# INFORMATION MANAGEMENT AND BUSINESS REVIEW

## BUSINESS MANAGEMENT PRACTICES

## OPPORTUNITIES AND CHALLENGES

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**Editorial**

Information Management and Business Review (IMBR) provides a unique platform for scholars around the world 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. Scope of IMBR includes: subjects of finance, accounting, auditing, cost & management accounting, financial psychology, financial literacy, marketing, information management, human resource management, knowledge management, innovation, change management, enterprise management, e-commerce and information system. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal and that all listed authors approve its submission to IMBR. It is IMBR policy to welcome submissions for consideration, which are original, and not under consideration for publication by another journal at the same time. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. The current issue of IMBR is a special issue in collaboration with Universiti Teknologi MARA, Malaysia and comprises papers of scholars from different universities of Malaysia, Indonesia, Sri Lanka, UAE, Taiwan and China. Assessing Information Security Competencies of Firm Leaders towards Improving Procedural Information Security Countermeasure, Review of the Business Management Capability and Adaptability among Malaysian Contractors, Covid-19 Pandemic and the Emergence of E-Payment, The Effects of Dynamic Capabilities on Firm's Financial Performance, Engaging Lean Six Sigma Approach Using DMAIC Methodology for Supply Chain Logistics Recruitment Improvement, A Verification of Okun's Law: The Case of Southeast Asian Countries, Social Cost-Benefit Analysis (SCBA) of Islamic Insurance (takaful) Drone-Assisted Disaster Victim Identification, To Recycle e-Waste or Not: Understanding Consumers' Intention, Solid Waste Management in Malaysia, Determinants of Sustainable Development among Malaysian Small and Medium Enterprises, Impact of Social Media Marketing Activities on Online Purchase Intention for the Cosmetic Industry, Conceptualizing Muslim Consumer Religiosity, Effects of Health, Labor and Capital towards Labor Productivity, Factors Influencing Ethical Behavioral Intention among Takaful Agents, Factors Inducing the Adoption of Knowledge Management System (KMS) in SMEs, Large and Government Organizations, Performance of Shariah vs Non-Shariah Firms: A Study of Manufacturing Sector, Accelerating digital talent readiness in Malaysian banking sector, The Adaptation of Social Media Marketing Activities in S-Commerce, Importance of Managerial Coaching in Public Organisation, A Study on Awareness, Exposure and Attitude towards Digital Citizenship among University Students, A Systematic Review on Marketing Strategies, A Cointegration Study of Life Insurance Demand in Malaysia and What have we Learned from Firm Efficiency Research are some of the major practices and concepts examined in these studies. All the submitted papers were first assessed by the committee of Universiti Teknologi MARA and editorial ream of the journal for relevance and originality of the work and then blindly peer-reviewed by the external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance, and clarity of the purpose. The special issue will therefore be a unique proposition, where scholars will be able to appreciate the latest results in their field of expertise, and to acquire additional knowledge in other relevant fields.

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# PAPERS

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# Assessing Information Security Competencies of Firm Leaders towards Improving Procedural Information Security Countermeasure: Awareness and Cybersecurity Protective Behavior

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**Abstract:** Cybersecurity threats are a serious issue faced by many organizations in this new information era. Therefore, security leaders play a significant role not only to ensure that all their employees are practicing good security behavior to protect organizational information assets but also to ensure that security technology has been installed properly to protect network infrastructure. This study aims to examine cybersecurity protective behavior (CPB) among employees in the organization and focus on the role of leadership competencies and information security countermeasure awareness. The questionnaires were distributed via email and self-administered, and the study managed to obtain 245 responses. Partial Least Squares-Structural Equation Modeling (PLS-SEM) analysis was used to analyze the final data. Confirmatory factor analysis (CFA) testing shows that all the measurement items of each construct were adequate in their validity individually based on their factor loading value. Moreover, each construct is valid based on its parameter estimates and statistical significance. The research findings show that Procedural Information Security Countermeasure (PCM) awareness strongly influences CPB compared to a leader's information security competencies (ISI). Meanwhile, ISI significantly influences PCM awareness. This study adapts the theory of leadership competencies in the context of cybersecurity, which is particularly beneficial to any industry in improving organizational information security strategic plans.

**Keywords:** *Cybersecurity Leaders, Cybersecurity Protection Behavior, Information Security, Information Security Competencies, Information Security Awareness*

## 1. Introduction and Background

Vulnerabilities may arise from the Internet-based interconnection of digital devices and information systems that can function in the cloud (Baikloy et al., 2020). Therefore, we need cybersecurity to guard against cyberthreats and vulnerabilities and protect an organization's data and information technology (IT) assets (Yeoh et al., 2022). In doing so, we need good cybersecurity strategic planning. Human errors, which result from the improper execution of an appropriate action sequence, such as poorly written communication (prescriptions, documentation, and transcribing), are the most problem in information security (Wong et al., 2022). According to Keers et al. (2013), human negligence and noncompliance with regulations are two common causes of human errors.

In both established and developing countries, there have recently been a lot of cybersecurity issues related to fraud and data breaches (Wong et al., 2022; Newman, 2019). A prominent bank in the banking sector recently issued a scam alert in Malaysia, warning consumers about a new fake bank website (which looks similar to the real website of the bank) that has been set up by fraudsters to steal financial information. Through messages delivered via WhatsApp, SMS, or emails, these scammers tried to persuade users to log into fake websites (The Star, 2021). Malicious cyberattacks have surged by 600% from 2016 to 2020, according to Symantec's Internet Security Threat report. Likewise, the Malaysia Computer Emergency Response Team (MyCERT) received reports of 10,699 cyberattacks in total in 2018 (Bernama.com, 2020).

The majority of these attacks—429 cases in total were categorized as ransomware attacks. A virus attack known as a ransomware attack encrypts files and/or locks people out of their devices. Users may be required to pay a "ransom" during a ransomware attack to recover their files (Zimba et al., 2018). More than 100,000 businesses across at least 150 countries were negatively impacted by the most well-known ransomware, "Wannacry" (Bernama.com, 2020). Recent research suggests that ransomware instances point to the likelihood that cyber attackers will target businesses to profit financially (CyberSecurity Malaysia, 2019). As a result, there have been significant financial outlays for operational costs, data recovery costs, and other related costs (Ahmad et al., 2021; Corallo, Lazoi, and Lezzi, 2020; Li et al., 2019; CyberSecurity Malaysia, 2019).

The latest security technologies, such as biometrics, firewalls, smartcards, and encryption, have been implemented by many organizations (Kreicberga, 2010), but employees' attitudes towards information security are still influenced by human error, which leads to information security problems (Park, Ruighaver and Ahamad, 2010). This is corroborated by data showing that human mistake accounts for 90% of cybersecurity issues (Kemper, 2019). Studies contend that technological advances cannot completely ensure effective information security if the information security behaviors of employees do not strongly conform to established cybersecurity norms in organizations. According to Kemper (2019), numerous firms have lost millions of dollars as a result of inadequate response times to security issues and careless employee activity. Equally, several organizations have fallen victim to cybersecurity breaches due to employee negligence, and non-compliance with their organization's information security policies (Willison and Warkentin, 2013).

Employees' cybersecurity behaviors may reflect inconsiderate actions such as not creating strong passwords, sharing passwords, leaving devices connected to the internet without any online protection, logging in to company systems through unsecured networks, and being offhand while handling organizational data and information (Akhunzada et al., 2015). Therefore, as suggested