context, Mohd Nasurdin et al. (2022) found that organizational-based resources positively influence employee job performance through enhanced motivation. Therefore, training and development remain an important motivational factor that may contribute to higher levels of job performance.
**H3:** *There is a relationship between training and development and job performance.*

**Promotion**
Promotion is an important human resource management practice that provides employees with opportunities for career advancement, greater responsibilities, and improved rewards. Employees often perceive promotion as recognition of their contributions and achievements, making it a significant motivational factor associated with job satisfaction, commitment, and job performance.

According to Nitisemito (2008), promotion refers to the movement of an employee from a lower position to a higher position with increased authority, responsibility, and benefits. From the perspective of Expectancy Theory (Vroom, 1964), employees are motivated when they believe that their efforts and performance will lead to valued outcomes, such as promotion and career advancement. Employees who perceive promotion opportunities as fair and attainable are therefore more likely to be motivated to improve their performance.

Prior research has shown a positive correlation between the presence of promotion paths and job performance. Firdaus et al. (2024) have shown that job promotions facilitate employees' performance through career development, indicating that employees perceive as more positive the availability of opportunities for advancement and growing more committed and achieving higher levels performance. Additionally, from the standpoint of employees, the promotion system based on transparency and merit creates a stimulating environment for employees to focus on developing their skills and capabilities. As such, the promotion process retains its position as a key element in the motivational system designed to enhance levels of job performance.
**H4:** *There is a relationship between promotion and job performance.*

## 3. Methodology

This study employed a quantitative cross-sectional research design to examine the relationships between selected motivational factors and job performance among staff of Lembaga Tabung Angkatan Tentera (LTAT). For the purposes of this study, LTAT staff comprised employees in the executive and support staff categories. A survey approach was adopted, whereby data were collected at a single point in time using a structured self-administered questionnaire. The target population comprised 160 LTAT staff employed in Kuala Lumpur. The online questionnaire was distributed to all 160 target staff, and 115 usable responses were received, representing a response rate of 71.88%. This number also satisfied the minimum sample size of 115 recommended by Krejcie and Morgan (1970) for a population of 160. Convenience sampling was employed, and the individual staff member served as the unit of analysis.

Data were collected using an online survey administered through Google Forms. The questionnaire was adapted from previously validated instruments and consisted of six sections. The first section collected respondents' demographic information, while the remaining sections measured job performance, pay and benefits, working environment, training and development, and promotion. The measurement items were primarily adapted from Koopmans et al. (2013), Omar (2019), Raziq and Maulabakhsh (2015), Bai et al. (2018), and Mavale and Narkhede (2016). Minor wording modifications were made to ensure that the items were clear, relevant, and appropriate to the LTAT organizational context while retaining the original meaning of the constructs. All study variables were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Data were analyzed using SPSS 25.0. Descriptive statistics were generated for each study component. Frequencies, means, and standard deviations were calculated for demographic variables and study variables. Cronbach's alpha was used to assess the measurement instruments. After determining the internal consistency of the measurement instruments, the relationship of pay and benefits, working environment, training and development, promotions, and job performance was analyzed using multiple regression. The analysis also

helped the researcher determine the relative contribution of the motivational factors used in explaining the performance of LTAT employees and identified the motivational factor that was most correlated to the performance of LTAT employees.

## 4. Results and Discussion

### Respondents' Demographic Characteristics

Table 1 below presents the demographic profile of the respondents. Respondents in the 36-45 age group made up the largest segment at 41.7%. The 26-35 group made up 33%, while the 18-25 and 46-55 age groups combined made up the remaining 25.3% of the sample. Women made up 53% of the sample, while men made up 47%. Respondents made up 80% of the sample who were married. Single respondents made up 13.9% of the sample, while other statuses made up 6.1%.

Regarding family size, 49.6% of respondents had 1-3 children, 26.1% had no children, and 24.3% had four or more children. When it came to education, 37.4% of the sample held Diplomas, while 33% of the sample had a bachelor's degree. For work experience, 53% of the sample had over 5 years of experience at LTAT. Therefore, this sample represented employees with experience.

**Table 1: Demographic Profile of Respondents**

| Demographic Variables | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **Age** | 18–25 years | 14 | 12.2 |
| | 26–35 years | 38 | 33.0 |
| | 36–45 years | 48 | 41.7 |
| | 46–55 years | 15 | 13.0 |
| **Gender** | Male | 54 | 47.0 |
| | Female | 61 | 53.0 |
| **Marital Status** | Single | 16 | 13.9 |
| | Married | 92 | 80.0 |
| | Others | 7 | 6.1 |
| **Number of Children** | No children | 30 | 26.1 |
| | 1–3 children | 57 | 49.6 |
| | 4 and above | 28 | 24.3 |
| **Education Level** | Malaysian Certificate of Education (SPM) | 14 | 12.2 |
| | Malaysian Higher School Certificate (STPM) | 4 | 3.5 |
| | Diploma | 43 | 37.4 |
| | Bachelor's Degree | 38 | 33.0 |
| | Master's Degree | 7 | 6.1 |
| | Doctorate | 1 | 0.9 |
| | Other Qualifications | 8 | 7.0 |
| **Working Experience** | Less than 6 months | 4 | 3.5 |
| | 6 months – 1 year | 9 | 7.8 |
| | 1–3 years | 25 | 21.7 |
| **Working Experience** | 3–5 years | 16 | 13.9 |
| | More than 5 years | 61 | 53.0 |

**Descriptive Statistics of Study Variables**

As shown in Table 2, all of the study variables' mean scores were greater than 3.67, illustrating generally positive perceptions among study participants. The mean score for job performance was the highest of all variables (M = 4.15, SD = 0.52), which was interpreted to mean participants had relatively positive perceptions about performance. Of the study variables, training and development was perceived most positively (M = 4.09, SD = 0.58) and was ranked the next highest among the study variables, followed by the work environment (M = 4.05, SD = 0.59) and pay and benefits (M = 3.99, SD = 0.53). The mean score for the perception of the opportunity for promotion was the lowest among the study variables (M = 3.73, SD = 0.80); however, this score fell in the high range, which is positive.

According to the results, participants perceived the training and development as the most positive of the selected motivating factors, followed by the work environment and pay and benefits. For the factor of promotions, the high standard deviation indicates that participants perceived the motivating factor of promotions differently relative to the other selected motivating factors. The results describe employee perceptions of the selected motivating factors and job performance at LTAT.

**Table 2: Descriptive Statistics of Study Variables**

| Variables | N | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|
| **Job Performance** | 115 | 1.00 | 5.00 | 4.15 | 0.52 |
| **Pay and Benefits** | 115 | 2.14 | 5.00 | 3.99 | 0.53 |
| **Working Environment** | 115 | 2.25 | 5.00 | 4.05 | 0.59 |
| **Training and Development** | 115 | 1.50 | 5.00 | 4.09 | 0.58 |
| **Promotion** | 115 | 1.00 | 5.00 | 3.73 | 0.80 |

*Note: Mean interpretation: 1.00–2.33 = Low; 2.34–3.66 = Moderate; 3.67–5.00 = High.*

**Reliability Analysis**

Reliability analysis was conducted using Cronbach's alpha coefficient to assess the internal consistency of the measurement scales. Table 3 summarizes the reliability statistics for all study variables. The Cronbach's alpha values ranged from 0.821 to 0.910, indicating good to excellent reliability based on the guidelines proposed by George and Mallery (2003). Training and development recorded the highest reliability coefficient (α = 0.910), followed by working environment (α = 0.904), promotion (α = 0.896), job performance (α = 0.867), and pay and benefits (α = 0.821). Since all Cronbach's alpha values exceeded the recommended threshold of 0.70, the measurement scales were considered reliable and suitable for subsequent statistical analyses.

**Table 3: Reliability Analysis of Study Variables**

| Variables | Number of Items | Cronbach's Alpha (α) | Internal consistency |
|---|---|---|---|
| **Job Performance** | 10 | 0.867 | Good |
| **Pay and Benefits** | 6 | 0.821 | Good |
| **Working Environment** | 8 | 0.904 | Excellent |
| **Training and Development** | 8 | 0.910 | Excellent |
| **Promotion** | 5 | 0.896 | Good |

**Multiple Regression Analysis**

A multiple regression analysis was conducted relating pay and benefits, working environment, training and development, promotion, and job performance of LTAT staff. Results are available in Table 4. The model summary shows that the 4 selected motivating factors explained 44.8% of the variance in job performance ($R^2$ = 0.448). The adjusted $R^2$ of 0.428 shows that the selected model can explain about 42.8% of the variance in job performance. Results of the ANOVA show that the overall regression model was significant, $F(4, 110) = 22.355$, $p < 0.001$, which shows that the selected motivating factors have a significant influence on job performance.

**Table 4: Multiple Regression Analysis of Selected Motivational Factors and Job Performance**

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| **1 (Constant)** | 1.728 | 0.282 | – | 6.135 | 0.000 |
| **Pay and Benefits** | 0.126 | 0.088 | 0.145 | 1.439 | 0.153 |
| **Working Environment** | 0.102 | 0.085 | 0.132 | 1.210 | 0.229 |
| **Training and Development** | 0.363 | 0.086 | 0.462 | 4.237 | 0.000 |
| **Promotion** | 0.007 | 0.062 | 0.012 | 0.109 | 0.913 |
| **R** | | | 0.670 | | |
| **R Square** | | | 0.448 | | |
| **Adjusted R Square** | | | 0.428 | | |
| **F** | | | 22.355 | | |
| **Sig.** | | | 0.000 | | |

*a. Dependent variable: job performance*

*b. Predictors: pay and benefits, working environment, training and development, and promotion.*

The results revealed that training and development was the only variable that exhibited a significant positive relationship with job performance ($\beta = 0.462$, $p < 0.001$), thus supporting H3. This finding indicates that employees who perceive greater access to training and development opportunities tend to report higher levels of job performance. Among the four selected motivational factors examined, training and development emerged as the strongest factor associated with job performance. The finding is consistent with previous research that emphasizes the importance of training and development in enhancing employees' knowledge, skills, and competencies, which are essential for effective job performance (Noe, 2023). The result also supports the transfer of training theory proposed by Baldwin and Ford (1988), which suggests that employees who successfully apply the knowledge and skills acquired through training to their workplace are more likely to demonstrate improved performance. Furthermore, continuous training and development initiatives contribute to the creation of a learning-oriented work environment that encourages employees to continuously improve their competencies and remain competitive in their respective roles. In addition, employees who receive training opportunities often perceive that the organisation values their professional growth and career development, which may enhance their motivation, morale, and commitment to organizational goals (Reyes, 2023). Training and development also play a strategic role in preparing employees to respond effectively to organizational changes, technological advancements, and evolving job requirements (Diwedi & Nema, 2023). Therefore, the findings highlight the importance of investing in employee training and development as a means of enhancing job performance and supporting organizational success.

In contrast, no significant relationship was found between pay and benefits and job performance ($\beta = 0.145$, $p = 0.153$). Therefore, H1 was not supported. Although respondents generally perceived pay and benefits positively, the results suggest that compensation alone may not be sufficient to explain variations in job performance. This finding is consistent with previous research indicating that while remuneration is valued by

staff, it often exerts a weaker influence on performance outcomes compared to non-monetary motivational strategies or work-life balance initiatives (Dangaiso et al., 2024). Furthermore, this empirical outcome aligns with observations that monetary perks demonstrate only a moderate link with employee outcomes, suggesting that organizational retention and productivity are heavily mediated by additional factors beyond basic salary (Halim & Latiff, 2024). For instance, organizational culture, leadership dynamics, and specific job demands frequently exert a more profound influence on overall productivity than extrinsic rewards alone (Boakye et al., 2024).

Similarly, working environment was not significantly related to job performance ($\beta = 0.132$, $p = 0.229$). Thus, H2 was not supported. One possible explanation is that respondents may have perceived the working environment at LTAT as relatively stable and satisfactory, resulting in limited variation in responses. Consequently, the working environment may not have emerged as a distinguishing factor in predicting job performance. This lack of significance aligns with findings in other organizational contexts where environmental variables failed to demonstrate a measurable impact on individual output (Masharyono et al., 2023). For instance, studies in dynamic corporate settings have similarly reported that environmental factors, such as ambient noise or physical facilities, do not always exert a statistically significant influence on employee efficiency (Lismanto, 2022). Furthermore, in cases where essential infrastructure or resources are lacking, environmental factors may fail to correlate with performance, as the primary impediments to productivity remain institutional rather than physical (Sukriyani, 2021).

The results also indicated that promotion was not significantly related to job performance ($\beta = 0.012$, $p = 0.913$). Therefore, H4 was not supported. This finding suggests that promotion opportunities may not be a primary determinant of job performance among LTAT employees. Employees may place greater emphasis on opportunities to develop their knowledge and skills rather than on career advancement opportunities alone. Furthermore, the disconnect between promotion and performance outcomes challenges traditional expectations, as institutional advancement does not automatically translate into improved employee task execution (Sichinsambwe et al., 2020). This observation aligns with findings in other contexts where promotion-related responsibilities do not necessarily incentivize higher performance, potentially due to the increased administrative burden that may detract from core professional tasks (Ratemo et al., 2021).

The results show that out of the four motivational factors, training and development were the only factors connected to job performance. These results also indicate the necessity of employee development in the organisation. This shows the importance of developing employees as it can help improve both the workforce and the organisation as a whole.

## 5. Conclusion, Limitations and Recommendations

This research analyses how certain motivational factors affect job performance among the staff of Lembaga Tabung Angkatan Tentera (LTAT). The results showed that among the motivational factors, only training and development were significantly related to job performance. Pay and benefits, working environment, and promotion, on the other hand, were not related to job performance. These findings show that for workplace performance to improve, employee development is necessary.

These findings have their own limitations. First, the cross-sectional design of the study was limited to a single point in time and therefore captured the perceptions of the employees at that point. It may not reflect how motivation and job performance may change over time. Second, the results may not apply beyond the staff of LTAT, since the study focused solely on that group. Third, the sampling method used (i.e. convenience sampling) and the use of a self-reported questionnaire introduced sampling bias and response bias, respectively.

Training and development programs should continue to receive funding at LTAT to foster employees' knowledge, skills and competencies. It is also important to study other factors associated with job performance such as leadership style, engagement of employees, organizational commitment, culture of the organisation and work-life balance. Longitudinal studies may generate a substantial amount of knowledge about employee motivation and job performance. Other studies should focus on larger and more heterogeneous populations.

Overall, this study contributes to the literature by demonstrating that selected motivational factors differ in their relationships with job performance. Among the four factors examined, training and development emerged as the only significant predictor of job performance among LTAT staff. Therefore, organizations should prioritize relevant and continuous training and development initiatives to strengthen employees' knowledge, skills, competencies, and overall job performance.

**Acknowledgement:** The authors would like to thank the participants for their contribution to the research. Despite the self-funded nature of this research, no grant was received from any public, private, or non-profit sector funding organizations.

**Declaration of Competing Interest:** The authors declare that there are no conflicts of interest regarding the publication of this article. The authors affirm that the research was conducted independently, and there were no financial or personal relationships that may have affected the findings and the interpretation of the outcome.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# From Innovation to Regeneration: A Triadic Entrepreneurship Framework for Human-Centered Green Economic Transition

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**Abstract:** The green transition is often presented as a problem of technology, finance, and policy. That framing is useful, but it says less about the entrepreneurial activity that translates broad ambitions into products, services, and workable local solutions. This conceptual paper develops a Triadic Entrepreneurship-Regeneration Framework that brings digital, creative-cultural and social entrepreneurship into the same discussion while keeping their different starting points visible. We use a dynamic-capabilities lens and an integrative review of recent literature to examine how these pathways may build sustainability-oriented innovation capability. Digital ventures contribute technological reach and experimentation; creative-cultural ventures work from heritage, design and place-based knowledge; and social ventures begin with unmet social or community needs. The common mechanism is not the type of venture itself, but the ability to recognize opportunities, recombine resources and turn ideas into viable forms of economic, environmental or social value. Whether that capability contributes to green transition also depends on finance, skills, infrastructure, standards and institutional support. The framework therefore treats transition quality as more than environmental efficiency. It also asks whether new opportunities are inclusive, livelihoods remain viable, communities are resilient and human well-being improves. The paper offers a conceptual basis for later empirical work in ASEAN economies.

**Keywords:** *Green economy, Entrepreneurship, Sustainability-oriented innovation, Regenerative development, ASEAN*

## 1. Introduction and Background

Green transition is commonly discussed at the level of energy systems, technology and environmental regulation. From an economic perspective, however, the transition is also about how value is created and who is able to participate in that process. Resource efficiency, renewable energy and cleaner production remain central, but they now interact with digitalization, creative industries and demands for more inclusive growth. This makes entrepreneurship relevant to the green-economy debate in a way that goes beyond firm formation. The question is how different kinds of entrepreneurial activity can contribute to greener development without separating environmental goals from livelihoods, participation and well-being.

ASEAN provides a useful setting for this question because the region combines rapid economic change with marked differences in institutional capacity, industrial structure and digital readiness. Environmental pressures linked to urbanization, resource use and industrialization are also uneven across member states. Recent regional work therefore treats green transition as a development challenge involving investment, skills, employment and inclusion, not simply as an environmental program (Asian Development Bank [ADB], 2026). The region's digital transformation is occurring at the same time, which makes the interaction between technology, entrepreneurship and sustainability particularly relevant (Sonobe et al., 2024).

A single transition pathway is unlikely to fit this diversity. Digital platforms can widen market access where connectivity, skills and trust are already in place, yet produce little benefit where those conditions are weak. Green standards may encourage cleaner production among firms that can finance compliance, while smaller enterprises may struggle with the same requirements. These contrasts suggest that the policy issue is not only how quickly ASEAN can move towards greener activity, but also which combinations of capabilities and institutions allow different firms and communities to take part in that movement (ADB, 2026).

This is where entrepreneurship becomes analytically useful. Entrepreneurs often sit close to changing consumer needs, local constraints and emerging technologies, so they are among the actors who convert broad agendas such as digitalization or sustainability into something that can actually be used. They do not all work from the same resource base. A digital venture may begin with data and connectivity; a cultural enterprise with design, heritage or craft knowledge; and a social venture with an unmet community need. Treating these forms as interchangeable would obscure the mechanisms through which each one creates value.

Existing studies provide strong pieces of this argument, although they are usually located in separate literatures. Digital technologies can support green growth when institutions and human capabilities are able to absorb them (Yang et al., 2024). Work on digital sustainable entrepreneurship shows that technology can be embedded in business models that create economic, social and environmental value, while also carrying environmental costs of its own (Gregori & Holzmann, 2020; Seidl & Bican, 2025). Research on Indonesian batik SMEs demonstrates that cultural enterprise can combine entrepreneurship and digital technology with both conventional and green innovation (Febrianda et al., 2025). Social-entrepreneurship studies, meanwhile, place community needs, stakeholder relationships and social innovation at the centre of value creation (Prateeppornnarong, 2026; Yoon & Ho, 2025).

The problem is not a shortage of research on any one of these areas. It is the lack of a convincing explanation of how they might sit within the same green-transition process. Digital entrepreneurship is often examined through platforms and firm performance, creative entrepreneurship through culture and design and social entrepreneurship through mission and impact. Green-economy studies more often model technology, finance, governance or human capital as parallel determinants. What is still less clear is the mechanism that links heterogeneous entrepreneurial resources to sustainability-oriented change.

We address that gap through the Triadic Entrepreneurship-Regeneration Framework. The framework keeps digital, creative-cultural and social entrepreneurship conceptually distinct, but asks whether each can strengthen a shared capability for sustainability-oriented innovation. In this paper, that capability refers to the ability to notice relevant needs or opportunities, recombine resources and develop solutions that are economically workable while carrying social or environmental value. It is the bridge between entrepreneurial activity and green economic transition. The extent to which the bridge holds depends on the surrounding ecosystem, including finance, education, infrastructure, standards and policy support. Human outcomes are kept visible because a transition can be technically greener and still distribute its benefits narrowly.

Four questions structure the discussion. First, what does each entrepreneurial pathway contribute to sustainability-oriented innovation capability? Second, through what mechanism might that capability support green economic transition? Third, which institutional and policy conditions enable or limit the move from entrepreneurial innovation to wider green outcomes? Finally, how should transition quality be judged when regenerative and human-centred outcomes are included? Framing the paper around these questions shifts attention from a list of determinants to the process through which change may occur.

## 2. Literature Review and Conceptual Foundations

### Green economy and the transition perspective

A green economy can broadly be understood as an economy that improves human welfare and economic opportunity while reducing environmental risks and ecological pressures. The transition perspective adds a dynamic element to this idea. Rather than treating an economy as simply green or non-green, it focuses on the process through which technologies, institutions, investment patterns, production systems and consumption behaviors change over time. This distinction is important because the drivers of transition are unlikely to operate independently or uniformly across countries.

For ASEAN, green transition has several dimensions that move together only imperfectly. The ADB (2026) places measurement, jobs and skills, regulation, private investment and country-specific pathways within the same agenda. This is important because lower emissions alone do not tell us whether firms can adapt, workers can acquire relevant skills or communities can maintain viable livelihoods. Environmental improvement may therefore be necessary without being sufficient for a developmentally strong transition.

The determinants literature is useful in showing that greener growth is shaped by economic and institutional conditions as well as environmental variables. Yang et al. (2024), for instance, report relationships among digital technologies, human development, finance, institutional quality and green growth in South Asia. Such evidence supports a multi-factor view of transition. What it does not fully show is how these conditions are translated into changes in firms, products and business practices. That explanatory gap is where an entrepreneurship-and-capability perspective can add value.

This distinction matters for the present paper. A statistical association between digital development and green growth can identify a potentially important determinant, but it does not tell us what firms or entrepreneurs actually do with digital capability. The same is true for finance or governance. Yang et al. (2024) demonstrate that these conditions matter; our concern is the mechanism between the condition and the outcome. The framework therefore complements, rather than replaces, a determinants approach.

Distribution is another reason to view transition as a process rather than an end-state. New green sectors may create jobs and investment, yet the costs of adjustment can fall unevenly on workers, small firms and communities. The ADB (2026) places skills and country-specific pathways alongside environmental indicators for this reason. In our framework, transition quality improves when firms can adapt, workers can participate and new opportunities are not confined to actors who already have strong access to capital, skills or technology.

**Theoretical anchor: a dynamic-capabilities perspective**

Dynamic capabilities provide the main theoretical anchor because the framework is concerned with what actors do when conditions change, not only with the resources they possess. Teece (2007) describes this in terms of sensing, seizing and transforming. The distinction is useful here because the three entrepreneurial pathways start from different assets. Digital ventures tend to rely on technology, data and connectivity; creative-cultural ventures on design, heritage and place-based knowledge; and social ventures on mission, stakeholder relationships and unmet needs. A capabilities lens allows those different resource bases to be compared without treating them as equivalent.

We extend that logic in two directions. The first is directional: the capability of interest is not innovation in general, but innovation that is consciously connected to sustainability. Adaptation has greater relevance to this study when it creates viable economic value while reducing environmental pressure or strengthening social value. The second extension is contextual. Capabilities are exercised within an ecosystem, so finance, skills, infrastructure, standards, networks and legitimacy influence whether a promising idea remains local or develops into a wider economic contribution.

The value of the dynamic-capabilities perspective is especially clear when resources are abundant but action is weak. Owning a technology does not guarantee a useful digital service, just as possessing a cultural asset does not guarantee a viable creative enterprise and having a social mission does not guarantee impact. Sensing may involve recognizing a new digital opportunity, an unmet social need or a market for culturally distinctive products. Seizing turns that opportunity into an offering; transforming requires changes in routines, partnerships or resource use so that the offering can survive. This sequence gives the framework a common process without erasing the differences among pathways (Teece, 2007).

There is an important qualification. A firm can be highly adaptive and still create environmental damage or exclude particular groups. For this reason, adaptability alone is not the outcome we seek to explain. The relevant capability is one that also considers resource use, accessibility and longer-term development effects. Put differently, sustainability orientation gives direction to capability: it asks not only whether an innovation is new or commercially effective, but whether it moves value creation towards a more responsible form.

**Sustainability-oriented innovation capability as a connecting mechanism**

Sustainability-oriented innovation capability is the connecting construct in the model. Adams et al. (2016) describe sustainability-oriented innovation as intentional changes in products, processes, practices or organizational arrangements that create environmental and social value alongside economic returns. We use that idea at the capability level. The concern is whether entrepreneurs and firms can identify sustainability-related needs, combine knowledge and resources, experiment, and adapt their business models without merely

relocating social or environmental costs elsewhere. The three entrepreneurial pathways enter this process differently, but each ultimately has to convert its starting resources into workable value.

This distinction prevents the framework from assuming that entrepreneurship is automatically sustainable. Omri and Almoshaigeh (2025) show that the development effects of entrepreneurship vary with the form of entrepreneurship and with complementary innovation and financial conditions. Their findings support the argument that entrepreneurial activity needs an enabling environment before it can generate balanced economic, social and environmental outcomes. Policy, therefore, should not treat more entrepreneurship as an end in itself; it should strengthen the capabilities and conditions that make entrepreneurial activity useful for transition.

**Digital entrepreneurship as a technology-enabled pathway**

Digital entrepreneurship is defined here by the role of digital technology in creating, delivering or reorganizing value. Platforms, mobile applications, data analytics, cloud services and artificial intelligence can lower information and transaction costs, extend market reach and allow new service configurations. This matters particularly for smaller or newer firms that cannot rely on extensive physical infrastructure. At the same time, the value of a digital venture depends on more than the presence of technology; it depends on how that technology changes access, coordination and user experience.

The sustainability literature on digital entrepreneurship is therefore mixed in a productive way. Gregori and Holzmann (2020) show that digital technologies can support business models that create economic, social and environmental value. Seidl and Bican (2025) likewise identify sustainability as a source of differentiation and stakeholder value for digital start-ups. Neither line of work justifies treating digitalization as inherently green, however, because data infrastructure and energy-intensive technologies have environmental footprints of their own. Digital entrepreneurship is better understood as an enabling pathway whose sustainability effects depend on design and context.

Sport-tech offers a simple illustration. An application for sport participation or service access is not an environmental innovation by definition. Yet it can reduce search and coordination costs, connect users with providers, widen access to activities and create new forms of service delivery. Those outcomes matter because economic value is being created through changes in participation and information, not only through higher productivity. Whether such an application contributes to sustainability depends on the resources it uses, the groups it reaches and the kind of behavior it enables.

We deliberately keep the sport-tech example generic. Its role is to show that a digital venture can contribute to human-centred development even when environmental objectives are not its primary purpose. An application that improves access to information, lowers coordination costs or helps users participate in services may create social and economic value. The sustainability question comes later: how inclusive is access, how resource-intensive is the technology, and can the model scale without creating new forms of exclusion? This interpretation is consistent with Gregori and Holzmann's (2020) emphasis on multidimensional value creation.

The same reasoning cautions against technological optimism. More digital activity does not automatically mean greener activity. Energy use, infrastructure requirements and unequal access can offset some of the expected benefits. Seidl and Bican (2025) make a similar point by showing that sustainability can be valuable to digital start-ups while remaining difficult to embed in the business model. For ASEAN, this tension is practical: digital expansion can open markets and services, but gaps in affordability, skills and connectivity can reproduce existing inequalities.

Accordingly, we expect digital entrepreneurship to strengthen sustainability-oriented innovation capability through faster experimentation, better connectivity, data-enabled learning and new value propositions. That expectation is conditional, not universal. Skills, infrastructure, finance, digital trust and the environmental footprint of the technology all influence whether a digital venture contributes meaningfully to green transition.

**Creative-cultural entrepreneurship as a place-based pathway**

Creative-cultural entrepreneurship starts from a different resource base. Its value is rooted in artistic practice, design, heritage, identity and place-based knowledge rather than primarily in technology. Entrepreneurs create value by adapting those resources through design, storytelling, branding, experience and market access. The development significance lies in the possibility that economic activity can support livelihoods while keeping cultural knowledge active rather than treating it as a static asset.

Batik is a useful Southeast Asian example because culture, enterprise and design are closely intertwined in the sector. The argument here is not that batik is automatically sustainable. Rather, batik shows how inherited knowledge can remain economically relevant when it is combined with design innovation, digital market access and changing consumer preferences. If adaptation strengthens markets without stripping away cultural meaning, creative-cultural entrepreneurship can contribute to livelihood continuity as well as innovation.

This pathway reaches green transition only under additional conditions. Cultural preservation and environmental sustainability are not the same thing. Cleaner materials, energy use, waste management and sourcing determine whether cultural production also improves environmental performance. Creative-cultural entrepreneurship therefore contributes first through adaptation, differentiation and livelihood creation; it becomes more directly relevant to green innovation when responsible production practices are also part of the business model.

Evidence from Indonesian batik SMEs illustrates this layered relationship. Febrianda et al. (2025) find that entrepreneurship and digital technology can support both conventional and green innovation. Their study is useful for the present framework because it shows that heritage-based enterprise is not outside contemporary innovation. Cultural knowledge can be combined with new market and technological capabilities while remaining a distinctive source of value.

The boundary is important precisely because it prevents overclaiming. A culturally valuable enterprise can still rely on environmentally harmful production. Conversely, a small creative enterprise may improve its environmental practices without losing cultural authenticity. The framework therefore separates cultural resilience from green performance and allows both to be assessed. This makes the creative-cultural pathway analytically stronger than simply labelling heritage enterprise as sustainable.

**Social entrepreneurship as a mission-oriented pathway**

Social entrepreneurship is distinguished mainly by its orientation towards a social or community problem. Technology, partnerships and commercial methods may all be used, but the venture is organized around social value as well as financial viability. This makes the pathway particularly relevant to a human-centred transition, because opportunity recognition begins with the question of whose problem is being addressed rather than with technology or heritage as the starting asset.

Research on social innovation also shows that mission is not enough. Yoon and Ho (2025), drawing on cases from South Korea and Singapore, describe social innovation as a system involving entrepreneurs, institutions, intermediaries and support structures. Prateeppornnarong (2026) similarly identifies pro-social motivation alongside managerial competence, stakeholder management and multi-stakeholder governance in Thai social enterprises. Both studies point towards an ecosystem rather than an individual-hero interpretation of social entrepreneurship.

This has implications for entrepreneurship education. If young people encounter entrepreneurship only as business-plan preparation, they may learn to recognize market gaps without asking who benefits from the proposed solution. Exposure to social entrepreneurship broadens that frame. It encourages students to identify a problem, consider affected stakeholders and test whether a proposed response is both useful and financially viable. That habit of reasoning is relevant to a human-centred green transition even when the resulting venture is not formally classified as a social enterprise.

Education therefore matters less because every student should become a social entrepreneur and more. After all, it shapes what counts as an opportunity. Students can be asked to consider profitability together with

resource use, inclusion and durability. In practice, this means examining whether a solution solves a real problem, whether the people expected to benefit can access it, and whether the model can survive beyond a short project cycle. Such questions bring social value into entrepreneurial judgement rather than adding it after a venture has been designed.

The ecosystem evidence reinforces the same point. Social purpose may motivate a venture, but sustained outcomes require organizational capability, partnerships, legitimacy and often finance. Yoon and Ho (2025) emphasize the interaction among actors and support structures, while Prateeppornnarong (2026) highlights managerial and stakeholder capabilities. In the present model, social entrepreneurship contributes to sustainability-oriented innovation when the mission is translated into a solution that can persist, adapt and mobilize support.

Social entrepreneurship should nevertheless remain distinct from sustainable entrepreneurship. Bonfanti et al. (2024) show that the literatures overlap but are not interchangeable. We therefore treat social entrepreneurship as a complementary pathway: its particular contribution is to keep unmet needs, participation and stakeholder value visible within the wider transition, rather than to assume that social purpose is equivalent to environmental performance.

**Institutional and policy ecosystem**

Entrepreneurial innovation does not take place in an institutional vacuum. Access to digital and physical infrastructure, finance, education, intellectual-property arrangements, public procurement, environmental standards and research networks can all influence whether a promising idea is developed, financed and scaled. These conditions also affect who is able to enter the innovation process in the first place.

This institutional dimension is consistent with green-growth evidence. Yang et al. (2024) identify institutional governance as an important part of the relationship between economic capability and green growth, while the ADB (2026) stresses regulatory coherence, skills, investment and private-sector mobilization in ASEAN. A fragmented policy approach can therefore produce isolated programs that each address technology, enterprise or sustainability without creating a pathway between them.

In the framework, institutional and policy support is treated as an enabling condition rather than as another entrepreneurial pathway. It includes access to finance, entrepreneurship education, infrastructure, standards, market access and collaboration among universities, firms, communities and government. These elements influence both the scale of entrepreneurial activity and its direction. The same venture may remain a local experiment in one setting and become a scalable transition solution in another because the surrounding ecosystem differs.

This helps explain why entrepreneurship programs often produce uneven results. Training can strengthen individual skills, but it cannot compensate for missing finance or market access. Environmental standards can signal a preferred direction, yet small firms may still need technical assistance to comply. Universities can generate knowledge and talent, but that knowledge has limited value if there are no channels through which firms or communities can use it. The relevant policy question is therefore relational: which combinations of support allow capabilities to reinforce one another?

The answer is unlikely to be identical across the three pathways. Digital ventures may depend particularly on connectivity, trust and scaling finance. Creative-cultural enterprises may need design capability, certification, intellectual-property awareness and access to wider markets. Social enterprises may rely more heavily on partnerships, blended finance and institutional legitimacy. A coordinated ecosystem does not mean providing the same support to every venture. It means recognizing different constraints while keeping a common direction towards inclusive and sustainable value creation.

**Human-centred regenerative development**

Green transition is usually monitored through indicators such as carbon intensity, renewable-energy use, resource productivity or environmental innovation. These measures are necessary, but they say little about

whether people and communities can participate in the transition and benefit from it. A human-centred perspective adds that distributional question to the environmental one.

Relevant outcomes therefore include more than income growth. Decent livelihoods, access to entrepreneurial opportunities, skills, participation, social inclusion, community resilience and cultural continuity all matter to the quality of transition. Amorós et al. (2021) show that entrepreneurship also has consequences for subjective well-being, reminding us that entrepreneurial outcomes are experienced by individuals as well as firms. At a regional level, the practical question is whether greener economic change produces opportunities that are accessible and durable.

Regenerative development gives the framework a more demanding endpoint. Mang and Reed (2012) approach regeneration through the potential of place and the co-evolution of human and ecological systems. Hahn and Tampe (2021) translate a similar logic into business strategy by arguing that firms can contribute to the health of the social-ecological systems on which they depend. We use the term in that spirit: economic activity should not only reduce damage, but where possible strengthen environmental, social, cultural and human capacities while remaining economically viable.

This is different from using 'regenerative' as a decorative synonym for sustainability. The distinction is about direction. A sustainability strategy may aim to reduce harm or maintain acceptable conditions; a regenerative orientation asks whether the wider system becomes more capable over time (Hahn & Tampe, 2021; Mang & Reed, 2012). The trade-offs are real. A program can create local income without reducing environmental pressure, and an environmental intervention can improve resource efficiency while leaving communities economically fragile. The framework keeps those tensions visible instead of assuming that all desirable outcomes move together.

Human well-being belongs in the model for the same reason. Entrepreneurship is not experienced only through revenue, productivity or firm survival. Amorós et al. (2021) show that motivation is associated with differences in subjective well-being. At the community level, similar concerns appear in participation, resilience and livelihood quality. We do not claim that entrepreneurship alone delivers these outcomes. Rather, they provide a test of transition quality: are the opportunities created through innovation meaningful and accessible to the people expected to live with the transition?

## 3. Research Methodology

We used an integrative conceptual review because the research question crosses literatures that do not share one set of constructs, methods or levels of analysis. A meta-analysis would not be appropriate for this purpose, and the paper is not presented as an exhaustive systematic review. Following Snyder (2019), we made the review process explicit enough for readers to see how literature was identified, selected and brought together. The aim was conceptual explanation rather than article counting.

The search and reading process was organized around six domains that came directly from the research questions: green economy and green transition; digital entrepreneurship; creative-cultural entrepreneurship; social entrepreneurship and social innovation; institutional and policy ecosystems; and human-centred or regenerative development. We used iterative combinations of these domain terms, including related expressions such as digital sustainable entrepreneurship, institutional quality, entrepreneurial ecosystem and sustainability-oriented innovation. Regional policy reports were included when they offered direct ASEAN context.

A source was retained when it served at least one clear purpose in the framework: defining a focal construct, supporting a proposed relationship, or identifying a condition, limitation or regional feature that affected that relationship. Priority was given to peer-reviewed work and authoritative regional reports, with recent studies preferred where suitable. Older sources were kept when they were foundational to the argument, as with dynamic capabilities and regenerative development. Descriptive sources with little conceptual relevance were not used as core evidence.

During reading, we extracted five kinds of information rather than coding for effect sizes. For each entrepreneurial pathway, we asked: what resource does the pathway start from; how is value created; where is the sustainability relevance; what conditions strengthen or weaken the mechanism; and what economic, environmental or human outcomes are discussed? This made it possible to compare firm-level studies, cross-country evidence and regional reports without pretending that they were methodologically equivalent.

The synthesis then focused on convergence and difference. Innovation capability appeared repeatedly as a point of connection, but the literature also provided reasons not to equate the three pathways. Digital entrepreneurship is not the same as digitalization; cultural enterprise is not automatically green; and social entrepreneurship is not synonymous with sustainable entrepreneurship. Keeping those distinctions was important because the framework depends on explaining how different starting points can converge without erasing their boundaries.

The framework emerged through three rounds of comparison. We first mapped the value-creation logic of each pathway separately. We then compared the pathways to identify a common capability that could plausibly connect their different resources with sustainable transformation. Finally, we added institutional conditions and downstream human outcomes to explain why similar entrepreneurial ideas may have very different transition effects in different settings. The five propositions were developed from this final configuration.

This method involves judgement. Conceptual fit across heterogeneous literatures cannot be reduced to a mechanical inclusion rule, so the claims have been kept proportionate to the review design. We do not report an exhaustive article count, pooled effect or ranked list of determinants. The framework should instead be read as a middle-range explanation that can be challenged and tested in later empirical work.

Its intended domain is emerging economies, especially ASEAN, where digital growth, cultural enterprise, social innovation and sustainability pressures coexist. The relative importance of each pathway is likely to vary with sectoral structure, market maturity and institutional capacity. That variation is not a weakness of the model; it is one of the questions the model is designed to make testable.

## 4. Proposed Conceptual Framework and Propositions

The framework begins with a deliberately simple claim: entrepreneurs can start from very different resources and still contribute to the same broad transition. Digital entrepreneurship begins largely with technology, connectivity and data. Creative-cultural entrepreneurship works from heritage, design and local knowledge. Social entrepreneurship begins with mission, stakeholder relationships and community needs. Rather than forcing these pathways into one category, the framework asks whether each can build a capability for sustainability-oriented innovation.

That capability is the point at which an entrepreneurial idea becomes relevant to green transition. It involves moving from experimentation to changes in products, services, processes, resource use or business models. Institutions and policy shape whether this movement can continue. Finance, education, infrastructure, standards and collaboration may help an innovation travel beyond its original setting, while their absence can leave it fragmented. The endpoint is intentionally broader than environmental performance because transition quality also depends on livelihoods, resilience and well-being.

**Figure 1: Triadic Entrepreneurship-Regeneration Framework**

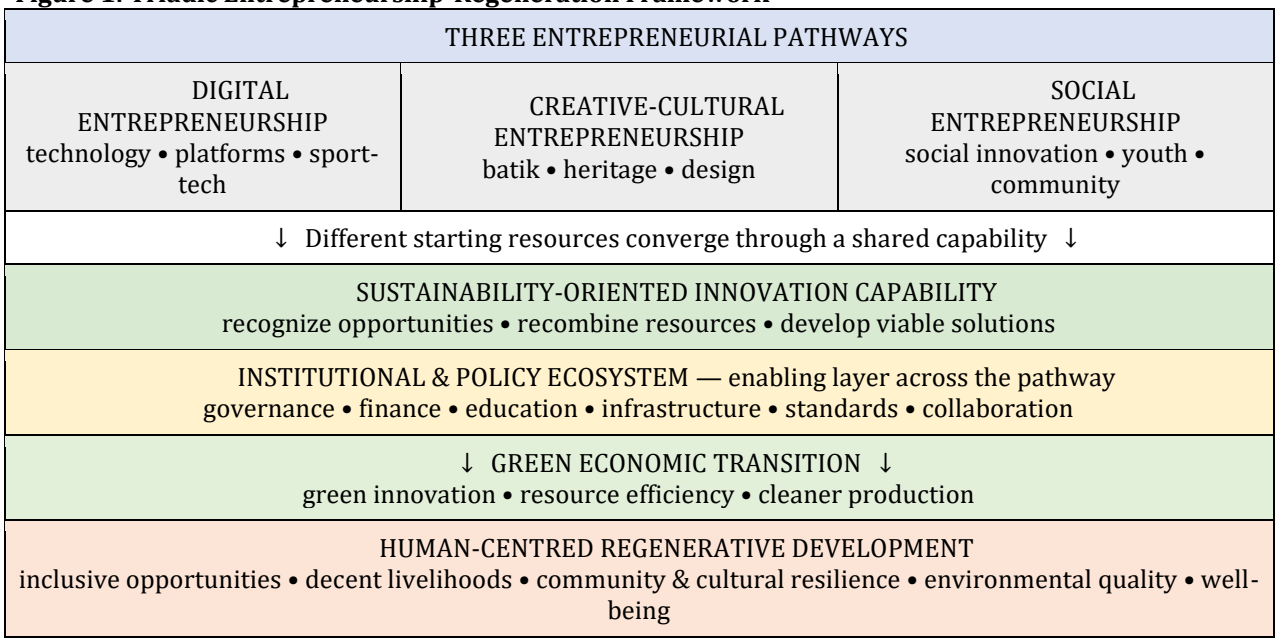



**Table 1: Entrepreneurial pathways, mechanisms and expected contributions**

| Construct | Primary resource/base | Proposed mechanism | Expected contribution |
|---|---|---|---|
| Digital entrepreneurship | Technology, platforms, connectivity and data | Technology-enabled experimentation, access and information efficiency | Sustainability-oriented innovation capability |
| Creative-cultural entrepreneurship | Heritage, design, cultural knowledge and place | Cultural adaptation, design innovation and market differentiation | Sustainability-oriented innovation capability and cultural resilience |
| Social entrepreneurship | Social mission, stakeholder networks and community needs | Problem-solving, social innovation and collaborative value creation | Sustainability-oriented innovation capability and inclusion |
| Institutional & policy ecosystem | Governance, finance, education, infrastructure, standards and collaboration | Reduces barriers, enables scaling and aligns capability with transition goals | Strengthens the capability-to-transition relationship |
| Green economic transition | Green innovation, resource efficiency and cleaner production | Economic and environmental transformation | Human-centred regenerative development |

**Distinctive mechanisms and boundary conditions**

Digital entrepreneurship works mainly through speed, connectivity and information efficiency. Those advantages are not available equally everywhere. Weak digital skills, poor affordability, limited infrastructure, low trust or a resource-intensive digital system can reduce the expected sustainability benefit. Digital intensity may widen access in one setting and deepen exclusion in another.

Creative-cultural entrepreneurship works through the adaptation of heritage, design and place-based knowledge. Its main constraints are different: cultural authenticity, intellectual-property protection, market

access and the environmental performance of production. A culturally valuable product may be economically successful and still have a poor environmental footprint, so cultural value should not be used as a proxy for green performance.

Social entrepreneurship relies on mission-driven problem solving and stakeholder mobilization. Here, the main limits arise when a socially useful idea lacks financial viability, managerial capability or stakeholder legitimacy, or when growth produces mission drift. The pathway therefore depends on an organizational model that can preserve purpose while remaining capable of surviving and scaling. Institutional quality cuts across all three pathways. Finance, skills, infrastructure, standards and collaboration affect how far an innovation can move beyond local experimentation. These conditions do not remove the differences among the pathways. They determine whether those differences can be converted into a sustainability-oriented capability that has wider economic relevance.

**Propositions**

Proposition 1 (P1): Digital entrepreneurship is expected to strengthen sustainability-oriented innovation capability through connectivity, technological adoption, data-enabled learning and technology-enabled value creation. The reasoning is primarily capability-based. Digital tools can shorten experimentation cycles, improve access to information and support new service configurations. We do not expect a direct or automatic improvement in green performance. The sustainability effect depends on what the application is designed to do, its resource footprint and the institutional conditions under which it operates (Gregori & Holzmann, 2020; Seidl & Bican, 2025).

Proposition 2 (P2): Creative-cultural entrepreneurship is expected to strengthen sustainability-oriented innovation capability when cultural and creative assets are adapted into economically viable value while social and environmental considerations are retained. Cultural and creative assets are treated here as productive resources, not as passive heritage. Design, storytelling and market adaptation can renew their economic relevance, and digital tools can extend market reach. Febrianda et al. (2025) provide a useful batik example. The proposition remains conditional because cultural innovation contributes more directly to green transition when adaptation is accompanied by responsible production, resource efficiency or other environmentally relevant practices.

Proposition 3 (P3): Social entrepreneurship is expected to strengthen sustainability-oriented innovation capability when mission-driven problem solving is combined with stakeholder collaboration and organizational capability. This proposition is concerned with the direction of entrepreneurial purpose. Social ventures begin from unmet needs and stakeholder value, which gives them a natural connection to inclusion and community problem solving. Yet purpose alone is insufficient. Evidence from Yoon and Ho (2025) and Prateeppornnarong (2026) suggests that social innovation depends on ecosystems, managerial competence and stakeholder relationships. The pathway becomes transition-relevant when social purpose is converted into a viable solution that can persist and, where appropriate, scale.

Proposition 4 (P4): Sustainability-oriented innovation capability is expected to contribute positively to green economic transition, with the strength of this relationship depending on institutional and policy support. A firm may possess a promising innovation and still be unable to diffuse it because finance, standards, infrastructure, market access or legitimacy are missing. Institutional support can lower those barriers and align private experimentation with wider transition goals. This logic is consistent with evidence on institutional quality and green growth and with the ADB's (2026) emphasis on policy coherence, investment and skills. The proposition therefore distinguishes having an innovation from having the conditions needed for that innovation to matter at scale.

Proposition 5 (P5): Green economic transition is more likely to support human-centred regenerative development when environmental gains are accompanied by inclusive economic opportunities, viable livelihoods, community and cultural resilience, and improved well-being. The final proposition treats green transition as a route to development rather than as the endpoint itself. Cleaner production and greater resource efficiency remain essential, but the transition is more complete when people can participate in the opportunities it creates and communities are better able to absorb future shocks. This broader outcome also

makes trade-offs visible: empirical work can ask whether environmental improvement is accompanied by human gains or whether one is being achieved at the expense of the other.

## 5. Discussion and Conceptual Contributions

The framework's first contribution is to make the mechanism between entrepreneurship and green transition explicit. Entrepreneurship is not assumed to cause green outcomes directly. Its relevance depends on whether entrepreneurial activity produces a capability for sustainability-oriented innovation. This shifts the question from 'does entrepreneurship matter?' to 'what kind of capability is created, and in what direction is it used?' Dynamic capabilities therefore become useful not only for understanding adaptation, but also for asking whether adaptation moves economic activity towards better environmental and social outcomes.

A second contribution is to take entrepreneurial diversity seriously. A mobile application, a heritage-based enterprise and a community-oriented social venture may appear to belong to different conversations. They do. The framework does not try to collapse them into one category. Instead, it shows that different resource bases can still feed into a shared capability mechanism, provided the differences in how value is created are kept visible.

That plural view matters in ASEAN because advanced digital ecosystems exist alongside craft-based microenterprises, cultural industries and community ventures. A model built only around frontier technology can miss local knowledge and forms of innovation that are embedded in place. A model built only around community enterprise can understate what digital tools make possible. The regional context therefore strengthens the case for analyzing several entrepreneurial pathways within the same transition framework.

This changes the level at which entrepreneurship enters green-economy research. Rather than treating entrepreneurship as one more variable in a determinants model, the framework asks which resources entrepreneurs mobilize, what capability those resources produce and which conditions allow that capability to influence transition. The approach can still be tested quantitatively later, but it retains the qualitative differences among entrepreneurial forms that a single aggregate indicator would hide.

The pathways may also reinforce one another. Digital tools can help cultural enterprises reach wider markets, cultural knowledge can differentiate digital offerings, and social purpose can influence how either type of venture defines value. Some of the most interesting cases may therefore be hybrid rather than pure examples of one pathway. This opens a useful empirical question: do combinations of pathways produce stronger sustainability outcomes than any pathway operating alone?

A third contribution is the refusal to equate novelty with sustainability. Digital technologies can increase efficiency, creative ventures can create new markets and social enterprises can address local needs, but none of these outcomes is automatically green. Sustainability orientation acts as a directional test. It asks whether an innovation changes resource use, production practices, inclusion or other transition-relevant outcomes in a meaningful way.

The creative-cultural pathway adds a place-based dimension that many transition models overlook. Cultural assets can support livelihoods and local identity, but they need adaptation if they are to remain economically viable. When design, market access and responsible production are combined, creative enterprise can contribute to resilience without reducing heritage to a commodity. The key is to separate cultural continuity from environmental performance while allowing the two to reinforce one another.

The social pathway adds a distributive dimension. A technically efficient transition can still be developmentally weak if opportunities are concentrated among a small group of firms or communities are excluded. Social entrepreneurship keeps attention on unmet needs, participation and stakeholder value. In this sense, it brings the question of 'who benefits?' into the innovation process itself.

The final contribution concerns the endpoint. Environmental efficiency remains central, but the framework treats it as part of a wider development judgement. A transition is stronger when it also expands capabilities,

supports viable livelihoods and leaves communities better able to cope with future shocks. Regenerative development is used in that sense: not as one narrow measurable variable, but as an orientation towards building economic, ecological, social and cultural capacity over time.

**Managerial and Policy Implications and Recommendations**

The policy implication is not that governments need another stand-alone entrepreneurship program. The stronger message is that green-economy policy, digital policy, creative-economy support and social-enterprise development should speak to one another. Digital-skills programs can include sustainability applications; creative-economy support can address cleaner production and circular design; and social-enterprise initiatives can connect community problem-solving with green innovation. Integration matters because entrepreneurs make business-model decisions before many sustainability requirements are imposed on them.

For economic-development agencies, this means avoiding policy silos. Digital adoption can accelerate activity without improving transition quality if resource use and access are ignored. Cultural-enterprise support can increase sales while leaving production practices unchanged. Social-enterprise programs can celebrate mission while underinvesting in managerial capability. Support is more likely to produce durable value when technology, markets, finance, sustainability and social purpose are considered together at the point where ventures are being developed.

Universities have a particular role because they sit between knowledge creation, youth development and external stakeholders. Applied projects, living laboratories and university-community-industry collaborations can give students experience with real problems while giving firms and communities a space to test ideas. This is relevant in ASEAN, where universities are simultaneously expected to contribute to employability, digital transformation, innovation and sustainable development.

Industry involvement is equally important for the next stage of the framework. Sport-tech firms, batik and other creative SMEs, and social enterprises can act as practice partners in testing whether the proposed mechanisms make sense outside the literature. Expert panels, co-design workshops and pilot cases could help refine the measurement of sustainability-oriented innovation capability before larger empirical work. The value of industry involvement lies in validation and learning, not in adding names to the author list.

Financing and market access also need to reflect the diversity of the three pathways. Digital ventures may require technology investment and scaling finance. Creative-cultural enterprises may benefit more from design support, certification, branding and market development. Social enterprises often depend on partnerships, blended finance or outcome-oriented procurement. A green-finance system focused only on large infrastructure projects can therefore miss smaller forms of innovation that matter to local transition.

Institutional quality remains a basic condition across these interventions. Predictable regulation, clear environmental standards, functioning digital infrastructure, intellectual-property protection, skills and coordination all reduce uncertainty for entrepreneurs. The ADB (2026) similarly emphasizes policy coherence, private-sector participation and skills in ASEAN's transition. The policy objective is not simply to increase entrepreneurial activity, but to create conditions in which useful innovation can be developed and directed towards sustainable outcomes.

Monitoring should follow the same logic. Emissions and resource intensity remain important, but they should be read alongside indicators of decent work, entrepreneurial access, community resilience, cultural capability and well-being. A policy that improves environmental performance while narrowing economic participation should not be treated as an unqualified success. The framework therefore suggests evaluating both ecological performance and the quality of development produced by the transition.

**Implications for Future Research**

The framework has clear limits, and those limits define the next research tasks. The relationships proposed here are theoretical rather than empirically established. The pathways can overlap in practice, and green transition does not mean exactly the same thing across sectors or countries. Institutional support is also represented at a relatively broad level. Future research therefore needs to test construct boundaries and

examine whether the proposed mechanisms behave differently across ASEAN settings rather than assuming that one configuration fits the region.

Measurement will be particularly important. Digitalization can be represented through infrastructure, adoption or platform use; entrepreneurship through firm entry, activity rates or sector-specific measures; and institutional quality through governance indicators. Sustainability-oriented innovation capability is harder to capture because it combines the ability to innovate with the direction of that innovation. Future measures will need to distinguish general innovation capacity from innovation that is explicitly related to resource efficiency, cleaner production, inclusion or other transition goals.

A Malaysia-Indonesia comparison could be useful for this purpose. The two economies are geographically close and institutionally connected within ASEAN, yet they differ in market scale, entrepreneurial ecosystems and policy arrangements. A comparative design could test whether the same determinants operate differently across the two settings and whether institutional quality changes the strength of the entrepreneurship-transition relationship. A broader ASEAN panel would sacrifice some institutional depth but provide greater generalizability. Both approaches are compatible with the framework.

At the macro level, the model can be translated into testable relationships among digitalization, entrepreneurship, green innovation, institutional quality and green economic transition. Panel data would make it possible to examine direct effects as well as mediation, moderation or threshold behavior. Human-development indicators could then be added to test whether stronger green performance is associated with more inclusive outcomes rather than assuming that the two necessarily move together.

At the meso level, the focus can shift to entrepreneurial ecosystems in particular cities or regions. Comparative work could examine how universities, government agencies, creative industries, digital ventures and social enterprises interact, and whether different ecosystem configurations produce different forms of green innovation. This level is useful because national indicators often hide the place-based institutions and relationships through which entrepreneurs actually operate.

At the micro level, multiple case studies offer a direct route to the three pathways. Sport-tech or other application-based ventures could represent digital entrepreneurship; batik or heritage-based firms could represent creative-cultural entrepreneurship; and education- or community-oriented ventures could represent social entrepreneurship. Comparing these cases would allow researchers to identify common capabilities while retaining sector-specific constraints and differences in sustainability mechanisms.

For a later doctoral study, the framework can be simplified into a more parsimonious empirical model. One possible design is to examine digitalization, entrepreneurship, sustainability-oriented innovation capability and institutional quality as drivers of green transition, with innovation capability tested as a mediator and human-centred development as a downstream outcome. This would preserve continuity with earlier research on the determinants of green economy while adding the mechanisms and distributional questions that the present conceptual paper brings into view.

**Conclusion**

Green economic transition is better understood as a process than as a single technological shift. Entrepreneurs, firms, institutions, communities and public policy all shape how value is created and how quickly new practices spread. By placing digital, creative-cultural and social entrepreneurship in the same framework, this paper shows that their contribution does not arise from being similar. It arises from the different resources they bring into a shared capability for sustainability-oriented innovation.

The Triadic Entrepreneurship-Regeneration Framework makes two points. First, heterogeneous entrepreneurial starting points can converge through a capability mechanism without losing their distinctive logics. Second, environmental improvement is not a sufficient test of transition quality. Institutions and policy determine whether useful innovations move beyond isolated experiments, while human-centred regenerative development asks whether greener economic activity also broadens opportunity, strengthens livelihoods and supports resilience.

The practical implication is modest but important. Innovation has developmental value when it creates sustainable value for people, place and the future. For ASEAN, green transition should therefore be treated neither as an environmental obligation nor simply as a race to adopt new technology. It is also an opportunity to connect digital capability, cultural creativity, social purpose and institutional support in ways that make economic development more resilient, inclusive and worth sustaining.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Social Risk Management of Artificial Intelligence in Higher Education: A Conceptual Framework

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**Abstract:** With the rapid uptake of artificial intelligence (AI) in higher education, academic risks need to be viewed as not only technical issues but as socio-institutional harms that impact equity, trust, and accountability. The methodology used for this study is a conceptual literature review and qualitative synthesis of existing academic research. This study tackles the problem existing in the literature, which is unstructured definitions, by synthesizing the literature to create a complete conceptual framework for Social Risk Management (SRM). The proposed framework places SRM in a unique role, serving as the institutional interface between the introduction of AI and social outcomes, with the role of a mediator and moderator between the raw technical inputs and the negative effects of AI on society. There are four main operational pillars of SRM identified in the synthesis. This study also adds the competency of SRM as a core competency of governance, not only for its ethical dimension but also for being a proactive competency. Moreover, it offers a clear research program for future empirical studies, detailing potential ways to measure SRM and to investigate its differences in various application areas of universities, such as admissions, financial aid, tutoring, and even assessment.

**Keywords:** *Social Risk Management, Artificial Intelligence, Higher Education, Institutional Governance, Conceptual Framework*

## 1. Introduction and Background

Artificial intelligence (AI) is becoming part of higher education to support learning analytics, tutoring, automated or assistive assessment, student support, and university governance and decision-making (Malynoshevskyi, 2023). The focus of the literature examined here is a single point: AI risks cannot be expressed as only technical problems of reliability (e.g., error rate of the model). Risks, however, are only socio-institutional harms that rely on the design, governance, and legitimation of practices enabled by AI in universities. "Risk" is then articulated as multi-dimensional, encompassing transparency, privacy, bias/discrimination, and governance, and the "social" impact of AI is then brought to the fore when systems impact participation, equity, trust, the student experience, and accountability structures.

AI initiatives in academia, as detailed by Schaeffer et al. (2024), demand governance and compliance oversight, no matter how small, in areas including transparency, user privacy, data confidentiality, data integrity, and system availability, as well as vulnerabilities like bias and discrimination. Likewise, Radzhabov et al. (2026) explicitly systemise socio-economic and social risks resulting from the use of AI in the educational process and list the social risks, which encompass digital inequality, discrimination and algorithmic bias, loss of trust and motivation. Malynoshevskyi (2023) also notes that the extensive use of AI can exacerbate existing social risks and introduce new dilemmas in the educational field, where discrimination and marginalisation are intertwined with institutional policies and implicit social norms.

This socio-technical dynamic is particularly pronounced in Malaysia, where the higher education system is experiencing a fast-paced policy-driven digital transformation (Jamaluddin et al., 2025). The transition is facilitated by strong national policies such as AI-RMAP 2021-2025 and the Digital Education Policy (DEP) that have incorporated the use of AI to develop competencies in the Fourth Industrial Revolution (IR4.0) in tertiary students (Jamaluddin et al., 2025). But it is a push from the top that has to be confronted with real-life student-level complexities. Previous empirical modelling of Malaysian undergraduates has found that performance expectancy and peer social influence (Mohamad Mozie et al., 2025) are significant factors for student adoption of generative tools such as ChatGPT. Furthermore, Abd Malik et al. (2024) found that Malaysian university

students always underestimate or overlook the critical concerns of using AI in writing, the research process, data analysis, cognitive over-dependency, and academic dishonesty.

These works stimulate the main question of this literature review: What is the relationship between social risk management and the risk connoted by AI in higher education contexts? In all studies, social risk management is defined as an institutional governance capacity that forecasts, avoids, reduces, and monitors social risks related to the adoption of AI, such as social risks relating to fairness and inclusion, human accountability, procedural legitimacy, and the maintenance of educational values. Research conceptualizing "social risk management" within the context of artificial intelligence in higher education is notably lacking.

The reviewed sources use different terms for the concept of “social risk management”, but share the view that it is a system of institutional behaviours to shield stakeholders against negative societal impacts of AI. There are components that keep repeating themselves, which can be synthesized. Equity-oriented mitigation steps are needed for social risk management: discrimination, algorithmic bias, and unequal access. Digital inequality and discrimination or algorithmic bias are identified by Radzhabov et al. (2026) as a social risk. Akhtar (2024) and Ladyzhets (2024) continue this theme with an emphasis on fairness, inclusivity, and narrowing of access gaps as AI risks.

Second, social risk management requires human-centred control and accountable decision-making. Babić & Matović (2025) provide a risk-assessment logic linking probability of risk occurrence to the degree of teacher control and AI automation. Their results indicate that a combination of high control and high automation is most effective in mitigating risks, whereas low control with high automation is the riskiest scenario. This control mechanism also happens in a social way, even if the goal isn't explicitly social, as it influences the students' experience of the decisions made by AI and their ability to contest those decisions, as well as the ability of the stakeholders of the decisions to have meaningful agency.

Third, social risk management involves procedural and governance safeguards including risk-tiered authorization, impact assessment, human oversight, decision logging, audit, and contestability. Zou and Wang (2026) describe these elements in the context of an adaptive governance model of AI-powered digital governance in higher education, highlighting risk boundaries like data extraction and purpose drift, algorithmic bias and opacity, automation reliance and responsibility fragmentation, and deviation from education values. The governance orientation is also emphasized by Schaeffer et al. (2024), who consider risk-management frameworks such as NIST AI RMF and highlight stakeholder engagement, due diligence, and compliance.

Overall, the literature provides evidence that social risk management is not an isolated and marginal issue. It is an operational governance capability for organizing the use of AI towards socially acceptable outcomes and minimizing the risk of AI harms to society.

**Conceptual Research Objective**

The main conceptual goal of this study is to explore the connection between Social Risk Management (SRM) and the multi-dimensional risks of Artificial Intelligence (AI) adoption in Higher Education (HE). This study not only considers AI risks as technical issues of model reliability or error rates, but also as socio-institutional harms that are shaped by the design, governance, and legitimation of practices facilitated by AI in university environments. Specifically, in this study, the function of SRM as an “institutional interface” in order to capture the inputs of the AI implementation before they turn into socially consequential harms is evaluated.

## 2. Methodology

This study employs a Systematic Literature Review (SLR) approach to systematically gather, assess, and integrate the vast number of publications on AI deployment and governance in higher education. The review protocol is designed to be transparent, rigorous, and reproducible in literature identification and selection, following the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement and ROSES (Reporting Standards for Systematic Evidence Syntheses). To guarantee the wider and fuller coverage of higher education governance and educational technology as well as social risk management, literature retrieval was carried out via multidisciplinary and field-specific academic databases: Scopus, the

major bibliographic database, which has broad coverage of peer-reviewed journals in the field of social sciences, education, computer science, and institutional governance. Web of Science (WoS): Used to retrieve high-impact peer-reviewed research articles/letters across the Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCI-EXPANDED). Google Scholar: A complement to the academic search engine to find the latest in-house research reports, working papers, and new press materials. Targeted search: Specialized Publisher Databases were used for targeted searches to collect specialized technical governance and education technology publications from IEEE Xplore, ScienceDirect, SpringerLink, and Wiley Online Library.

**Table 1: Inclusion and Exclusion Criteria Matrix**

| Criterion | Inclusion Criteria | Exclusion Criteria |
|---|---|---|
| Timeframe | Recent literature (2023–2026) reflecting current generative AI capabilities. | Pre-2023 publications lacking relevance to current generative AI tools. |
| Context | Higher education institutions (undergraduate, postgraduate, administration). | K-12 primary education or corporate settings without university governance. |
| Thematic Focus | Social risk mitigation, institutional risk controls, equity, trust, oversight. | Purely technical software benchmarking lacking institutional social analysis. |
| Document Type | Peer-reviewed journal articles, indexed book chapters, conference papers. | Non-peer-reviewed blog posts, media opinion pieces, or editorials. |

## 2. Literature Review

There are multiple ways in which AI-related risks can affect social outcomes. Several pathways are given by the reviewed sources toward the socially consequential effects of AI-related risks.

**Algorithmic discrimination, inequity and participation.**
The pathway that dominates is algorithmic discrimination and unequal participation. Digital inequality, falling trust and motivation, and discrimination and algorithmic bias are explicitly mentioned by Radzhabov et al. (2026) on their list of social risks. According to Malynoshevskyi (2023), there is a policy-linked explanation: discrimination and marginalisation can occur in institutional decisions based on AI, as personal values, prejudices, and implicit social norms influence social interaction logic. This means that social risk management needs to consider not just technical bias, but also institutional frameworks that license or validate the outputs from AI.

Bias is not the only equity issue. It is important to make sure that AI technologies are accessible to everyone in higher education institutions, as pointed out by Akhtar (2024), and that their use in development can help create some socio-cultural risks, like increasing inequity in access (Ladyzhets, 2024). Overall, these sources indicate that in its current form, AI is creating social risk by reconfiguring educational opportunities and exacerbating inequalities.

**Trust, legitimacy and impacts on student experience**
Another is the loss of trust and concerns about legitimacy. Social risks are explicitly mentioned by Radzhabov et al. (2026) and include a lack of trust and a lack of motivation. While promising, AI deployment could lead to extensive surveillance systems and management practices that can constrict the physical, emotional, and intellectual experiences of students, cautions Aper (2024). Whilst Aper's (2024) focus is on the lens of leadership decision-making, the message is that AI risk is social when it is related to student perceptions of autonomy, dignity, and perceived fairness.

From this perspective, social risk management includes managing the institutional narrative and procedural legitimacy of AI decisions. If students feel AI is interfering with their learning, taking away responsibility, or not aligned with educational values, the risks of AI are not just about the accuracy of the results but about the social impact on students, including decreased engagement, decreased motivation, and contested legitimacy.

**A lack of accountability and mismatch between governance structures and accountability**

A third path relates to diffusion of responsibility and misalignment of governance. Automation dependence and responsibility diffusion are the risks they outline, which can happen when AI is adopted into university governance without proper oversight and accountability structures. The risks they highlight are automation dependence and responsibility diffusion, which can arise when AI is implemented in university governance without sufficient human oversight and accountability mechanisms. They also highlight problems of misalignment with educational values and criticize the idea of AI being neutral in terms of productivity or as a standalone decision-maker. Schaeffer et al. (2024) add to that by stating the requirements for risk assessment and governance and compliance issues (e.g., transparency, privacy, data integrity, data availability). These categories are frequently referred to as "technical-governance domains" but have social implications, since the lack of transparency and accountability diffusion diminishes the power of those impacted to challenge results.

**Socio-cultural transformation and human-centred educational values**

Lastly, in socio-humanitarian and sociological texts, a socio-cultural path is highlighted. AI impact is placed in the context of an increasingly dangerous society by Ladyzhets (2024), who believes that social media should be coordinatedly managed at all levels, while at the same time emphasizing that AI gives rise to new forms of sociality in higher education. Similarly, Shahnazaryan & Shahnazaryan (2024) regard risks as increasing inequities in access and loss of human connection, while emphasizing the importance of socio-cultural and ethical considerations of AI.

All these together suggest that social risk management should see higher education as a social institution and risks as the change of learning relationships and the maintenance (or loss) of human-centred educational values.

## 3. Operational Pillars of Social Risk Management

Although not every source includes empirical tests of "social risk management" as a construct, there are mechanism-level mitigation approaches that, while not identical to and not all covering social risk management, can be tied to the social risk management framing.

**The control–automation risk gradient and human control.**

In our set, the clearest mechanism-level evidence is offered by Babić & Matović (2025). They have adopted a human-centered approach to charting risk probabilities based on teacher control and AI automation in their study. They draw the conclusion that risk reduction is best achieved with both high control and high automation, but with low control and high automation it is the riskiest combination. This finding can be socialized: decisions can be opaque or less contestable when AI automation moves forward without meaningful teacher control; teacher control is more likely to give rise to social accountability and understanding of context. This mechanism provides the foundations for a social risk management justification that institutional safeguards should not operate at its extremes: "full automation without oversight" or "control without functional integration." Risk management, rather, relies on assigning roles in such a way that it maintains responsibility, equity, monitoring, and interpretation in the human context.

**Governance frameworks: Oversight, Auditability and Contestability.**

Kifaru (2026) and Zou & Wang (2026) suggest an adaptive governance framework especially developed for digital governance with AI in universities. The principles that they apply involve risk classification and authorization, impact assessment, human oversight, decision recording, audit, contestability, and institutional updating. Importantly, they do not advocate for a form of autonomous AI decision-making and do not regard AI as an automatic productivity tool. From the perspective of social risk management, these are meant to maintain the legitimacy of the procedure and diminish the risk of irreversible harm generated by AI. The same governance requirements are identified for higher education AI systems by Schaeffer et al. (2024), and the benefits of risk-management frameworks are discussed for facilitating discussion and due diligence among stakeholders. Their work is more extensive than governance in higher education institutions; however, the governance aspects are closely related to the social risk management aspects noted earlier.

**Adopted responsibility strategies and ethical/inclusivity commitments**

Akhtar (2024) and Tomakova & Tomakov (2026) offer integrative approaches to AI risk mitigation in education. Akhtar (2024) outlines opportunities and risks and suggests comprehensive integration strategies that have minimal impact and ethical considerations (transparency, fairness, and inclusivity). Tomakova & Tomakov (2026) list and categorize risks at the technological, ethical, psychological, cognitive, social, pedagogical, and legal/regulatory level, and state that the process of risk recognition helps to reduce negative impacts and preserve human factors through regulation, teacher retraining, and technical infrastructure. These works suggest that there is a need for social risk management to rely on both procedural governance (rules and oversight) and capability building (such as training teachers) to ensure that social safeguards can be put in place. Nagy et al. (2024) discuss the factors and obstacles towards AI being adopted in higher education systems. It brings to the fore the ethical, institutional, and geographical differences in the adoption of AI, and offers empirical grounding on the differences between institutional readiness and real risks of adoption.

**Role shift in institutions and pedagogical/participatory change and reconfiguration.**

Multiple sources highlight the need to reassess the roles of participants and educational approaches to address AI risks. Vidrevich et al. (2026) identify the danger of bias in evaluation, decreased critical thinking abilities, and suggest ways to mitigate the dangers through the redesign of the roles of all participants and the revision of teaching methods and pedagogical technologies. In addition, Vasoya (2023) focuses on mitigation as parental and educators' strategies and responsibilities. This transformation of roles mirrors the social aspect of risk, as it focuses on who has the authority, students' perceptions of AI interactions, and how the learning process continues to be shaped by developmental and humanistic objectives.

**The social risk management-AI risk connection in higher education**

Multiple risks stem from the use of AI tools in higher education: these include privacy risks, transparency risks, bias and discrimination risks, opacity risks, dependence on automation risks, and pedagogical disruption risks (Schaeffer et al., 2024; Zou & Wang, 2026; Tomakova & Tomakov, 2026; Vidrevich et al., 2026). Second, such risks associated with AI can become socially hazardous when they lead to harms that affect stakeholders' lived experience and social positions—including inequity, marginalization, loss of trust, decreased student agency, and diffusion of responsibility (Radzhabov et al., 2026; Malynoshevskyi, 2023; Aper, 2024; Zou & Wang, 2026). Third, social risk management is built upon equity-oriented controls, human-centered oversight and governance procedures that ensure accountability, contestability and educational values, reducing AI risk (Babić & Matović, 2025; Zou & Wang, 2026; Akhtar, 2024; Malynoshevskyi, 2023).

This synthesis indicates that social risk management can be proposed as the “institutional interface” between AI systems and social outcomes. The institutional authorization, role allocation, governance, and socio-cultural legitimacy are thus all co-productive of AI risk, as it is not simply tied to the technology itself.

## 4. Research Implications and Gaps

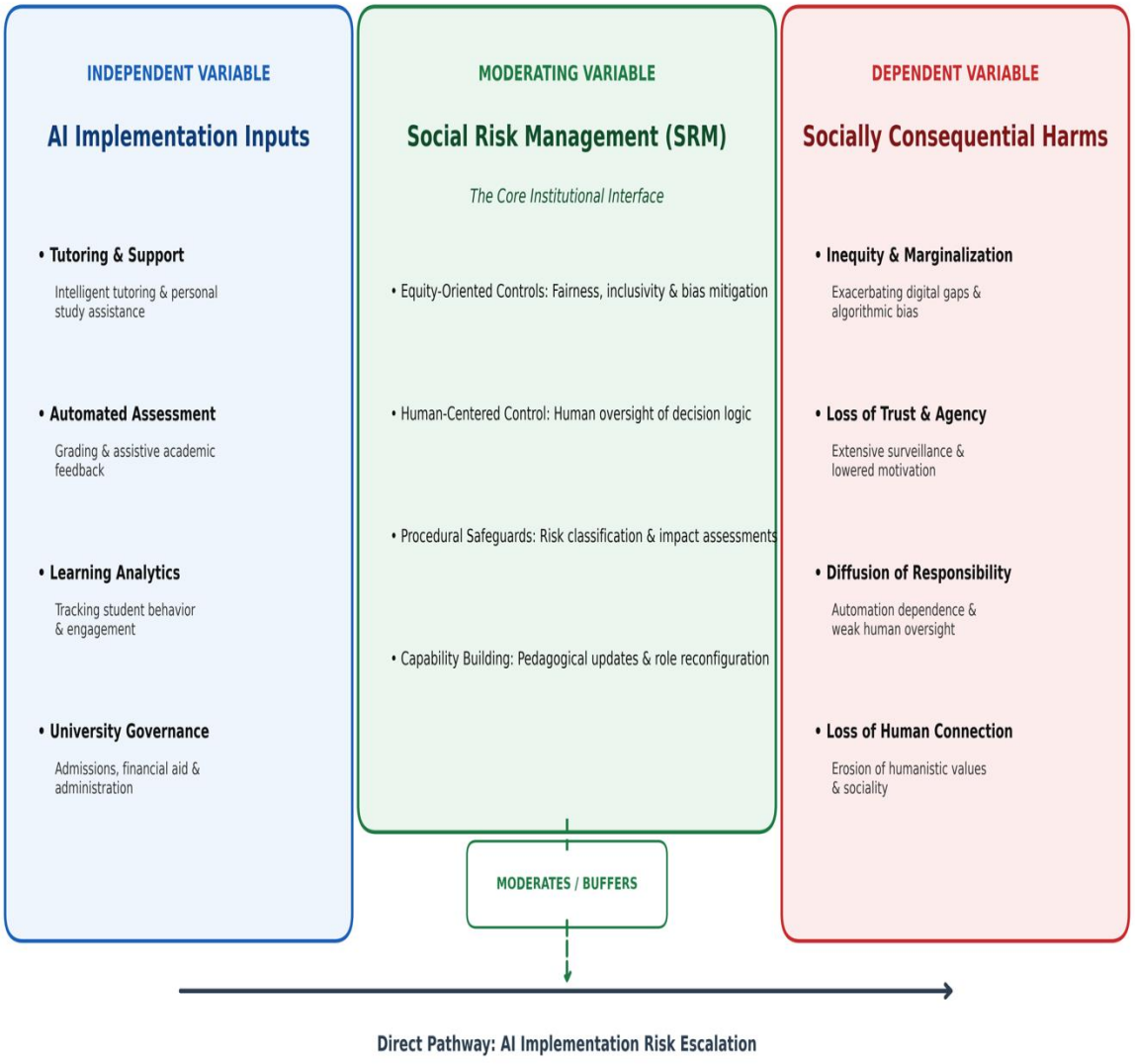
The literature reviewed offers some conceptual and governance bases that are useful, but also identifies gaps. There is a lack of uniform operational definitions of social risk management. The term “social risk management” is not defined as a measurable variable; many sources talk about social risks, governance, and ethical mitigation. This implies that more empirical research is required in order to operationalise this construct (e.g., through governance maturity, safeguards of inclusion and oversight practice, and contestability mechanisms). This is also limited by empirical causal evidence of social risk management-AI risk outcomes. While the majority give conceptual frameworks, classifications, or governance proposals, Babić & Matović (2025) provide the strongest mechanism-level quantification.

There are variable representations in higher education application domains. The correlation between social risk management and specific use cases of AI is not consistently addressed to the same extent in the risks covered, as are the other risks of admission, financial aid, tutoring, and assessment. Despite these disparities, there is a compelling theoretical argument: social risk management is an important mediator/moderator between the implementation of AI in higher education and the socially negative consequences of AI use in HE.

**The conceptual framework**

AI Implementation Inputs (Independent Variable): These are the major operational deployment areas, such as intelligent tutoring systems, automatic assessment and grading systems, learning analytics, and governance of the university. Social Risk Management (Moderating Variable): Comprises four operational pillars implemented by universities: (1) Equity-Oriented Controls, (2) Human Centred Control, (3) Procedural Safeguards, and (4) Capability Building and Role Reconfiguration. Socially Consequential Harms (Dependent Variable): These represent four ways in which the unchecked application of AI can disrupt the social practices of schools: algorithmic inequity and marginalization, loss of student trust and student agency, diffusion of responsibility and loss of human connection

**Figure 1: The Proposed Conceptual Framework**




**Formal Hypothesis Specifications**

**H1:** (Direct Baseline Effect): AI Deployment Scope has a significant positive direct relationship with Social Risk Exposure in higher education institutions.

**H2:** (Main Moderation Effect): Institutional Risk Controls (SRM) significantly negatively moderate the positive relationship between AI Deployment Scope and Social Risk Exposure, such that the impact of AI deployment on social risk exposure is weaker when institutional risk controls are high.
**H2a:** (Fairness Controls): Implementation of Fairness & Inclusion Controls significantly dampens the positive effect of AI automated evaluation on student inequity and marginalization.
**H2b:** (Human Oversight): Human Oversight (Human-in-the-Loop) policies significantly dampen the positive effect of AI academic assistance on student loss of trust and agency.
**H2c:** (Process Transparency): Process Transparency & Appeal channels significantly dampen the positive effect of administrative AI deployment on accountability confusion.
**H2d:** (Staff Adaptation): Staff Training & Adaptation significantly dampens the positive effect of broad AI deployment on student and faculty relational isolation.

## 5. Conclusion

This study reframes social risk management (SRM) as a key institutional governance function of higher education institutions (HEIs) in the fast-paced landscape of AI adoption. Instead, SRM acts as a structural moderating variable, influencing, dampening, and neutralizing the direct risk pathway between the inputs of implementing AI (analytics, automated assessment, tutoring, governance) and socially consequential harms (algorithmic inequity, loss of student trust and agency, responsibility diffusion, erosion of human connection). Universities are able to put in place an active institutional fence that prevents socio-institutional degradation by implementing a four-pillar operational framework: Equity-Oriented Controls, Human-Centered Controls, Procedural Safeguards, and Capability Building. But the need for strong SRM moderation is even greater in developing higher education ecosystems such as Malaysia, where national digital policies and the government's readiness to embrace technology converge with socio-cultural diversity. Malaysia's universities are moving into the implementation of the Malaysia National AI Roadmap, MOHE digital transformation guidelines, and institutional analytics and automation tools, with a drive toward rapid integration of generative AI. Empirical findings from recent studies in Malaysian universities reveal factors that support the use of AI tools as well as emerging issues of equity, integrity, and disciplinary variations, which align with the UTAUT model. In Malaysian higher education, the role of SRM as a moderator is different. The proposed framework puts forth SRM as a formal moderating interface that regulates the level of social risk(s) resulting from the implementation of AI in universities.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Virtual Reality Adoption in Malaysia's Business Events Ecosystem: A Stakeholder Sensemaking Perspective

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**Abstract**: Virtual reality (VR) provides options to achieve higher levels of engagement, personalization, and service delivery in the industry of business events. However, to adopt it, it is necessary to meet the technology requirements, because its value for different stakeholders is perceived differently in the context of organizations and institutions. The present research studies the situation concerning the case of technology adoption in the business events industry in Malaysia from the perspective of stakeholder sensemaking. It studies how the actors in the process of technology adoption- organizers of events, providers of technology, and policymakers- perceive both the possibilities of VR and its challenges, and how their perceptions influence the adoption process. This paper presents a conceptual discussion based on the literature; primary data have not yet been collected. Semi-structured interviews, observations, and thematic analysis are proposed for future empirical investigation. The literature reviewed suggests a contradiction between the idea of the advantages of VR technologies and the difficulties connected with the implementation of these technologies. Besides, organizational readiness, digital capabilities, and cooperation of stakeholders are discussed as potential factors influencing the process. The paper emphasizes that VR technology adoption is a process of interpretation and cooperation rather than a simple technology choice. The researchers recommend gradual or phased adoption of VR technologies, training of staff, support policies, and greater cooperation between event organizers and technology providers.

**Keywords**: *Virtual reality, business events, stakeholder sensemaking, technology adoption, organizational readiness, immersive technology, Malaysia*

## 1. Introduction and Background

The application of Virtual Reality in the Meetings, Incentives, Conventions and Exhibitions industry in Malaysia is an essential step toward digital transformation driven by Industry 4WRD initiatives and demand for immersive experiences (Ibrahim et al., 2025). Nevertheless, successful implementation of new and immersive technologies depends on the perception of different stakeholders, such as government officials, organizers, and new technology providers (Asbollah et al., 2026; Ibrahim et al., 2025). With the implementation of the stakeholder sensemaking model, the research aims to analyze the process through which the stakeholders understand their activities in the context of the obtained standards and limited resources (comes et al., 2026). This approach goes beyond usual technology acceptance models and investigates how the actors evaluate the potential of VR spaces in the context of the unique socio-economic environment of Malaysia (Filimonau et al., 2024).

Such analysis helps to fill the gap in academic knowledge, since today's discussions focus on technical parameters only, paying little attention to behavioral and institutional aspects determining the long-term viability of innovations (Chen et al., 2023; Koohang et al., 2023). The current research focuses on the interdependent relationships amongst the stakeholders, indicating their distinct views on metaverse-related experiences with respect to priority strategic initiatives regarding the immersive facilities within the local MICE industry ecosystem (Paul & Rena, 2024; Radić et al., 2025). In particular, the role of differing beliefs regarding the usefulness of immersive technologies and social norms in constructing the conditions for or impeding alignment of local policies will be examined (Buhalis et al. 2023); Lau et al., 2024). The study also pursues an analysis of divergent perceptions to investigate the way different stakeholders compare the limitations imposed by immersive technologies to advantages offered in terms of facilitating participation and enhancing marketing efforts after the pandemic (An et al., 2025). The importance of this process is evident due to the pressing need to align consumers' face-to-face preferences with the need to gain consumer loyalty through digital means in the market (Tiong & Jamie, 2022).

Therefore, sensemaking will be considered as the major research approach in the study of stakeholders' attempts to overcome tensions between traditional means of service delivery and the deployment of virtual environments (Chen et al., 2025). The recognition of the importance of cognitive and social processes in the research allows for greater understanding of how established meanings can affect the course of digital innovation in the local market (Dewi & Darma, 2024; Zhong et al., 2024). This means that it is essential to carry out a specific study of how organizations' actors reconcile technological embodiments with ergonomic interventions to convert abstract digital capabilities into actual business opportunities (Balakrishnan et al., 2024).

## 2. Literature Review

The discussions regarding organizational innovation often rely on modeling frameworks such as the Technology-Organization-Environment framework, which highlights the interconnection between information technology preparedness, internal organizational structures, and external environmental pressure (Lu et al., 2024; Sousa et al., 2024). Several recent works have moved forward from the classical modeling framework of the Technology Acceptance Model and examined how the perceptions of users in terms of ease-of-use and usefulness influence the acceptance of new immersive platforms (Shamim et al., 2025). These models provide background to the adoption literature, but this paper does not apply them as additional analytical frameworks. Its focus is on how stakeholder interpretations relate to organizational adoption responses. However, despite the abovementioned achievements in the field, the literature does not publish a sufficient number of works addressing stakeholder relationships and collaborations in technology adoption in the case of any traditional industry (Saghafian et al., 2021).

To fill this gap in the market, sensemaking theory can be applied for interpreting stakeholder interdependencies leading to the translation of the disruptive potential of the technology into reality (Hennig-Thurau et al., 2023). When referring to the sensemaking perspective, it should be noted that it means that sensemaking is a social activity that allows individuals to point out how people cognitively proceed with the technological change, which aligns with numerous works presenting users' behavioral intentions but states the reconstruction of their professional identity and job role in terms of this adoption process (Marchegiani et al., 2024). This concept is particularly useful in the context of the ecosystem of business events since it allows one to think about VR adoption as something fluid rather than a one-time action (Hakami et al., 2026). Examining these different interpretations makes it possible to gain insights into how the different parties involved are achieving a balance between the advances in metaverse technology and the changing environments of organizations and new service delivery needs (Dolata & Schwabe, 2023).

Moreover, while existing research mainly concentrates on the economic effects on companies due to this change, very often social and environmental problems related to the multi-stakeholder decision-making process are ignored (Polyviou & Pappas, 2023). This paper addresses these conceptual issues through stakeholder sensemaking, examining how actors interpret contextual conditions and use those interpretations to justify adoption responses (Weick et al., 2005). The current research is of great importance, as there is still a considerable volume of theoretical discussions (Baker et al., 2023; Laachach et al., 2024) but not many empirical investigations that would allow understanding of the real processes in Malaysia's business events (Sharma et al., 2025).

In addition to these organizational issues, the opportunities for the creation of new service environments for hospitality and tourism due to the technology of the metaverse should be mentioned, as the necessity of a completely new approach to the management of the value chain is evident (Foroudi et al., 2026; Jung et al., 2024). Managers' interpretations of emerging technologies may inform whether they regard implementation as relevant to their organizational priorities. This issue is considered within the sensemaking lens rather than through an additional upper-echelon framework. Apart from needing a deeper understanding of how different stakeholders negotiate conflicting interests since those actors are often torn between the two competing assertions regarding protecting innovation and assuring operational stability (Fazio et al., 2023).

Stakeholder motivations and perceived autonomy can be explored as part of their accounts of VR's relevance and feasibility, without introducing a separate motivational theory. The realization of the necessity to adopt

these platforms does depend heavily on the role of media richness and the users' sense of presence, which alters the nature of business events (Chin et al., 2023). At the same time, in the ecosystem, the process of sensemaking becomes even more complicated because of the need to match individual thinking with the strict limitations of existing networks (Comes, M., 2026).

Thus, the analysis of such a complicated process shows that organizations tend to regard virtual reality not just as a device, but rather as an instrument that changes the entire landscape of the industry (Ramdan et al., 2025). The course of negotiations is being affected by the third parties that are top managers whose models of thinking and systems of values determine whether the reality shall be regarded as innovation-based necessity or rather as a threat to the existing ways of doing business (Zhang, 2024). In addition to this, the participation of various stakeholders, including government representatives and industry experts, calls for a shift toward inclusive sensemaking, taking into account different levels of technological knowledge and relevance (Firman et al., 2025; Ledesma-Chaves et al., 2025).

In this context, the issue of digital inequality is particularly important because the unequal capacity of SMEs to cover technological costs and governance can either promote or hamper a fair distribution of technology (Izevbigie, 2026). It is only by taking into account the fact that perceived usefulness and social support are the key determinants of behavioral intention that participants in the adoption process can better match their strategies with the nature of different participants and their needs (Ariza-Montes et al., 2023).

This relationship between behavioral factors is important in view of the need to understand the importance of perceived value of investment for the process of making decisions about the viability of technologies (Çavuşoğlu et al., 2026). Alternatively, it is important to point out that adopting virtual technologies depends on the extent to which organizations are capable of combining technical simplicity of implementation with social pressures leaders of organizations experience in their working environment (Fares et al., 2024; Merz et al., 2025). Finally, the evolutionary trajectory emphasizes the importance of going beyond usual imposition methods for the specific needs of the firms that have unique dimensions in Malaysia's digital development (Jo & Park, 2023). In this regard, there is a need to eliminate the technological poverty of the platform by bringing the technology and companies to the same level (Loo et al., 2023; Chiew & Cheah, 2025). TOE is used here to organize the technological, organizational and environmental conditions surrounding adoption, while sensemaking examines how stakeholders interpret and negotiate those conditions (Baker, 2012; Weick et al., 2005). Finally, the activation of local companies through the provision of specific training programs will help to fill the gap between technological requirements and real practice in event management (Babolian Hendijani & Jaszus, 2024).

Moreover, due to the additional efforts of the governmental authorities that provide regulatory and financial support, these projects will become more active because the intervention of the government would significantly lower the entry barriers for resource-scarce organizations (Doe et al., 2022). The support of the industry is considered to be important since it will give organizations the possibility to go further than simply experimenting with technologies (Sarfraz et al., 2023).

In this context, the promotion of digital connection by the Malaysian government, including the financial aspect of it, like the Industry 4WRD Intervention Fund, shall serve as a prerequisite for firms to move from occasional use to digital maturity (Yong, 2023). Despite this, however, technological limitations and a recurring absence of collaborative diffusion in the broader network continue to hinder this shift, limiting the conversion of these large-scale measures into success in the industry (Hossain et al., 2024). Therefore, bringing this gap to a close requires those organizations and firms providing the support to go beyond financing and instead develop effective collaborative networks, as the absence of these structures currently limits the possibility of achieving spillover on the ecosystem-wide level (Costa & Moreira, 2022). In this sense, increasing the effectiveness of these interactions calls for universities and technical colleges to make curricula more relevant so as to eliminate existing weaknesses in Malaysia's supporting infrastructure, which currently prevents large-scale industrial uptake (Leang & Rasiah, 2023).

In addition, it is important to enable interdisciplinary knowledge exchange involving academic researchers, industry practitioners, and decision-makers to create the required local innovation for sustainable ecosystem

growth (Shalihah, 2024). These collaborative initiatives would also focus on creating necessary digital skills through structured education, ensuring that companies possess the competencies to use immersive technologies (Amuso et al., 2021). Moreover, these capacity-building initiatives should go hand in hand with the idea of fighting the Pilot Trap, according to which organizations need to prioritize long-term organizational readiness over isolated technology-driven experiments (Akbaba et al., 2026). As firms navigate the uncertain world of new technologies, they need to develop capabilities that are flexible and causative, as sometimes it is more useful for nontraditional actors to act opportunistically than to have a rigid plan (Zabel et al., 2023). For that reason, when dealing with virtual reality, one should avoid taking it as a definitive technological solution and see it rather as a complicated ongoing process, which is affected by different social, psychological, and organizational factors (Al-Sharafi et al., 2024).

The sensemaking lens directs attention to the meanings event professionals attach to VR and how these meanings may inform their adoption responses (Weick et al., 2005). This is a sensemaking process that shows that digital transformation can be viewed as a social process based on the idea that meanings of virtual reality are co-created during interaction and build relationship capital (Pelletier & Cloutier, 2019). Thus, organizational resistance can result from a different understanding of technologies since perceived value is determined by the lack of internal backing and expertise (Jalo & Pirkkalainen, 2024). In order to overcome this obstacle, companies need to adopt an approach that is user-oriented, allowing them to pay priority attention to technological adherence and proper training of specialists. In addition to achieving internal consistency, organizations need to consider the dynamics between technological innovativeness and cultural compatibility, as these are fundamental factors for proper implementation in tourism and event industries (Hasan et al., 2025). It is worth mentioning that culturally specific factors like collectivism and power distance can shape how firms perceive trust and risk, which is essential for firms to establish the way by which they utilize immersive technologies in their operations (Zhang et al., 2025). This confirms that well-known adoption models such as the Technology Acceptance Model and Theory of Planned Behavior need to be amended so that they ensure reliable forecasting of organizational behavior by including elements of social context (Han et al., 2019). Moreover, the application of the Technology, Organization, and Environment framework will enable people to understand better and analyze how pressure from outside institutions in conjunction with firms' internal readiness avails the strategy implementation of VR technologies (Cham et al., 2024; Tuyen & Hanh, 2025).

In this regard, managers need to find some kind of balance between their understanding of VR as a business solution and the real existence of such resources like technical support and experience that are important preconditions for adoption (Sousa et al., 2023). It is obvious that businesses need to take into account how their internal characteristics impact their competitive position and the wishes of the customers regarding the use of virtual reality (Sousa et al., 2024). The current synthesis of organizational capabilities and the environment necessitates universal adoption of implementation methodology as a means to overcome the information gaps and strategic isolation characteristic of the hospitality and travel industry (Law et al., 2009). Such models highlight that successful technology adoption is not only due to the technology's performance but rather a response to the competitive environment and legislation governing the Malaysian commercial events industry (Wang et al., 2024). The organizational responses are also affected by managerial self-efficacy and technological preparedness, which are important psychological factors to implement strategies into practice in various local hospitality settings (Mammadov & Wald, 2025). Apart from the psychological factors of the individual actor, sensemaking of stakeholders in this ecosystem is affected by the concept of the "promised opportunities of development," which is an understanding of the future possibility of the use of technologies (Tran, 2025).

This indicates a transition in which the technological incentives are not just applied by imitation but are adopted through proactive management that matches operational readiness with market conditions (Lara et al., 2017). By implementing this alignment, adoption becomes an intentional action in which the management of the organization makes use of the technological benefits (Ismail et al., 2025). Employee support is considered an organizational condition within TOE and a concern that stakeholders may interpret when assessing implementation feasibility. This kind of commitment is very important since performance expectancy often comes out to be the main predictor of technology adoption and changes the attitudes of employees to immersive technologies in the business world (Alkhwaldi & Alshammarı, 2026; Rahmad & Rachman, 2025). Furthermore, companies can take advantage of the principles of organizational behavior in order to deal with

the correlation between the roles of individuals in their jobs and the systems of technology implementation effectively, as evidenced by the influence of employees' hierarchy on their perception of usefulness (Mogaji et al., 2024). In addition, the development of a tech-friendly culture through training programs plays a crucial role in turning individuals' perceptions into organizational capacity (Buhalis et al., 2024).

Within this approach, observation, experience, and confidence are considered aspects of stakeholder interpretation and learning rather than reasons to introduce a separate social cognitive framework. Moreover, this process is improved in the course of assessing the advantages of using virtual reality, regardless of the risks of information security and management that define the pace of integration (Hradecky et al., 2022). Thus, the balance should be achieved through implementing an integrated approach that will allow not only addressing different aspects of technical, organizational, and environmental implementation but also being able to reach the ocean of maturity (Jalo et al., 2022). The formation of initial trust among event planners, tech vendors, and attendees is crucial for reducing ambiguity and promoting joint implementation within this ecosystem. By assisting this collective conceptualization, stakeholders can create better correspondence between enabling circumstances and organizational requirements, facilitating infrastructural and instrumental assistance to lower the threshold of implementation (Boel et al., 2023). Thus, the relationship between these multifaceted contributors suggests that the pre-implementation phase is important in decreasing barriers to resistance, especially in the context of budget planning and consensus among stakeholders (Lodhi et al., 2024).

Implementing gradual, pilot-based implementation strategies can help organizations gather local evidence regarding the instructional and commercial feasibility of new immersive platforms prior to full-scale implementation (Ji et al., 2026). Acceptance research provides background on performance expectations and social influence, but UTAUT is not applied as an additional framework in this paper. These concerns are explored within stakeholder accounts and their contextual conditions. Together, the contextual and interpretive perspectives suggest that the current organizational models should change from static implementations to dynamic assessments of readiness for implementing new technologies (Sharma, 2025; Toyoda et al., 2023). The importance of the change in this respect is especially prominent in the context of Malaysia, where the government initiatives, such as Industry 4WRD, aim at narrowing the gap between the existing technological infrastructure and unrealized opportunities for immersive industries implementation (Ibrahim et al., 2025). As industry leaders reconcile macro-level policy enablers with micro-level organizational agility in the context of their business moments, they can gain a better understanding of how to make the transition from testing new models to becoming an accepted operational method (Ibrahim et al., 2025; Kumar et al., 2023). The successful transition is indicative of the shift in strategic thinking where, nowadays, conference organizers start to value job relevance more and prioritize playfulness when dealing with environmental pressures in the realm of business events management (Sangkaew et al., 2019).

Sensemaking is the central theoretical lens in this paper, consistent with its focus on how stakeholders interpret VR adoption. TOE provides a supporting structure for technological, organizational, and environmental conditions (Weick et al., 2005; Baker, 2012). The connection is explicit: contextual conditions provide opportunities and constraints; stakeholders interpret and negotiate their significance; these interpretations inform responses such as piloting, adaptation, postponement or continued use. Experience may then prompt reconsideration of earlier interpretations. For example, a limited budget may be understood as a reason to postpone implementation or to seek a partner for a smaller pilot. This is an illustrative possibility, not a finding. The relationship is exploratory and iterative rather than a tested causal model. Other frameworks mentioned in the literature provide background only and are not separately applied.

## 3. Research Design

This paper is conceptual and draws on a narrative discussion of literature on VR adoption, stakeholder interpretations and organizational readiness. No interviews or observations have yet been conducted, and no participant sample or empirical coding results are reported. The literature is considered in relation to technological, organizational and environmental conditions and the ways stakeholders may interpret those conditions. This discussion does not constitute a systematic review or establish the prevalence of adoption barriers in Malaysia. A future qualitative investigation is proposed to examine bounded VR adoption initiatives. Participants would be selected purposively for direct involvement in decisions or implementation, including

relevant organizers, venue representatives, technology providers and supporting institutions. Semi-structured interviews could be supplemented by documents and non-participant observations, subject to permission. Thematic analysis would examine contextual conditions, interpretations, negotiations and adoption responses, while allowing additional themes to emerge. An audit trail, reflexive notes, comparison across sources and examination of contradictory accounts would support research quality. Ethics approval, informed consent, confidentiality and secure data storage would precede collection. The actual sample, collection procedures, genuine participant extracts and coding examples must be reported after this work has been completed.

The literature reviewed identifies a tension between anticipated benefits of immersive technologies and concerns about implementation. Organizational XR research addresses perceived value, resistance and adoption intention (Jalo & Pirkkalainen, 2024), while tourism VR research identifies limited knowledge and experience, doubts about usefulness and reluctance to invest (Sousa et al., 2024). These observations originate from the cited studies and are not findings from Malaysian participants. They provide a basis for exploring how stakeholders interpret VR's relevance and feasibility, but do not establish local adoption patterns.

## 4. Conceptual Synthesis

The conceptual synthesis distinguishes three connected elements: contextual conditions, stakeholder interpretations and adoption responses. TOE organizes conditions such as technology requirements, organizational resources and external expectations; sensemaking directs attention to how stakeholders understand these conditions and justify action (Baker, 2012; Weick et al., 2005). A constraint does not imply a single response: actors may consider adaptation, collaboration, a smaller trial, or postponement. These alternatives illustrate the proposed relationship rather than empirical outcomes. Future analysis should connect documented conditions to genuine stakeholder accounts and subsequent action, retain contradictory accounts, and consider alternative explanations such as decision authority or resource limits. No participant quotations, coding breakdown, or validated relationships are presented because primary data have not been collected.

## Discussion

The literature-based concerns can be organized through TOE, but contextual categorization alone does not explain the responses stakeholders develop. Sensemaking adds attention to how actors interpret the relevance and feasibility of VR and negotiate implementation responsibilities (Baker, 2012; Weick et al., 2005). The proposed contribution is therefore a connection between context, interpretation and action. For example, identifying a skill shortage would describe an organizational condition; explaining a response would also require understanding why stakeholders favor training, external support or postponement. This example is illustrative. The framework also allows experience to reinforce or revise earlier interpretations, rather than assuming adoption is a one-time decision. It remains provisional: agreement cannot overcome every technical or financial constraint, and stakeholders with greater decision authority may proceed despite disagreement. Training, partnerships, and phased implementation are possible implications to investigate, not interventions demonstrated to improve adoption in Malaysia. Future empirical research must establish these relationships through traceable evidence and examine cases that challenge the proposed account.

## 5. Conclusion

The literature reviewed suggests that to positively implement VR technology in Malaysia's business event sector, it is important to correctly synchronize the deployment of the technology with the awareness of the business context (Akmal et al., 2025). For this purpose, it is crucial to go beyond experimentation and utilize universal models of implementation, which are based on the user-centered approach while considering the technical and financial aspects of the local market (Raji et al., 2024). Future research should aim to study the combination of VR technology and physical spaces to get better estimates of the perceived authenticity of the technology (Tan, 2024; Lodhi et al., 2024). Furthermore, researchers should study the evolution of consumer attitudes towards the Metaverse and new technologies using a longitudinal or experimental design (Morrison et al., 2024). In addition, academic research should address the effectiveness of collaboration tools between technology developers and event managers, which will allow keeping digital improvements relevant in terms of cultural values and operational capability (Alkhwaldi & Alshammarı, 2026; Zhu & He, 2025).

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Uncovering the Structural Drivers of Carbon Emissions in Malaysia: Energy Demand vs. Macroeconomic Determinants

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**Abstract:** Rapid industrialization and urbanization in Malaysia have driven substantial economic expansion alongside a sharp escalation in carbon dioxide ($CO_2$) emissions, creating a major policy tension regarding its commitment to reduce carbon intensity by 45% by 2030. This study examines the symmetric and asymmetric long-term relationships, cointegration, and dynamic causality among GDP, energy consumption, renewable energy, urbanization, industrialization, and $CO_2$ emissions within a unified dynamic framework. Empirical results reveal that energy consumption is the sole statistically significant driver of Malaysia's long-run carbon emissions, whereas GDP, renewable energy, urbanization, and industrialization exert no statistically significant direct impact. Crucially, the statistical insignificance of GDP refutes the applicability of the Environmental Kuznets Curve (EKC) hypothesis in Malaysia, demonstrating that higher income levels will not automatically induce environmental recovery past a specific development threshold. Therefore, policymakers cannot rely on passive economic growth to achieve sustainability. To effectively decouple economic progress from carbon output, national frameworks must move beyond income-driven assumptions and implement targeted interventions focused on direct energy demand management, fossil fuel subsidy reforms, and aggressive clean-energy substitution.

**Keywords**: *Sustainability, Carbon Dioxide ($CO_2$) emissions, industrialization, urbanization, time-series, long-run, ARDL, Malaysia*

## 1. Introduction and Background

Malaysia has undergone substantial industrialization and urbanization over recent decades, driving national economic expansion while precipitating a sharp escalation in carbon dioxide ($CO_2$) emissions (Awosusi et al., 2024). This environmental footprint is evident in historical trends: national $CO_2$ emissions surged from approximately 3,568 kilotons (kt) in 1960 to 56,190 kt in 1990, reaching over 295,000 kt in recent years due to accelerated manufacturing, energy consumption, and infrastructure expansion (Raihan et al., 2022; World Bank, 2024). Concurrently, Malaysia's urbanization rate increased from 25% in 1960 to nearly 79% (World Bank, 2024), expanding urban transport networks, heavy construction, and industrial energy demand. Notably, Malaysia records significantly higher per capita. $CO_2$ emissions than many of its Southeast Asian neighbors (Harun et al., 2021), establishing a pressing need to re-examine the structural drivers of its national carbon trajectory.

This environmental trend creates a sharp policy tension between sustaining economic development gains and meeting the country's voluntary commitment to reduce carbon intensity by 45% by 2030 relative to 2005 levels (Raihan et al., 2022). Addressing this challenge requires a systemic perspective because isolated environmental interventions across energy, industrial output, and urban planning generate complex, interconnected side effects. Although fossil fuel dependency remains the primary driver of national emissions, expanding renewable energy deployment offers a viable mechanism to harmonize economic growth with environmental sustainability (Raihan & Tuspekova, 2022). However, decoupling economic output from fossil fuel consumption requires targeted policy alignment. Recent evidence indicates that expanding clean energy generation, particularly when linked with energy subsidy reforms, is far more aligned with Malaysia's emissions targets than maintaining coal- and gas-dominated power mixes (Yahoo et al., 2024).

From a theoretical perspective, the dynamic interaction between economic expansion and environmental quality is frequently anchored in the Environmental Kuznets Curve (EKC) hypothesis, which posits an inverted U-shaped relationship where environmental degradation initially worsens with income growth but declines once a country reaches higher development thresholds (Afroz et al., 2022). However, empirical evidence regarding Malaysia's determinants reveals complex, non-linear dynamics. For instance, urbanization has been shown to initially lower emissions before increasing them past a specific threshold, while simultaneously Granger-causing $CO_2$ emissions (Shahbaz et al., 2016). Similarly, total energy consumption exerts a dominant long-run positive effect on emissions, with unidirectional causality running from energy use to carbon output (Raihan et al., 2022). These findings imply that policies relying strictly on aggregate economic growth or total energy demand risk ignoring structural differences across urban centers, industrial subsectors, and clean-energy transitions.

Despite the growing body of empirical literature, a critical gap remains: existing research on Malaysia frequently fails to account for both symmetric and asymmetric impacts when evaluating how the country's energy-intensive industrial evolution shapes its environmental footprint (Bi et al., 2024; Ha et al., 2024). Grounded in the Environmental Kuznets Curve (EKC) framework, GDP, industrialization, total energy consumption, and urbanization initially aggravate emissions through the scale effect during rapid economic expansion. Over time, structural economic shifts (composition effect) and the adoption of cleaner energy sources, such as renewable energy (technique effect), determine whether emissions can be decoupled from economic activity. However, macroeconomic and energy shocks often trigger non-linear or disproportionate responses in emissions depending on whether these drivers experience positive or negative shifts. Assuming purely linear or symmetric relationships can lead to biased dynamic estimation and flawed policy conclusions. Furthermore, few studies evaluate GDP, energy consumption, renewable energy, urbanization, and industrialization within a unified dynamic framework that distinguishes short-term cyclical shocks from durable structural adjustments. Establishing whether feedback loops exist (bidirectional causality) is equally essential, as it indicates whether economic and energy decisions both drive and react to environmental conditions (Shahbaz et al., 2016).

To address these empirical and theoretical gaps, this study sets out to achieve three interconnected objectives: first, to investigate the symmetric and asymmetric long-term effects of GDP, energy consumption, renewable energy, urbanization, and industrialization on Malaysia's carbon emissions. The second objective is to evaluate whether a stable long-run cointegrating relationship exists among these determinants in a unified framework. Moreover, the third objective aims to uncover the direction of dynamic causality among the variables to distinguish immediate economic adjustment costs from persistent sustainability outcomes.

By establishing the dynamic and causal architecture of Malaysia's emissions process, this research provides a robust empirical foundation to recalibrate national development models toward greater ecological efficiency (Hou et al., 2025; Malik et al., 2022). These insights are particularly relevant as Malaysia transitions from a resource-based economy toward high-value manufacturing and service sectors (Segar et al., 2024). Differentiating short-term emission reactions from long-term structural trends will equip policymakers with the evidence necessary to sequence targeted energy substitution strategies, reform fossil fuel subsidies, and integrate sustainable urban planning frameworks into Malaysia's long-term growth agenda.

## 2. Literature Review

Theoretical frameworks assessing the nexus between economic activity and environmental degradation often utilize the Environmental Kuznets Curve hypothesis model to elucidate the driving forces behind carbon emissions (Borsha et al., 2024). These theories emphasize that while increased income levels initially exacerbate ecological stress due to resource-intensive industrialization, maturation may eventually foster technological efficiency that reduces carbon intensity (Iqbal et al., 2024; Kraujalienė et al. 2026). Empirical literature specific to Malaysia reveals conflicting evidence regarding these models, with some studies validating the Kuznets curve (Afroz et al., 2024), while others emphasize that urbanization and economic growth persistently exacerbate emissions (Adeleye et al., 2021; El-Aal et al., 2024). Specifically, while some research highlights a positive correlation between energy consumption and carbon output (Bouchoucha et al., 2024), other empirical findings suggest that the Environmental Kuznets Curve remains invalid within the Malaysian

context (Raihan, 2024). Consequently, identifying research gaps requires addressing the inconsistency in how renewable energy integration and technological innovation are modelled as mitigation strategies within the national framework (Gazi et al., 2022; Raihan & Voumik, 2022).

Further, despite existing studies confirming that economic expansion and energy utilization remain the primary drivers of environmental contamination, the mechanisms by which structural transformation influences these outcomes remain insufficiently explored (Gyamfi et al., 2021). Recent academic discourse underscores that the comprehensive potential of technological innovation and forest sequestration in Malaysia remains under-researched despite their hypothesized mitigation benefits (Raihan & Tuspekova, 2023). Furthermore, although existing literature often focuses on the broader Southeast Asian region, there is a lack of granular analysis regarding how Malaysia's specific industrial composition and energy-intensive tourism sector interact to alter national emission trajectories (Derouez & Ifa, 2025; Raihan et al., 2023). Moreover, extant research frequently utilizes cross-sectional data, which fails to adequately capture the dynamic, time-varying nature of these causal relationships within Malaysia's rapidly evolving economic landscape (Khosravi et al., 2024). Furthermore, while literature has extensively examined the emissions-energy nexus in contexts such as Pakistan, empirical consensus on the directionality of these variables in the Malaysian sector remains elusive (Tanveer et al., 2021). Prior studies using the autoregressive distributed lag approach indicate that energy consumption and economic expansion exert a positive, significant impact on carbon output without a reciprocal influence from emissions on economic performance (Falade & Adeyemi, 2023; Hu et al., 2021). Such conflicting empirical results underscore a critical research gap regarding whether existing energy policies are effectively decoupling growth from carbon intensity (Raihan, 2023; Supriyanto et al., 2022). Additionally, current scholarly efforts have largely overlooked the distinct environmental consequences of specialized energy sources, particularly the ecological trade-offs associated with emerging hydroelectric and renewable technologies in Southeast Asian nations (Awosusi et al., 2025).

**Empirical Findings on the Variables**

**Relationship between GDP and $CO_2$ emissions**

There have been many empirical studies that prove there is a strong link between increased GDP and $CO_2$ emissions. According to Suhartoko & Ekaristi (2023), economic development acts as one of the determinants of $CO_2$ emissions along with factors like population change, FDI, and fossil fuels. The authors use a fixed effects panel regression model that shows a significant positive relationship between GDP and $CO_2$ emissions, which implies that $CO_2$ emissions increase along with economic development. The authors believe that this could be attributed to the level of development of ASEAN countries because production requires more energy. Similarly, Sahputra et al. (2025) highlighted the close relationship between economic growth, energy consumption, and $CO_2$ emissions, stating that economic growth in developing countries is often accompanied by increasing energy demand. However, the study also emphasized that economic growth could improve the environment with the adoption of cleaner energy sources and sustainable energy practices. This indicates that the environmental impact of economic growth not only relies on the level of economic development but also on the nature of energy usage. According to Sugiharti et al. (2025), GDP is one of the key determinants of carbon emissions. Further, the findings concluded that there is a positive relationship between GDP and $CO_2$ emissions.
**H1:** Gross Domestic Product (GDP) has a significant effect on $CO_2$ emissions.

**Relationship between Energy Consumption and $CO_2$ Emissions**

A study carried out by Saboori & Sulaiman (2013) examined the interrelationships between energy consumption, economic growth, and CO2 emissions in five ASEAN countries. The findings of their study suggest that there is a significant and positive impact of energy consumption on CO2 emissions in both the short and long term. The findings demonstrated that the elasticity of CO2 emissions in relation to energy consumption was greater in the long run than the short-run elasticity of the two variables. Thus, it suggested that the environmental consequences of energy consumption become more severe as time progresses. In addition, all five countries exhibit a direct correlation between energy consumption and CO2 emissions, and there was a bidirectional causal relationship between energy consumption and CO2 emissions found by using the Granger causality test results.

According to Sugiharti et al. (2025), there is a positive correlation between increased total energy use and

energy intensity in ASEAN countries with CO2 emissions because, as economies use more energy for production purposes, the environment faces more pressures than decreases. This paper uses data from 1990 to 2021 and applies a STIRPAT-based model using the CCEMG estimation method due to econometric issues related to cross-sectional dependence and heterogeneity in panel data analysis. The authors found a positive connection between CO2 emissions and GDP growth rate, population growth rate, and energy intensity, interpreting their results as increased economic activity and population pressure that led to increased energy demand and caused environmental pollution.
**H2:** Energy consumption has a significant impact on $CO_2$ emissions

**Relationship between Renewable Energy and $CO_2$ Emissions**
Renewable energy has also become one of the vital elements of sustainable development policies due to its capability to reduce the dependency on fossil fuels and carbon dioxide emissions. Renewable energy usually produces less carbon emissions during energy production than conventional fossil fuels do. However, the efficiency of renewable energy in reducing carbon dioxide emissions depends on the level of usage of renewable energy, existing energy systems, and the progress of the energy transition process in a particular nation. Various findings have been found for this relationship, whereby Pratama et al. (2021) have identified a considerable inverse relationship between renewable energy and $CO_2$ mitigation, either for long-term or short-term. He found a statistically significant long-term relationship between renewable energy consumption and $CO_2$ emissions by using a vector error correction model (VECM) in panel data analysis between 2007 and 2016. Therefore, it was concluded that an increase in renewable energy would reduce $CO_2$ emissions.
**H3:** Renewable Energy has a significant impact on $CO_2$ emissions

**Relationship between Urbanisation and $CO_2$ Emissions**
Urbanization is considered an important factor influencing the release of $CO_2$ emissions as far as energy demands, modes of transport, infrastructure, and consumption patterns are concerned. A study by Amiza and Jalil (2024) employs pooled OLS, fixed, and random effects panel approaches to explore the impact of urbanization on carbon emissions in seven ASEAN countries from 2011 to 2022. The authors conclude that urbanization positively affects carbon emissions together with economic growth. The findings have supported the previous study by Perwithosuci et al. (2023), which also found a positive connection between the urban population and carbon emissions in the ASEAN-5 in the period from 1990 to 2020 within a fixed-effects model. Most recent study by Thi and Thi (2025) analyze the influence of urbanization on carbon emissions through the lens of urbanization as a primary cause of carbon emissions based on the panel data of all ten ASEAN countries for 2000 to 2020 assert that continued urbanization in ASEAN countries is leading to increased environmental strain.
**H4:** Urbanization has a significant impact on $CO_2$ emissions

**Relationship between Industrialization and $CO_2$ Emissions**
Industrialization is the transformation of an economy from primarily agricultural to manufacturing and industrial production. It is this process that drives economic growth through productivity increases, job opportunities, and technical innovation. Susilowati et al. (2023) explore the relationship between industrialization and $CO_2$ emissions in ASEAN countries based on a Vector Error Correction Model (VECM) in the 2001–2020 period. They conclude that industrial value added has no statistically significant impact on $CO_2$ emissions in both short-run and long-run estimates. On the other hand, Claire and Widyawati (2023) found a positive coefficient of industrialization alongside a negative quadratic one (1.325 and −0.031) in their long-term findings on nine ASEAN member countries over the period of 1990–2019.
**H5:** Industrialization has a significant effect on $CO_2$ emissions.

## 3. Research Methodology

This research study aims to determine the factors influencing $CO_2$ emissions in Malaysia through a quantitative approach. A quantitative approach is appropriate in this case as numerical data is required in the form of time series data and as the study is likely to use various econometric techniques to analyze the relationships between $CO_2$ emissions and the independent variables.

**Research Design**

The effects on $CO_2$ emissions of economic growth, energy consumption, renewable energy consumption, urbanization, and industrialization are analyzed in this study. This study uses a time series research design covering the years between 1990 and 2023. Data for the analysis were obtained from reliable sources. These include the World Development Indicators (WDI) of the World Bank and the Asian Development Bank (ADB). The Autoregressive Distributed Lag (ARDL) model is used to determine the short-run and long-run relations among the variables. The ARDL model is applicable in this case since the variables can be integrated at different orders as long as at least one of the variables does not belong to the second order, I(2).

**Table 1: Variable Measurement Table**

| Variables | Measurement | Unit | Source |
|---|---|---|---|
| $CO_2$ | $CO_2$ emissions excluding land-use, land-use change and forestry (LULUCF) | Tonnes of $CO_2$ equivalent per capita (t $CO_2$e/capita) | World Development Indicators (World Bank) |
| GDP | GDP per capita (constant 2015 US$) | GDP per capita | World Development Indicators (World Bank) |
| EC | Energy use per capita | kg of oil equivalent per capita | World Development Indicators (World Bank) |
| RE | Renewable energy consumption as a share of total final energy consumption | % of total final energy consumption | World Development Indicators (World Bank) and Asian Development Bank |
| URB | Urban population as a percentage of total population | % of total population | World Development Indicators (World Bank) |
| IND | Industry value added (including construction) | % of GDP | World Development Indicators (World Bank) |

**Model Specification**

An econometric model is constructed to determine the main independent variables affecting $CO_2$ emissions in Malaysia. The independent variables are economic growth, energy consumption, renewable energy consumption, urbanization, and industrialization. The model draws its theory from environmental economics. The model is expressed as follows:

$$CO_{2t} = f\ (GDP_t, EC_t, RE_t, URB_t, IND_t)$$

Where $CO_2$ emissions represent the dependent variable, while GDP, energy consumption, renewable energy consumption, urbanization and industrialization represent the explanatory variables.

The econometric techniques that have been used in this research include the unit root test to check whether the variables are stationary, and the ARDL model to determine the long-run relationship between the variables. The econometric models are as shown below:

$$CO_{2t} = \alpha_o + \beta_1 GDP_t + \beta_2 EC_t + \beta_3 RE_t + \beta_4 URB_t + \beta_5 IND_t + \mathcal{E}_t \qquad (1)$$

Where:
$\alpha_o$= constant term
$\beta_1 - \beta_5$ = Long-run coefficients of the explanatory variables
$\mathcal{E}_t$= Error term
$CO_{2t}$= Carbon dioxide emissions
$GDP_t$= Economic growth
$EC_t$=Energy consumption
$RE_t$= Renewable energy
$URB_t$= Urbanisation
$IND_t$= Industrialisation

To examine the existence of a long-run cointegrating relationship among the variables, the ARDL bounds testing approach is employed based on the Unrestricted Error Correction Model (UECM). The corresponding

bounds testing equation is specified as follows:

$$\Delta CO_{2t} = \alpha_0 + \sum_{i=1}^{p} \beta i \, \Delta CO_{2,t-i} + \sum_{i=0}^{q1} Yi \, \Delta GDP_{t-i} + \sum_{i=0}^{q2} \delta i \, \Delta EC_{t-i} + \sum_{i=0}^{q3} \theta i \, \Delta RE_{t-i} + \sum_{i=0}^{q4} \eta i \, \Delta URB_{t-i} + \sum_{i=0}^{q5} \kappa i \, \Delta IND_{t-i} + \emptyset_1 CO_{2_{t-1}} + \emptyset_2 GDP_{t-1} + \emptyset_3 EC_{t-1} + \emptyset_4 RE_{t-1} + \emptyset_5 URB_{t-1} + \emptyset_6 IND_{t-1} + \varepsilon_t \quad (2)$$

Where:
Δ = First difference operator representing short-run changes
$\emptyset_1, \emptyset_2, \ldots \emptyset_6$ = Long-run level coefficients used to conduct the ARDL bounds test
$p, q1, \ldots q5$ = Optimal lag lengths
$\varepsilon_t$ = Error term

Additionally, various diagnostic tests will be done to check if the ARDL model is adequate and reliable. The Ramsey RESET test will check the appropriateness of the model specification, while the Jarque-Bera test will check if the residuals follow a normal distribution. The Breusch-Godfrey Serial Correlation LM test will check for serial correlation, and the Breusch-Pagan test will check if there are any remaining model residuals that are heteroskedastic. These tests are done to check if the estimated ARDL model fulfills the required assumptions of econometrics so that the results are reliable and robust.

## 4. Results & Discussion

This chapter presents the empirical results and discussion of the study examining the determinants of carbon dioxide ($CO_2$) emissions in Malaysia. The analysis comprises unit root tests, the Autoregressive Distributed Lag (ARDL) model, ARDL bounds testing for cointegration, and a series of diagnostic tests to assess the validity and robustness of the estimated model.

**Table 2: Descriptive Statistics**

| Statistics | CO2 | GDP | EC | RE | URB | IND |
|---|---|---|---|---|---|---|
| **Mean** | 6.498144 | 2331.402 | 7749.933 | 47.21741 | 66.14024 | 41.8693 |
| **Median** | 7.019491 | 2301.691 | 7745.933 | 44.14001 | 66.34008 | 41.0670 |
| **Maximum** | 8.199600 | 3050.373 | 11445.39 | 68.30000 | 76.44348 | 48.5302 |
| **Minimum** | 3.612050 | 1188.841 | 4184.761 | 29.00000 | 49.03007 | 35.9347 |
| **Std. Dev.** | 1.422500 | 504.8371 | 2084.371 | 8.404584 | 8.331568 | 3.853371 |
| **Skewness** | 0.043214 | 0.004589 | 0.391170 | 0.848980 | 0.552982 | 0.081410 |
| **Kurtosis** | 1.909305 | 2.200833 | 1.915362 | 2.687282 | 2.107155 | 1.880700 |

Table 2 reports the descriptive statistics for $CO_2$ emissions, GDP, energy consumption, renewable energy consumption, urbanization, and industrialization in Malaysia. The descriptive statistics comprise the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and Jarque-Bera statistics. The mean indicates the average value of each variable over the study period, while the median represents the central value of the observations. The maximum and minimum values indicate the upper and lower bounds of each variable, respectively, providing an overview of the extent of variation and changes in the variables throughout the study period. The standard deviation further reflects the degree of dispersion of the observations around their respective means, while skewness and kurtosis provide information on the distributional characteristics of the data. The Jarque-Bera statistic is used to assess whether the variables follow a normal distribution.
The standard deviation shows that energy consumption is the one that exhibits more dispersion, whereas $CO_2$ emissions show less dispersion. This shows that there were more variations in energy consumption than in the other variables. The kurtosis gives the form and tail characteristics of a probability distribution. The value near 3 is typical for a normal distribution. However, in this case, the kurtosis figures are less than 3, lying between 1.8807 and 2.6873. As such, the variables are platykurtic, meaning they have distributions that are flatter than a normal distribution.

**Table 3: Correlation**

| | CO2 | GDP | EC | RE | URB | IND |
|---|---|---|---|---|---|---|
| **CO2** | 1 | 0.8971 | 0.9832 | -0.4230 | 0.9744 | -0.3401 |
| **GDP** | 0.8971 | 1 | 0.9360 | -0.0486 | 0.9515 | -0.6063 |
| **EC** | 0.9832 | 0.9359 | 1 | -0.3321 | 0.9817 | -0.3790 |
| **RE** | -0.4230 | -0.0486 | -0.3321 | 1 | -0.3083 | -0.3920 |
| **URB** | 0.9744 | 0.9515 | 0.9817 | -0.3083 | 1 | -0.4349 |
| **IND** | -0.3401 | -0.6063 | -0.3790 | -0.3920 | -0.4349 | 1 |

The correlation analysis was conducted to assess the strength and direction of the linear relationships between $CO_2$ emissions and the selected independent variables. The results indicate that $CO_2$ emissions are strongly and positively correlated with energy consumption (EC), urbanization (URB), and GDP, with correlation coefficients of 0.9832, 0.9744, and 0.8971, respectively. These findings suggest that higher levels of energy consumption, urbanization, and economic growth are closely associated with higher $CO_2$ emissions in Malaysia.

In contrast, $CO_2$ emissions exhibit a moderate negative correlation with renewable energy consumption (RE), with a correlation coefficient of −0.4230, indicating that greater reliance on renewable energy is associated with lower $CO_2$ emissions. Meanwhile, industrialization (IND) shows a weak negative correlation with $CO_2$ emissions, with a coefficient of −0.3401. Overall, the correlation results provide preliminary evidence of the relationships between $CO_2$ emissions and the explanatory variables; however, these correlations should not be interpreted as evidence of causality.

**Table 4: Unit Root Test**

| | Level I(0) | | First Difference I(1) | | |
|---|---|---|---|---|---|
| | **Augmented Dickey-Fuller** | **Phillips-Perron** | **Augmented Dickey-Fuller** | **Phillips-Perron** | **Order of Integration** |
| CO2 | 0.3153 | 0.2342 | 0.0000 | 0.0000 | I(1) |
| GDP | 0.9226 | 0.9549 | 0.0001 | 0.0000 | I(1) |
| EC | 0.2719 | 0.0537 | 0.0000 | 0.0000 | I(1) |
| RE | 0.7233 | 0.5547 | 0.0415 | 0.0442 | I(1) |
| URB | 0.3104 | 0.0000 | 0.4793 | 0.4793 | I(0) |
| IND | 0.7856 | 0.7728 | 0.0001 | 0.0001 | I(1) |

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were employed to determine whether the data series are stationary or non-stationary. For both the ADF and PP tests, the null hypothesis assumes the presence of a unit root. If the p-value is less than 0.05, the null hypothesis is rejected, indicating that the variable is stationary. As presented in Table 4, the results reveal that. $C0^2$, GDP, EC, RE, and IND are non-stationary at level but become stationary after first differencing. Therefore, all the mentioned series are I(1) variables. For $C0^2$the ADF and PP tests at level produced probability values of 0.3153 and 0.2342, respectively, while at the first difference, the values were both 0.0000. The same way, for the GDP, the level p-values are 0.9226 and 0.9549 in the ADF and PP tests, respectively.

The probability values for EC in the ADF test and the PP test at level are 0.2719 and 0.0537, respectively, while those of the two tests became significant after first differencing at probability values of 0.0000. The RE is not stationary at level based on the ADF and PP p-values of 0.7233 and 0.5547, respectively, but became stationary after first differencing with p-values of 0.0415 and 0.0442, respectively. The IND follows a similar trend, where the level p-values are 0.7856 and 0.7728, respectively, and p-values of 0.0001 after first differencing.

However, the PP test shows stationarity of URB at level with a probability value of 0.0000. Thus, URB is considered an I(0) variable. Even though the ADF test at level gives a probability value of 0.3104, the PP test confirms stationarity at the 5% level of significance. In summary, the outcome suggests that the variables consist of a mixture of I(0) and I(1) processes and do not include any I(2) process.

**Table 5: ARDL**

| Variables | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 2.222632 | 1.948322 | 1.140793 | 0.2674 |
| $CO_2$(-1) | 0.003002 | 0.165010 | 0.018193 | 0.9857 |
| GDP | 0.000228 | 0.000121 | 1.892335 | 0.0730 |
| GDP(-1) | -0.000310 | 0.000157 | -1.981859 | 0.0614 |
| GDP(-2) | -0.000160 | 0.000135 | -1.186582 | 0.2493 |
| EC | 0.0001999 | 0.000354 | 5.642893 | 0.0000 |
| EC(-1) | 0.000875 | 0.000473 | 1.847563 | 0.0795 |
| EC(-2) | 0.000996 | 0.000366 | 2.723484 | 0.0131 |
| RE | -0.019214 | 0.034020 | -0.564779 | 0.5785 |
| IND | 0.014356 | 0.017250 | 0.832220 | 0.4151 |
| URB | -0.846321 | 0.515096 | -1.643034 | 0.1160 |
| URB(-1) | 0.805031 | 0.487965 | 1.649711 | 0.1146 |

The Autoregressive Distributed Lag (ARDL) model was used to examine the dynamic relationship between carbon dioxide ($CO_2$) emissions and its determinant factors such as Gross Domestic Product (GDP), energy consumption (EC), renewable energy consumption (RE), urbanization (URB), and industrialization (IND). The ARDL is suitable for this study, as the unit root results showed that there is a mixture of I(0) and I(1) variables, but no variables are integrated of order I(2). The estimation results from EViews suggest that the ARDL model selected contains the time lags of $CO_2$, GDP, EC, and URB. The coefficient of lagged $CO_2$, $CO_2$(-1), is 0.003002 with a probability value of 0.9857. This coefficient is statistically insignificant, which means that the impact of the previous period's $CO_2$ emission does not have a significant effect on the current $CO_2$ emission in the estimated model.

The current coefficient D(GDP), in the ARDL estimation, is represented by the coefficient of 0.000228 and the probability of 0.0730. The coefficient is positive, suggesting that an increase in GDP is associated with an increase in $CO_2$ emissions. The coefficient is not statistically significant at the 5% significance level, however. The first lag of GDP has a coefficient of -0.000310 with a probability value of 0.0614, while the second lag has a coefficient of -0.000160 with a probability value of 0.2493. Neither coefficient is statistically significant at the 5% level. This finding is consistent with the research by Ghoshray & Lorusso (2025), who found a positive correlation between GDP and $CO_2$ emissions in selected ASEAN economies such as Malaysia. It has been found that economic growth in the region is positively correlated with high $CO_2$ emissions due to increased energy consumption. However, the insignificance of income growth challenges the validity of the Environmental Kuznets Curve (EKC) hypothesis in Malaysia. The findings demonstrate that higher economic growth will not passively yield environmental recovery past a development threshold. Because economic development alone is insufficient to induce natural decarbonization, targeted policy interventions must focus on restructuring national energy demand, reforming fossil fuel subsidies, and accelerating clean-energy substitution to effectively decouple economic output from carbon emissions.

The current coefficient of energy consumption is 0.001999, and the probability value is 0.0000, which shows that the coefficient is positive and statistically significant. This means that the higher the use of energy, the more $CO_2$ is emitted. The coefficient of the first lag of EC is 0.000875, and the probability value is 0.0795, which is not statistically significant at the 5% level. Meanwhile, the second lag of EC has a positive coefficient of 0.000996 and a probability value of 0.0131. Thus, there is a statistically significant positive association between the second lag of energy use and $CO_2$ emissions. The findings were supported by previous studies done by Saboori and Sulaiman (2013), which have shown a positive and significant relationship between energy use and $CO_2$ emissions in ASEAN countries. The study results showed that the higher the energy demand, the more emissions generated, especially in countries that are highly energy dependent on fossil fuel-based energy sources.

The coefficient of renewable energy consumption (RE) is -0.019214, and the probability value is 0.5785. The negative coefficient means that there is an inverse relationship between the use of renewable energy and $CO_2$ emissions. But this correlation is not statistically significant at the common 5% level of significance. So, the ARDL findings are not statistically significant enough to conclude that consumption of renewable energy has a significant impact on $CO_2$ emissions in the estimated model. This problem may be attributed to the current renewable energy contributions by Malaysia, which are still inadequate to achieve any significant decline in overall $CO_2$ emissions, considering the continued use of fossil fuels. This insignificant finding is in accordance with the findings of Nasution et al. (2026), who have used a Panel ARDL model for six ASEAN countries for the period 1990-2020 and found that consumption of renewable energy had a statistically insignificant effect on $CO_2$ emissions. The researchers argue that the present use of renewable energy in ASEAN countries may not be enough to produce any visible effect on $CO_2$ emissions.

Industrialization (IND) has a positive coefficient of 0.014356 with a probability value of 0.4151. The positive coefficient implies that increasing the level of industrialization might mean increasing $CO_2$ emissions, but this is not statistically significant at the 5% level. The insignificant result may be explained by the differences in Malaysia's industrial structure, technology, and source of energy, which can balance out the potential increase in emissions due to industrialization. These findings are consistent with those reported by Pratama et al. (2021), who found that industrialization in the ASEAN-5 nations failed to cause a statistically significant effect on $CO_2$ emissions. The authors suggest that the relationship between industrialization and $CO_2$ emissions might depend on the degree of industrialization and reliance on fossil fuels in the industry. The lack of significant results, however, indicates that there could be an environmental benefit to industrialization through better technology and cleaner production processes.

For the variable of Urbanization, the coefficient of the coefficient is negative, -0.846321 and the probability value is 0.1160. The negative coefficient indicates that the amount of $CO_2$ emissions could decrease with an increase in urbanization. But the coefficient is not statistically significant at the 5% level. This insignificant coefficient could be due to differences in the urbanization pattern, transportation facilities, and energy use in Malaysian cities that could neutralize the expected environmental impact of urbanization. The first lag of Urbanization has a positive coefficient of 0.805031 and has a probability value of 0.1146, which is not statistically significant. This result is consistent with the findings of Lubis & Widodo (2025), who found that the effect of urbanization on CO2 emissions is not always positive and may vary based on different stages of urbanization development. This concept can explain the lack of significance noted in this paper.

Overall, the ARDL estimation results confirmed that energy consumption is positively related to $CO_2$ emissions, especially the second lag of energy consumption. In the reported ARDL estimation, the other explanatory variables fail to display any statistically significant effects at the 5% level. Next, the ARDL estimation result is followed by the Bounds Test to verify whether there is a long-run relationship between the variables.

**Table 6: ARDL Bound Test**

| Test Statistic | Value | Significance | I(0) | I(1) |
|---|---|---|---|---|
| F-statistic | 6.326279 | 10% | 2.08 | 3 |
| k | 5 | 5% | 2.39 | 3.38 |
| | | 2.5% | 2.7 | 3.73 |
| | | 1% | 3.06 | 4.15 |

To determine whether there is any long-run association between carbon dioxide emissions and the explanatory variables (GDP, EC, RE, URB, IND), an ARDL Bounds Test is used. The null hypothesis is that there is no long-run association among the variables. The test results show an F-statistic of 6.326279, where k = 5, representing the number of explanatory variables. The F-statistic obtained is compared against the lower bound I(0) and the upper bound I(1) at different significance levels.

Based on the confidence interval constructed using the 5% level of significance, the lower and upper bounds are 2.39 and 3.38, respectively. The F-statistic, which is 6.326279, is higher than the upper bound critical value of 3.38, thus leading to the rejection of the null hypothesis and suggesting the existence of a long-run relationship between the variables. Additionally, the F-statistics are greater than the upper bound critical

values at the 10%, 2.5%, and 1% levels of significance.

**Table 7: Diagnostic Test**

| Diagnostic Test | F-Statistic | p-value |
|---|---|---|
| Breusch-Godfrey LM Test | 2.940998 | 0.0836 |
| Jarque-Bera Normality Test | 0.352317 | 0.838485 |
| Breusch-Pagan Test | 1.023728 | 0.4730 |
| Ramsey RESET Test | 0.075798 | 0.7866 |

The results of the Breusch-Godfrey LM test were obtained with an F-statistic of 2.941 and a p-value of 0.0836. Considering that the p-value is greater than 0.05, it can be concluded that the null hypothesis of no serial correlation cannot be rejected. In other words, there is no serial correlation present in the model. The results of the Jarque-Bera test for normality show a statistic value of 0.352 and a p-value of 0.8384. The p-value being greater than 0.05 implies that we fail to reject the null hypothesis. This indicates that the data are normally distributed.

In the case of the Breusch Pagan test, the F-value is 1.023728, while the corresponding p-value is 0.4730. As the p-value is greater than 0.05, the null hypothesis is not rejected by the test, which means that heteroskedasticity is not present in the model. Likewise, the result of the Ramsey RESET test is as follows: the F-statistic equals 0.075798, while the p-value is 0.7866. Since the p-value is greater than 0.05, it means that the null hypothesis is not rejected. This indicates that there is no evidence of model misspecification.

## 5. Managerial Implications and Recommendations

There are many implications and recommendations to be taken from this study in relation to Malaysia's policymakers and other relevant stakeholders. The study highlights the need for synchronizing economic growth with energy usage and developing renewable energy alongside sustainable urban and industrial development. In the long term, energy consumption becomes the only significant variable affecting $CO_2$ emissions, while GDP, renewable energy consumption, industrialization, and urbanization are not found to be statistically significant. This shows that Malaysia must continue growing economically but work harder towards integrating low-carbon measures in its economic development process. More focus should be placed on green investment, energy efficiency, clean production, and renewable energy to ensure environmentally friendly economic growth.

Based on the ARDL estimation results, energy consumption is identified as the most significant determinant influencing $CO_2$ emissions in Malaysia. The positive correlation and statistical significance between energy consumption and $CO_2$ emissions show that energy consumption plays an important role in $CO_2$ emissions in Malaysia. Therefore, Malaysia must continue working towards improving the implementation of energy efficiency policies at the household, transport, commercial, and industrial levels. Efforts should be made to encourage the use of energy-efficient technologies and improve energy efficiency, especially in energy-intensive industries. Incentives may also be considered to encourage firms to lower their energy intensities and use energy-efficient technologies. Moreover, there might be some consideration by the government on the amendment of existing fossil fuel subsidy structures to act as an additional way to control energy demand and encourage efficient energy consumption. This is in line with Yahoo et al. (2024)'s assertion on the need for clean energy growth and subsidies for energy to be integrated in order to help Malaysia achieve its $CO_2$ emissions targets. Overall, all these actions can help in reducing energy consumption in Malaysia.

Despite the negative coefficient of renewable energy consumption, its effect in the model is statistically insignificant. Therefore, although renewable energy has the potential to reduce $CO_2$ emissions, stronger implementation and wider adoption are required before its environmental impact becomes significant. This suggests that the present level of renewable energy usage is not enough to make a statistically significant change in $CO_2$ emissions. This concurs with Nasution et al. (2026), whose position is that current uses of renewable energy might not be enough to produce any effects on $CO_2$ emissions. Therefore, Malaysia must continue to enhance and develop renewable energy programs. There needs to be more attention paid to accessibility, involvement, investment, and efficiency of the present renewable energy programs. Moreover,

there must always be monitoring done in order to see how much renewable energy contributes to $CO_2$ reduction.

Urbanization is found to have a negative but statistically insignificant relationship with $CO_2$ emission levels. Therefore, the obtained findings cannot provide statistical evidence regarding the reduction of $CO_2$ emissions as a result of urbanization in Malaysia. The finding corresponds to those of Lubis & Widodo (2025), which state that the effect of urbanization on $CO_2$ emissions depends on the level of urbanization development. The implication is that the environmental impact of urbanization can be determined by such factors as urbanization development pattern, transportation system, and energy consumption. In this regard, Malaysia needs to continue implementing sustainable urbanization in terms of sustainable public transport, buildings, and urbanization planning.

Industrialization shows a positive but insignificant relationship with $CO_2$ emissions. Even though the relationship between industrialization and $CO_2$ emissions is not statistically significant, the positive coefficient indicates the possibility of some pressure on the environment arising from the process of industrialization. Taking into account that the influence of the process under consideration could differ depending on the industrial structure, the type of technology used, and energy sources, it is important for Malaysia to encourage the use of clean production, efficient technologies, and renewable energy in industries.

**Conclusion**

This research attempts to identify the determinants of $CO_2$ emissions in Malaysia using the ARDL methodology in order to examine the impacts of GDP, energy consumption, renewable energy consumption, urbanization, and industrialization. The findings indicate that there exists a long-run relationship between the variables considered in the research, suggesting that the selected factors are relevant in explaining $CO_2$ emissions in Malaysia.

The findings identify GDP and energy consumption as significant determinants of $CO_2$ emissions. The GDP is positively and significantly effect on $CO_2$ emissions in the long run, while the energy consumption is also positively and significantly related to the $CO_2$ emissions. Renewable energy consumption is negatively but statistically insignificant in its relation to $CO_2$ emissions. Urbanization is negatively and statistically insignificant, while industrialization is positively but statistically insignificant in relation to $CO_2$ emissions.

In general, the study results indicate the importance of regulating energy usage and sustainable economic growth as key elements for solving the problem of $CO_2$ emissions in Malaysia. The study provides empirical support useful for the decision-making process in developing solutions to help Malaysia achieve its goals towards becoming a low-carbon economy. At the same time, the results obtained may act as an example for future studies to analyze $CO_2$ emissions in Malaysia using different variables, methods, and time frames. In this way, there is a possibility to get a more comprehensive picture of the main drivers of $CO_2$ emissions in Malaysia.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Social Media Influence on ESG Investment Intentions: Herding Effects Among Young Investors

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**Abstract:** The rapid growth of Environmental, Social, and Governance (ESG) investing has coincided with the increasing reliance of young investors on social media for financial decision-making. While digital platforms and financial influencers ("finfluencers") accelerate information dissemination, limited empirical work explains how digital cues interact with psychological biases in emerging markets. Drawing upon the Theory of Planned Behavior (TPB) and Social Influence Theory, this conceptual study proposes a framework to investigate the effect of social media exposure on ESG investment intentions among young retail investors in Malaysia, while examining herding behavior as a moderating mechanism. The proposed framework outlines a quantitative cross-sectional research design utilizing Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the structural relationships. The paper provides theoretical insights into the convergence of digital media dynamics, psychological biases, and sustainable finance in emerging markets, offering practical implications for policymakers, financial institutions, and regulators.

**Keywords**: *Social Media Influence, ESG Investing, Investment Intention, Herding Behavior, Theory of Planned Behavior*

## 1. Introduction and Background

Environmental, Social and Governance (ESG) investing has become a pillar in modern financial systems (Dinh & Xiao, 2025; Tiwari et al., 2024). In developing countries such as Malaysia, this transformation is driven by retail investors from Generation Z and Millennials. They want to grow their wealth while having socially responsible and environmentally conscious investments (Martutiningrum & Catyanadika, 2025; Tiwari et al., 2024). These trends support national sustainability goals with the supporting structure of Bursa Malaysia's enhanced ESG reporting (Ahmad et al., 2021).

With the digitalization of financial markets, the way young retail investors collect and analyze financial data has been greatly impacted and changed (Hamid et al., 2022; Jaya et al., 2025). The new media contains both market and social data. Ningtyas et al. (2024) believed that the new media has social influences. An individual's perception of the market and understanding of the market is based on their peers, and their success is influenced by their friends' social media posts. The new media is dominated by financial influencers and social media peer networks who quickly change the perceptions of the financial markets on social media via social proof and viral content (Joseph et al., 2025; Ningtyas et al., 2024). However, the speed of social media combined with the unstructured format of communication has created a number of behavioral and psychological issues, such as a strong tendency toward herding. Investors will completely disregard private information and will blindly follow the sentiment of the digital crowd (Koutmos, 2024; Abdul Manaf et al., 2024).

While the body of literature on sustainable finance is expanding rapidly, existing research exhibits three critical deficiencies. Most ESG literature in emerging markets focuses heavily on corporate ESG disclosures and firm valuation (Ahmad et al., 2021), offering sparse empirical insights into individual retail investor decision-making (Abdul Manaf et al., 2024). Although social media is recognized as a key news channel for Generation Z (Jaya et al., 2025), studies rarely examine how distinct dimensions of social media exposure (informational vs. normative influence) translate into actual sustainable investment intentions (Joseph et al., 2025). Furthermore, most behavioral finance literature treats herding behaviour strictly as a direct predictor of asset pricing or

market downturns (Ah Mand et al., 2023). However, in digital environments, herding functions more accurately as a cognitive boundary condition, as a moderator that can either amplify or dampen the translation of social media messages into personal investment intentions (Rammal et al., 2025; Tiwari et al., 2024). In volatile emerging markets like Malaysia, herding around ESG themes introduces risks of speculative trading, inflated valuations, and greenwashing exposure (Rammal et al., 2025). Although prior research has examined direct media effects or general market herding, critical gaps remain regarding how psychological biases moderate the relationship between digital influence and ethical investment decisions. Therefore, this conceptual study proposes a holistic model to explain how social media exposure directly drives young investors' ESG intentions and how herding tendencies act as a moderator in this digital environment. Comparative studies addressing how these behavioral mechanisms function among young, digital-native investors in emerging Asian markets remain scarce (Selvamani et al., 2026).

## 2. Literature Review

In today's academic literature, there is a clear prevalence of Sustainable and Responsible Investment (SRI) among young investors (Martutiningrum & Catyanadika, 2025). These individuals strive for purposeful profit (Raina et al., 2026), which makes their attention focus on responsible investment with consideration of ESG. There is a variety of factors affecting this attitude. The synergy between digital peer networks and social responsibility creates an atmosphere that contributes to the emergence of both objective and subjective Finfluence ESG investments (Raina et al., 2026). More specifically, the fear of cognitive dissonance between values and actions, together with the search for positive ethics and sustainability, encourages the formation of proactive behavior towards ESG investments and goes beyond the realm of mere advocacy (Martutiningrum & Catyanadika, 2025).

Now, social media dominates the sphere of SRI (Joseph et al., 2025). Through the use of platforms such as TikTok, Instagram, and X (formerly Twitter), investors are able to observe market tendencies and peers' points of view and shape purchasing trends due to peer influence (Ningtyas et al., 2024). Importantly, the information asymmetries caused by the information exchange of TikTok retail investors may influence purchasing decisions (Yoon & Oh, 2022). Nevertheless, there is a solid ESG base that brings additional attention to the environmental issues on Twitter, and the level of involvement in digital media might be influenced by changes in the market situation (Koutmos, 2024; Zhang et al., 2025).

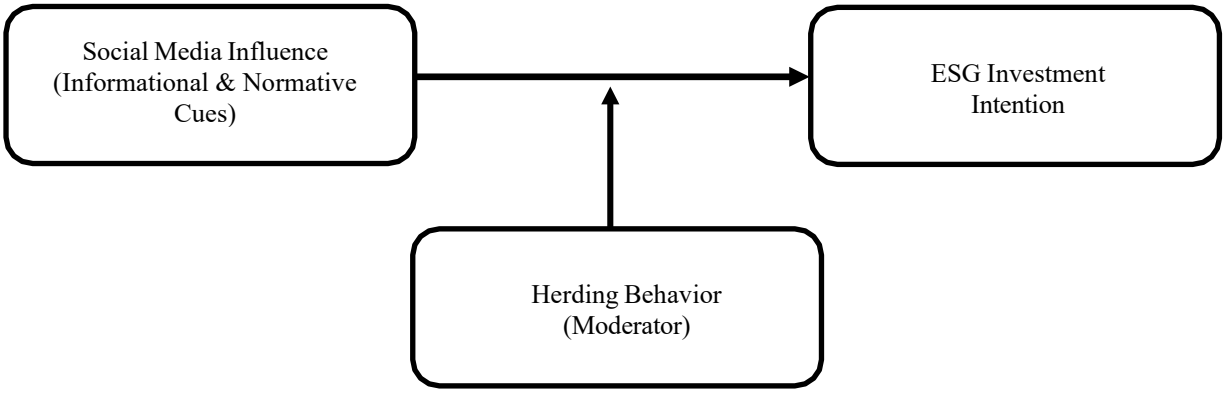
In this study, the Theory of Planned Behavior (Ajzen, 1991) is used to investigate the gap between intention and behavior in terms of sustainable investment (Martutiningrum & Catyanadika, 2025), supplemented with Social Influence Theory (Kelman, 1958). This model considers the investment intention as a combination of an individual's evaluation of ESG traits, perceived social pressure (subjective norms), and ease of performance (perceived behavioral control) (Martutiningrum & Catyanadika, 2025; Dinh & Xiao, 2025). In the case of Malaysia, the model reflects the search for "Profit with Purpose," which means wealth creation within the context of environmental issues (Raina et al., 2026). Modern subjective norms of Generation Z have raised the bar for what is considered "ethical" not just in terms of peer groups but also digital communities on TikTok and Discord in pursuit of profit with purpose (Jaya et al., 2025; Ningtyas et al., 2024). This is further enhanced by government support and the ease of accessing ESG funds in retail investment apps (Ahmad et al., 2021; Martutiningrum & Catyanadika, 2025).

Internal motivation and external motivation are differentiated by Social Influence Theory, and the authority of digital platforms is emphasized. In cases of uncertain social approval of ESG activities in a young investor's network, there is a higher chance of investing in ESG investments (Ningtyas et al., 2024). Finfluencers play an important role in the emerging form of influence in Malaysia. If the investor identifies with the brand of an influencer, the investor is likely to take on the position of the influencer regarding ESG and its impact (Hamid et al., 2022; Ningtyas et al., 2024). Internalization refers to the online distributed values of ESG influencing the self-identity of the investor and creating increasingly rational, irrevocable, and sustainable investment choices (Joseph et al., 2025).

According to the Theory of Planned Behaviour (TPB), behavioral intention is shaped by attitude towards the behavior, subjective norms, and perceived behavioral control. Exposure to social media has an effect on attitude

by providing information about the impact and benefits of ESG investments and on subjective norms through endorsement from peers and influencers (Jaya et al., 2025; Ningtyas et al., 2024). When young retail investors consume curated financial content on social media, external validation lowers the perceived risk and helps to create positive attitudes towards sustainable assets (Joseph et al., 2025).
**H1:** Social media influence has a positive effect on young investors' attitudes toward ESG investment intentions.
**H2:** Social media influence has a positive effect on young investors' subjective norms regarding ESG investment intentions.
**H3:** Social media influence directly and positively affects young investors' ESG investment intentions.

**Herding Behavior:** According to Social Influence Theory, people adopt behaviors via the mechanisms of compliance, identification, and internalization. In the digital sphere, herding behavior is characterized by the existence of a psychological bias when people use collective action due to information asymmetry or FOMO (Koutmos, 2024; Yoon & Oh, 2022). Contrary to being a direct driver, herding becomes an amplifier of both informational and emotional aspects. When an investor demonstrates a strong propensity for herding, the signals from social media (such as trending phenomena and high engagement of ESG stocks) become more influential, thus intensifying the intention to join others (Tiwari et al., 2024). In contrast, when people have low herding propensities, the content of social media undergoes more individual consideration and weakens the relationship between exposure to social media and investment intention (Rammal et al., 2025). Recent research shows that herding can lead to certain behaviors and moderate the components of a particular phenomenon. For example, according to Tiwari et al. (2024), herding can intensify or weaken the perceptions of social media users regarding the favorability of ESG products depending on the current social media trend. High herding propensities make investors more sensitive to the social media emotions expressed by other people in the close digital surroundings (Tiwari et al., 2024). It is assumed that this connection will be stronger in the post-COVID-19 era, when herding bias in ESG markets is negatively impacted and amplified by the instability of digital media in the economy (Koutmos, 2024; Yoon & Oh, 2022).
**H4**: Herding behavior significantly moderates the relationship between social media influence and ESG investment intention, such that the relationship is stronger for investors exhibiting higher herding tendencies.




## 3. Research Methodology

The research will employ a quantitative cross-sectional study design, which has many benefits when testing relationships between latent variables as well as moderations in behavioral finance. The population in question consists of young Malaysian investors between the ages of 18 and 40 years who actively participate in online social media investment communities, including Telegram, Facebook Groups, and Instagram (Jaya et al., 2025; Ningtyas et al., 2024).

A non-probability purposive sampling strategy will be applied by choosing respondents who actively use digital platforms (Ningtyas et al., 2024). Statistical justification from G*Power on detecting moderate effect sizes ($f2 = 0.15$, power = 0.80, $\alpha = 0.05$) and the PLS-SEM 10-times rule suggests the need to have a minimum of 150 to 300 respondents (Abdul Manaf et al., 2024).

Survey questionnaire items will be adapted from constructs validated in the existing literature in behavioral and sustainable finance. Particularly, 5 questions will be adapted from Hamid et al. (2022) and Joseph et al. (2025) measuring the frequency of exposure, perceived credibility, and engagement with influencers. Moreover, 5 questions will be adapted from Dinh and Xiao (2025) and Martutiningrum and Catyanadika (2025) for assessing willingness and plans to allocate funds for ESG assets. Another 5 questions will be adapted from Tiwari et al. (2024) and Yoon and Oh (2022) to measure reliance on market sentiment and imitation. All constructs will be measured on a standardized 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Instagram is a perfect example of Fintech social media in the social media influence component. The instrument will be distributed through Google Forms to Malaysian investment communities. The rest of the components concern social behavior and deal with ESG investment intentions, which will be redesigned from the validated scales of willing sustainable investment (Dinh & Xiao, 2025; Martutiningrum & Catyanadika, 2025). In addition, the investigation of the stage of social media and informational influence when Fintech social media "finfluencers" make an impact is part of the study. Herding behavior is the social behavior in question that stimulates investments in times of market uncertainty and involves a tendency to follow market trends (Rammal et al., 2025; Tiwari et al., 2024).

Analysis of the appropriate data is done via SmartPLS 4 Partial Least Squares Structural Equation Modeling due to the complicated nature of the model being proposed (Abdul Manaf et al., 2024; Martínez & Cervantes, 2021). In this study, the two-stage analytical approach is adopted. The first stage is concerned with the measurement model analysis and evaluation through the application of Cronbach's Alpha, Composite Reliability, Average Variance Extracted, and the Heterotrait-Monotrait ratio in order to prove the reliability and validity of the model (Abdul Manaf et al., 2024; Martínez & Cervantes, 2021). The second stage is concerned with the analysis of the structural model and the hypotheses through path coefficient analysis, coefficient of determination, and effect size.
Finally, the influence and the moderating role of herding behavior are considered to connect the influence of social media and herding to each other, especially concerning the intention of ESG investments. Hypothesis testing will be done through bootstrapping in 5000 subsamples.

## 4. Conclusion

Subjective norms have evolved from their physical environment into the digital world. In that regard, this paper provides some evidence in support of that evolution (Martutiningrum & Catyanadika, 2025; Raina et al., 2026). Moreover, it uncovers and shows the manner in which Malaysian youths adopt and participate in ESGs using digital indicators like 'likes' and influencers (Ningtyas et al., 2024). The research reveals and proves that herding is not just an outside peripheral issue but a moderate influence reflecting the power of social media to impact and manipulate decision-making in ambiguous situations (Rammal et al., 2025; Tiwari et al., 2024).

The findings above imply that most of the financial literacy campaigns need to go beyond ESG definitions and include behavioral finance and herding bias training, among others, particularly for the case of Malaysian youths (Abdul Manaf et al., 2024; Raina et al., 2026). Governments must cooperate with digital platforms and conduct some sort of data-sharing initiatives in order to address the "digital information paradox," whereby the goal should be to educate, not confuse, the masses (Jaya et al., 2025; Ningtyas et al., 2024). Although social media plays an important role in the Malaysian financial world due to the behavioral aspects of its utilization, future work should focus on enduring data and not anticipated ones.

From a theoretical perspective, the proposed model brings the Theory of Planned Behavior (TPB) and the Social Influence Theory together by proposing that herding works as a moderator boundary condition and not a direct effect. Once validated, the framework can provide regulators and organizations dealing with financial literacy in terms of intervention strategies. For instance, the regulators can design digital literacy programs aimed at educating young retail investors about herding bias within the social media environment to advocate sustainable finance.

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**Information Management and Business Review (IMBR)**
**Vol. 18, No. 4, 2026 (ISSN 2220-3796)**

# Enhancing Student Engagement and Comprehension Through Video Presentation Assignments

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**Abstract:** The study looks at how students perceive a video presentation task as a form of multimodal learning and assessment in Economics courses. More precisely, it investigates students' perceived level of conceptual understanding, their critical and creative thinking, their confidence in communication, their involvement in coming up with questions for a public audience, their experience in coming up with a tagline, and their general satisfaction with the assignment. A quantitative descriptive survey method was used, with a sample consisting of 262 undergraduate students taking ECO560 and ECO162. The data were gathered through a structured questionnaire containing 5-point Likert-scale items, and descriptive statistics were applied to look at the students' reported perceptions before and after they had done the assignment. The instrument showed good internal consistency, with a Cronbach's alpha of 0.918. The results show that students had positive views in all the areas measured. They reported relatively high levels of perceived understanding of the subject matter (Mean = 4.17), of critical and creative thinking (Mean = 4.22), of communication or critical-thinking skills (Mean = 4.29), and of overall satisfaction with the video production experience (Mean = 4.09). The students also said that preparing questions for a public audience helped them to understand the topic better (Mean = 4.22), while creating a tagline encouraged them to think more deeply about the topic (Mean = 3.98). Yet their confidence in speaking in front of a camera or an audience was still comparatively low (Mean = 3.86), indicating that some additional support might be useful in building up this kind of presentation confidence. In general, the findings show that students viewed the video presentation assignment favorably as an engaging method of learning and assessment. The study provides practical insights into the use of learner-generated video activities to promote active, experiential and multimodal learning in Economics education.

**Keywords**: *Learner-generated video, experiential learning, critical thinking, self-efficacy, multimedia assessment, higher education*

## 1. Introduction and Background

Higher education has in recent years gone beyond just passing on knowledge within subject areas towards methods of teaching that get students to actively build up, apply, and communicate that knowledge. This is especially true of Economics education, since students are required not only to understand theoretical ideas but also to interpret economic issues, connect them with real-life situations, and be able to communicate their understanding clearly. Although traditional methods of assessment such as written exams and essays are still important when it comes to testing students' grasp of concepts, they might offer fewer chances for students to turn abstract economic concepts into explanations that are accessible to people who are not specialists.

The development of digital technologies increases the possibilities for the inclusion of multimedia learning and assessment tasks in higher education (Hu & Kim, 2026; Lam & Yunus, 2023). Learner-generated video has attracted increased interest due to its nature, which encourages students to be active producers of knowledge rather than passive receivers of information (Balıkçı & Karataş, 2024). To create a video, students have to select relevant information, structure their thoughts, present technical concepts in a language easy to understand and communicate their understanding through visual and verbal means (Lam & Yunus, 2023).

The educational benefit of video-based activities might go beyond the act of making the video. If students have to explain academic concepts to an external or general audience, they will have to think about how specialized knowledge can be presented in a simple and easy-to-understand way. This could lead them to look more closely at the meaning of the concepts and to identify the key points that need to be conveyed. Moreover, asking

questions of members of the public can give students insight into different interpretations of an issue, and the need to produce a brief concluding message or tagline may lead to even more reflection and synthesis. These types of activities are in line with experiential approaches to learning, which involve students learning by taking part in an experience, reflecting on it, developing a conceptual understanding of it, and then applying that understanding in a new situation (Kolb, 1984).

A point that should be taken into account is the level of confidence that students have in expressing what they know. University students can feel anxious when asked to give a public speech or make a presentation, especially if they have to speak in front of an audience. Earlier studies have indicated that video-recorded presentation tasks could offer students an alternative setting in which to practice and improve their communication skills, and that repeatedly recording themselves and reflecting on their performances might lead to increased confidence and a greater sense of self-efficacy (Ngadiran et al., 2024; Permatasari, 2024). Yet the use of video does not mean that all the difficulties related to communication are eliminated. Students might become more at ease when explaining a subject but will still face problems concerning speaking in a natural way, presenting themselves on camera, or interacting with an audience. It is therefore important to understand these aspects when assessing the educational value of video-based assignments.

Even though there has been an increasing amount of literature on educational videos produced by students, there is still a significant gap in our understanding of how a structured assignment involving video presentations can at the same time get students involved in explaining concepts, interacting with the public, formulating questions, and creating reflective taglines in the context of Economics education. While previous studies have looked at student-made videos in terms of engagement, communication, digital skills, critical thinking, and self-confidence, comparatively little attention has been paid to how undergraduate Economics students see these closely linked activities as part of a single assessment task. In particular, there is scarce evidence as to whether students view such an assignment as helping them link theoretical economic concepts with practical explanations, foster critical and creative thinking, and communicate these concepts to a wider audience.

The fact that this gap exists is significant since the educational value of a multimedia assignment ought not to be judged simply on whether students are able to produce an attractive or engaging video; instead, its pedagogical value should also be assessed in relation to the cognitive and communicative skills involved in making the video. Asking students to prepare questions for the public and to create a brief tagline may add another level of conceptual thinking to the assignment by asking them to identify, simplify, interpret, and communicate the main idea of an economic concept.

Hence, the present study looks at how undergraduate students perceive a video presentation assignment that has been carried out in Economics courses. More precisely, it investigates the students' perceived level of understanding of the subject matter after completing the assignment, their perceived development of critical and creative thinking, their confidence in explaining economic concepts, their level of engagement with the public and their ability to formulate questions, their ability to come up with a tagline or 'word of wisdom', and their general satisfaction with the learning experience. The study also takes into account the students' perceived confidence when speaking to a camera or an audience, thus offering insights into the opportunities and challenges linked with video-based assessment.

The paper advances the existing body of literature by looking at a structured video assignment that students produced, the assignment involving conceptual explanation, public engagement, question formulation, and the creation of a reflective tagline all within the context of Economics education. Instead of stating that video assessment leads objectively to improvements in learning, the study centres on the students' own accounts of their learning experience and on the ways in which they perceived their academic and communicative achievements. It is important to make this distinction since students' perceptions offer useful evidence for teaching practices even though they do not in themselves amount to direct proof of actual learning gains. The results thus give practical advice to educators who are thinking of introducing multimodal and experiential assessment activities into Economics and other higher-education courses.

## 2. Literature Review

With the rise of digital education, short-form educational videos and multimedia assignments are gaining traction among educators. Recent literature discusses the implications and outcomes of learner-generated video assignments on student engagement, critical thinking, and communication proficiency.

Learner-Generated Video Assessments and Engagement
Previous studies have demonstrated that educational videos are a vital component capable of enhancing student understanding and facilitating information dissemination to students who may lack an interest in reading. However, the real engagement boost comes when students are not only consuming but creating video content. Student-produced video assignments are increasingly recognized as valuable tools for enhancing digital competency and collaborative learning (Balıkçı & Karataş, 2024). In fact, assigning video projects in place of traditional written assessments has been shown to inspire students and allow them to gain deeper disciplinary knowledge through research and creative application (Mustaqim et al., 2025). Learner-generated video (SGV) assessments have been found to consistently enable active learning by requiring greater investment from students, with the engagement level rising in tandem with instructors' targeted guidance and criteria (Hu & Kim, 2026).

Taken together, the findings of these studies demonstrate that the value of learner-created video goes beyond the mere implementation of technology. While Balıkçı and Karataş (2024) have argued for the importance of video creation for enhancing digital competency and collaborative learning, Hu and Kim (2026) have demonstrated the value of instructor-designed guidance and evaluation criteria for engagement effectiveness. The importance of these findings cannot be overstated, as they demonstrate that engagement should not be taken for granted and may not be inherent to the mere implementation of video as an assessment tool. By contrast, the learning value of video production may depend on the degree to which students are required to engage with the creation process and communicate the disciplinary content. For this reason, the current study expands on the prior findings by investigating a guided video-creation assignment, in which students were required not only to create a video but also to formulate questions to the public and to communicate the course concepts via a concluding tagline.

Critical Thinking and Conceptual Understanding
Media creation inherently involves processing information and transforming it into a format understandable by others. By requiring students to interview the public and relate their findings to course concepts via a tagline, the video project encourages them to grapple with the information and form complex inferences, a hallmark of critical thinking (Mustaqim et al., 2025). Indeed, in business and economics education, researchers have found that the content of student learning tends to gravitate towards the concepts they are required to create a video about for a given topic (Balıkçı & Karataş, 2024). By design, educational video creation assessments necessitate contextualizing and organizing information, thus enriching conceptual understanding with relevant context (Hu & Kim, 2026).

While earlier studies tend to indicate associations between video creation and deeper processing and conceptual learning, there is a potential issue linked to the type of learning task assigned. While both video production tasks require students to engage in organizing and articulating information, the extent of cognitive engagement can vary, with video production potentially being a more effective learning tool depending on whether learners are required to present material or have to interpret and contextualize it. Balıkçı and Karataş (2024) highlighted the link between video making and the concepts that had to be explained within the video; similarly, Mustaqim et al. (2025) linked such assignments to critical thinking and broader learning competencies. By contrast, Hu and Kim (2026) focused on the role of the design of the task and the guidance provided. Overall, the papers demonstrate that video production can be an effective tool for engaging learners in deeper learning, but its effectiveness depends on the extent to which the students are required to interpret, apply, and reflect on the material. That is why it is interesting to explore the current assignment, which asked learners to tie economic concepts with observed reactions and later create a tagline encapsulating the lesson.

**Public Speaking and Student Confidence**
Public speaking can be anxiety-provoking for university students and may affect their performance. Research

on Malaysian undergraduates has reported moderate oral-presentation anxiety, with students using rehearsal and practice to cope (Fong et al., 2022). Other research has examined the communication strategies students use and the factors associated with fear of oral presentations (Belaman et al., 2022). Video-recording assignments may provide an opportunity to rehearse and review performance. In a qualitative study of trainees enrolled in a public-speaking course, students reported feeling more confident and less nervous after completing a video-recording activity (Ngadiran et al., 2024). Related research on interactive video projects has also reported perceived improvements in university students' self-confidence in English public speaking (Permatasari, 2024). Nevertheless, recording a presentation does not necessarily eliminate communication apprehension; students may still need structured practice and guidance to develop task-specific confidence.

The literature reviewed, therefore, presents a nuanced view of video-based presentation activities: on the one hand, the camera may offer a less intimidating context for presenting than the actual performance of the activity does and enable repeated practice, reflection, and ultimately confidence-building (Ngadiran et al., 2024; Permatasari, 2024). On the other hand, the camera as such does not seem to eliminate communication apprehension. Hu and Kim (2026) similarly highlight that confidence develops gradually for specific tasks. The tension between enhanced confidence in conveying the subject matter and persistent discomfort in speaking to a camera or even an audience is thus relevant to this study. This study does not assume that the assignment involving a video would automatically overcome students' public-speaking barriers but explores their confidence in explaining concepts and, separately, their confidence in delivering the presentation in front of a camera or an audience.

**Theoretical Framework**

The current research is guided by two theoretical frameworks: Experiential Learning Theory (ELT) by Kolb (1984) and Self-Efficacy Theory by Bandura (1977). Both theories offer valuable insight into the learning processes associated with the proposed action. ELT is used to interpret the learning processes prompted by the video presentation assignment, whereas Bandura's theory is used to further understand students' perceived confidence in conducting communication-associated tasks.

According to Kolb (1984), ELT regards learning as a process, which occurs through a 'holistic' experience consisting of four stages: 'concrete experience', 'reflective observation', 'abstract conceptualization', and 'active experimentation'. The video presentation assignment included elements of all four stages of experiential learning. In particular, the students were requested to gain concrete experience with an economic topic, ask questions to the public, interpret or conceptualize the issues they experienced, and actively experiment with their understanding and questions by preparing a concluding tagline and recording a video presentation.

Bandura's (1977) Self-Efficacy Theory is particularly relevant to the communication aspect of the proposed assignment. Self-efficacy is defined as 'the beliefs about one's capabilities to produce chosen outcomes'. In the current study, self-efficacy was not measured using an established self-efficacy measure but rather the focus was on self-efficacy-related confidence in conducting specific communication tasks associated with the assignment. In particular, two items from the questionnaire were selected to measure the changes in participants' levels of self-efficacy-related confidence. Specifically, the students were requested to assess their level of confidence in being able to explain economic concepts to others and speak in front of a camera or an audience following the video presentation assignment. Whereas the former item taps into students' perceived capability to communicate academic information, the latter measures the perceived capability to speak publicly. In other words, public-speaking confidence is regarded as a task-specific self-efficacy-related confidence in this study.

This also explains why the two aspects of self-efficacy-related confidence are measured separately. It is entirely possible for a student to feel confident in being able to explain economic concepts but less confident in being able to speak publicly. Such a scenario would suggest that students' confidence in communication-related skills and tasks has remained stable, but the confidence in being able to perform specific tasks (speak publicly) has increased. Thus, the comparison between the two would indicate that, in students' perception, there was a greater increase in self-efficacy-related confidence in being able to explain economic concepts compared to confidence in public speaking.

The theoretical framework of the current research thus implies that the proposed assignment would provide the students with opportunities to practice and apply their newly acquired knowledge, and the successful performance of the task would enhance their perceived capability to perform specific communication tasks and behaviors. However, due to the nature of the current study, which relied on quantitative and qualitative data, these assumptions can only be regarded as evidence of increased students' perceived confidence and self-efficacy-related outcomes.

## 3. Research Methodology

Participants

The study involved 262 undergraduate students enrolled in Economics courses (ECO560 and ECO162). The majority were female (65.3%) and young adults (22-25 years, 51.5%). Most respondents were in their second year of study (79.0%) and were studying in the Faculty of Business and Management (70.6%) and Hotel and Tourism Management (28.6%).

Instrument

A questionnaire was used to collect the data. The main constructs were measured using a 5-point Likert scale (from Strongly Disagree to Strongly Agree). A reliability analysis was performed on the six main academic impact items, resulting in a Cronbach's alpha of 0.918.

Procedure

The students had to create an educational video presentation as part of the course assessment. The students had to develop questions for a representative sample of the public, relate the answers and discussions back to the corresponding economic concept, and finally, add a self-created "word of wisdom" or tagline to the end of the video.

When the assignments were completed and submitted, the students were asked to complete a self-report questionnaire. The items covered the students' expectations and level of confidence prior to completing the assignments and their educational, communicative, and involvement-related gains after completing the assignments.

Most importantly, the items related to the students' expectations and level of confidence prior to completing the assignments had to be completed after the assignments were done. As such, this study does not measure the students' actual level of knowledge or confidence prior to completing the assignments, but the students' recollections of such measures. This is an important difference, as the study does not feature a traditional longitudinal pre-test-post-test design.

Sample Size Justification

A total sample size of 262 respondents was secured for this study, which is considered highly robust and adequate for the purposes of data collection and statistical procedures employed. The adequacy of the sample size can be justified from several points:

Normality and Parametric Testing: The sample size significantly exceeds the cut-off of 30 respondents required by the Central Limit Theorem. Therefore, the sampling distribution of the means can be assumed to be approximately normal. This enables the use of parametric statistical testing on the entire set of data as well as its subsets (e.g., 171 female and 91 male respondents) without having to violate the underlying statistical assumptions.

Margin of Error and Representativeness: Assuming a standard 95% confidence level and maximum variability, a sample size of 262 would have a margin of error of ±6.05%. This is well within the acceptable range of precision for educational and social science surveys, ensuring that the results accurately reflect the views and academic outcomes of the larger body of students taking these Economics courses.

Item-to-Respondent Ratio: When using survey research and scale constructs, it is critical to have an adequate item-to-respondent ratio to ensure the stability and reliability of results. The main instrument employed to

measure the academic impact contained six major Likert-scaled items. The ratio of respondents to items in this study is approximately 43:1 (43 respondents per item). This far exceeds the minimum 10:1 rule of thumb, contributing to the excellent Cronbach's alpha score of this study.

## 4. Results

**Table 1: Demographic Profile of the Video Presentation Assignment**

| VARIABLES | FREQUENCY | PERCENTAGE |
|---|---|---|
| **GENDER** | | |
| Males | 91 | 34.7% |
| Females | 171 | 65.3% |
| **Total** | **262** | **100%** |
| | | |
| **AGE** | | |
| 18-21 | 23 | 8.8% |
| 22-25 | 135 | 51.5% |
| 26-30 | 63 | 24.0% |
| 30 and above | 41 | 15.6% |
| **Total** | **262** | **100%** |
| | | |
| **FACULTY** | | |
| Business and Management | 185 | 70.6% |
| Hotel & Tourism Management | 75 | 28.6% |
| Food Service & Entrepreneurship | 1 | 0.4% |
| Transport | 1 | 0.4% |

**Table 2: Descriptive Statistics (Pre-Assignment)**

| Measurement Item / Question | Mean (1–5) | Std. Dev. | Median | Analysis & Key Findings |
|---|---|---|---|---|
| **Initial Subject Understanding** *(Before I took this course, I already had a good understanding...)* | **2.92** | 1.16 | 3.0 | Students reported a moderate to low baseline understanding of the core topic before taking the course. |
| **Prior Interest in Subject** *(I am interested in the subject even before I took this course.)* | **3.61** | 1.03 | 4.0 | Interest levels were relatively high before the assignment, indicating baseline curiosity and openness to learning. |
| **Baseline Explanation Confidence** *(Even before I took the course, I am confident in explaining the main concepts...)* | **2.90** | 1.12 | 3.0 | Confidence in explaining complex economic concepts to peers or the public was low to moderate. |
| **Creative Approach Inclination** *(I often use creative approaches to understand academic concepts.)* | **3.58** | 0.95 | 4.0 | A majority of students were moderately inclined toward creative learning methods. |

| Measurement Item / Question | Mean (1–5) | Std. Dev. | Median | Analysis & Key Findings |
|---|---|---|---|---|
| **Baseline Camera/Public Speaking Confidence** *(It is my nature to feel confident speaking in front of a camera or audience.)* | **3.31** | 1.05 | 3.0 | Neutral to moderate natural confidence in speaking in front of an audience or camera. |
| **Prior Video Creation Experience** *(I have created educational videos before.)* | **3.37** | 1.21 | 3.0 | Mixed level of experience; a significant group had limited to moderate experience in producing educational media. |

**Table 3: Descriptive Statistics (Post-Assignment)**

| Measurement Item / Question | Mean (1–5) | Std. Dev. | Median | Analysis & Key Findings |
|---|---|---|---|---|
| **Improved Subject Understanding** *(I now have a better understanding of the topics after completing the video assignment.)* | **4.17** | 0.77 | 4.0 | Strong positive impact on core concept mastery following completion of the project. |
| **Engagement & Enjoyment** *(This video assignment made the learning process more interesting and enjoyable.)* | **4.27** | 0.78 | 4.0 | High agreement that the task enhanced learning interest and active engagement. |
| **Post-Task Explanation Confidence** *(I feel more confident explaining concepts to others after completing this task.)* | **4.00** | 0.81 | 4.0 | Significant boost in students' self-assessed ability to explain academic concepts clearly. |
| **Critical & Creative Thinking** *(This task encouraged me to think critically and creatively.)* | **4.22** | 0.79 | 4.0 | High agreement regarding the task's efficacy in fostering higher-order thinking skills. |
| **Post-Task Camera/Public Speaking Confidence** *(I am more confident speaking in front of a camera or an audience after this assignment.)* | **3.86** | 0.85 | 4.0 | Noticeable growth in public speaking and camera presence confidence. |
| **Overall Experience Satisfaction** *(I am satisfied with my experience in creating an educational video.)* | **4.09** | 0.79 | 4.0 | Overall student experience satisfaction is exceptionally positive. |
| **Future Recommendation** *(I believe that assignments like this should be continued for other subjects too.)* | **4.11** | 0.88 | 4.0 | Strong endorsement for continuing and scaling similar assignments in other courses. |

**Table 4: Descriptive Statistics Table**

| No | Factor Name | Mean | Std. Dev. |
|---|---|---|---|
| **A.** | **A. Pre-Assignment Readiness & Confidence** | | |
| 1. | Prior good understanding of main subject topics | 2.92 | 1.16 |
| 2. | Confident explaining concepts to peers/public before the course | 2.90 | 1.12 |
| 3. | Natural confidence speaking in front of a camera/audience | 3.31 | 1.05 |
| 4. | Prior experience in creating educational videos | 3.37 | 1.21 |
| 5. | Often use creative approaches to understand academic concepts | 3.58 | 0.95 |
| 6. | Prior interest in the subject before taking the course | 3.61 | 1.03 |
| **B.** | **Post-Assignment Impact & Critical Thinking** | | |
| 1. | The task encouraged critical and creative thinking | 4.22 | 0.79 |
| 2. | Better understanding of topics after completing the assignment | 4.17 | 0.77 |
| 3. | More confident explaining economic concepts to others post-task | 4.00 | 0.81 |
| 4. | More confident speaking in front of a camera/audience after this assignment | 3.86 | 0.85 |
| **C.** | **Public Engagement & Question Formulation** | | |
| 1. | Believes the activity improved communication or critical thinking skills | 4.29 | 0.72 |
| 2. | Creating public questions helped in understanding the topic better | 4.22 | 0.76 |
| 3. | Involving the public made the video more engaging | 4.17 | 0.77 |
| 4. | Effort put into designing the public questions | 4.06 | 0.80 |
| 5. | Overall experience rating in creating questions for the public | 4.01 | 0.78 |
| 6. | Confidence felt in formulating meaningful questions for a public audience | 3.94 | 0.83 |
| **D.** | **Tagline / Word of Wisdom Creation** | | |
| 1. | Tagline creation helped reflect more deeply on the topic | 3.98 | 0.87 |
| 2. | Effectiveness of the tagline in connecting with the public audience | 3.86 | 0.94 |
| 3. | Experience rating in creating a word of wisdom/tagline | 3.76 | 1.02 |
| 4. | Time and thought invested in crafting the tagline | 3.44 | 0.93 |
| 5. | Ease of coming up with a meaningful word of wisdom/tagline | 3.32 | 1.06 |
| **E.** | **Overall Satisfaction & Future Recommendation** | | |
| 1. | The assignment made learning more interesting and enjoyable | 4.27 | 0.78 |
| 2. | Believes similar assignments should be continued for other subjects | 4.11 | 0.88 |
| 3. | Overall satisfaction with the experience of creating an educational video | 4.09 | 0.79 |

Demographic Profile of Respondents

The demographic analysis was conducted on a total of 262 respondents. Most of them were female students (n = 171, 65.3%), as compared to male students (n = 91, 34.7%). In terms of age, over half of the sample belonged to the age groups of 22 to 25 years (51.5%) and 26 to 30 years (24.0%). This implies that the respondents were at an appropriate intellectual age to engage in critical thinking tasks.

The respondents were from different academic programs, where the largest groups were from HM252 (28.6%) and BA111 (24.4%). Overall, the sample was heavily skewed towards the Faculty of Business and Management (70.6%) and the Faculty of Hotel and Tourism Management (28.6%). The majority of the sample were in the middle of their studies (Semester 3 to Semester 4, Year 2), which comprised 79.0% of the respondents.

Pre-Assignment Readiness and Prior Knowledge

Descriptive analysis showed that before the course, the respondents had low to moderate understanding of the main topics (Mean = 2.92, SD = 1.16). Similarly, their initial confidence level in explaining Economics concepts to others (public) was very low (Mean = 2.90, SD = 1.12). Nevertheless, the respondents reported that they had a positive interest in the subject (Mean = 3.61, SD = 1.03) and a positive tendency to adopt creative approaches to learning academic concepts (Mean = 3.58, SD = 0.95). Their experience in creating educational videos and the natural confidence level in speaking in front of a camera were merely average, with means of 3.37 and 3.31, respectively.

Post-Assignment Impact on Comprehension and Critical Thinking

The video presentation assignment resulted in a highly positive academic impact. After accomplishing the task, findings revealed that the respondents agreed that the assignment helped them to learn and understand the topics (Mean = 4.17, SD = 0.77). Moreover, they strongly agreed that the video presentation assignment facilitated the enhancement of their critical and creative thinking skills (Mean = 4.22, SD = 0.79). Additionally, the respondents felt that they had a significantly increased confidence level in explaining concepts related to Economics to the public (Mean = 4.00, SD = 0.81).

Public Engagement and 'Word of Wisdom' Creation

One of the unique aspects of this assignment was that it required students to come up with a concluding tagline for their videos. According to the respondents, creating questions for the public made their videos more interesting (Mean = 4.17, SD = 0.77). They also agreed that this particular activity assisted in enhancing their critical thinking (Mean = 4.29, SD = 0.72).

With regard to creating a "word of wisdom" or tagline, this task was slightly challenging but rewarding for the respondents. While it was difficult for them to come up with an appropriate phrase (Mean = 3.32, SD = 1.06), they devoted quite some time and effort to brainstorm an appropriate saying (Mean = 3.44, SD = 1.120). They acknowledged that creating a tagline required them to think much deeper about their specific discussion topics (Mean = 3.98, SD = 1.121).

Overall Satisfaction

Overall, the video presentation assignment was very much appreciated by the students. It received the highest score in making their studies more interesting and fun (Mean = 4.27, SD = 1.122). The majority of the respondents were very much satisfied with their overall experience in creating the educational video (Mean = 4.09, SD = 1.123). Hence, they strongly suggested that such multimodal assignments be continued and adapted in other subjects in the future (Mean = 4.11, SD = 1.124). However, the confidence level in speaking in front of a camera remained one of the lowest-scoring items after the accomplishment of the task (Mean = 3.86, SD = 1.125).

## Discussion

Bridging the Knowledge Gap through Experiential Learning Essay

The data illustrates the effectiveness of the video presentation assignment in terms of transforming the passive reception of information into active understanding of concepts. The students' average topic understanding before the course was only 2.92, and their ability to explain economic concepts to others was only 2.90. However, after the assignment, the participants' topic mastery increased to 4.17. Such an outcome aligns with the theoretical background of the Experiential Learning Theory. Specifically, designing the questions aimed at the general audience and thereby being engaged in the process of transforming the information they have acquired from a theoretical one into an applied and understandable language can be viewed as "a process of active experimentation with ideas or objects." Thus, the idea of "learning to teach" to gain knowledge has proven to be efficient.

Public Engagement and Critical Thinking

The main positive outcome of the project was deemed to be the engagement of the public in the research. Thus, addressing "the need to think critically and creatively about the topic and effectively communicate the ideas to the public" received the highest mark among the respondents (mean = 4.22). In addition, the task of creating a "word of wisdom" or a tagline was also viewed positively, although it was rated lower than other aspects of the assignment (mean = 3.32). Nevertheless, the students believed that this concrete task of summarizing their experience was necessary as it provided a deeper consideration of the topic (mean = 3.98). Thus, the critical thinking component was viewed positively by the participants.

Self-Efficacy and the On-Camera Barrier

An interesting finding of the present study is that the majority of students increased their public speaking skills after the assignment. According to Bandura's Self-Efficacy Theory, one's beliefs in regard to their capabilities to exercise control over a particular behavior determine one's decisions and actions. Thus, the rise in scores from 2.90 to 4.00 demonstrates that the students have significantly gained confidence in their ability to teach

the audience. At that, the lowest rate was given to the aspect of speaking in public, which implies that, despite the overall increase, the fear of the camera was still present. Thus, the participants felt more confident in regard to the topic and their overall ability to educate but not to speak in front of people. Therefore, the students would benefit from additional training in speaking in public, which would correspond to the findings of the present study.

Overall Evaluation

Finally, the majority of students who participated in the survey expressed their satisfaction with the assignment. The students marked that the use of a multimedia presentation on the topic was a more interesting and entertaining way of learning (mean = 4.27). Moreover, the overall assessment of such learning experiences was also high (mean = 4.09). Lastly, the students expressed their willingness for such assignments to be included in other courses (mean = 4.11). Thus, the idea of video presentation as a tool for self-learning and assessment is pleasing to students. Therefore, the assignment can be successfully implemented in various areas of academics, and, in particular, in Economic disciplines.

## 5. Implications of the Study and Recommendations

The results of this study have several theoretical and practical implications for higher-education institutions, particularly with regard to the teaching of Economics.

Theoretical Implications

From a theoretical perspective, this study contributes to the body of knowledge on Kolb's Experiential Learning Theory and Bandura's Self-Efficacy Theory. First, by demonstrating that a simple video assignment can facilitate experiential learning without the need for lab sessions or field trips, this study extends the application of Kolb's model to digital educational settings. By analyzing the findings related to students' topic understanding and critical thinking, it can be concluded that creating an educational video, where students interact virtually with the public and process this information into a coherent explanation of the concepts, is an experiential learning cycle. Furthermore, the study provides further evidence in favor of Bandura's Self-Efficacy Theory. As mentioned above, the moderate positive correlation between students' confidence in the subject before the course, and post-assignment explanatory confidence suggests that completing a complex task, such as this video assignment, enhanced students' self-efficacy.

Pedagogical Implications for Educators

From a practical standpoint, the results of this study offer several insights for educators who seek to implement video-based assignments or are considering a pedagogical shift from passive to active learning approaches. Shifting from Passive Assessment to Active Translation: Traditional assessment methods, such as multiple-choice tests or essays, often require little processing of information; students simply recall the material they have memorized. On the other hand, the results of this study demonstrate that transforming abstract academic concepts into questions aimed at the public and creating a tagline to relate these concepts to the general audience requires more processing of the information, thus being conducive to deeper learning and comprehension.

Building Confidence Through Scaffolding: While students were generally satisfied with the assignment and it enhanced their confidence in the subject, the lowest mean score related to confidence was recorded for speaking in front of a camera or audience (Mean = 3.86). This shows that despite the well-documented benefits of video recording on presentation-related anxiety, students still feel anxious about it. Particularly in the era of Generation Z, where they are much more comfortable with technology than previous generations, the implementation of video assignments should be accompanied by confidence-building scaffolds such as practice recording sessions.

Encouraging Creative Autonomy: One of the most interesting findings of this study was that students utilized opinion-based and scenario-based questions much more than factual ones and invested considerable effort into designing questions for the public. This shows that students value creative autonomy and the opportunity to demonstrate their communicative and conceptual skills. Therefore, educators should provide more opportunities for creative expression in assignment design, rather than focusing on objective questions or factual answers.

Institutional Implications

At the institutional level, the results of this study might prompt the revision of the assessment criteria to include multimodal assignments. As highlighted by this study, such projects have the potential to enhance subject matter mastery, critical thinking, and public speaking skills. By encouraging student-produced video assignments, institutions promote the development of competencies necessary for the students to succeed in the workplace, including digital literacy and communication skills. Additionally, it is essential to ensure that both students and faculty have access to the necessary resources to implement such assignments.

## Conclusion

The use of a video presentation assignment in Economics courses is an effective way to enhance student engagement, critical thinking, and conceptual understanding of the subject. It is recommended that educators continue to utilize such assignments. Future iterations of the assignment could include a short workshop on public speaking or confidence-building to further promote the pedagogical value of this assessment type.

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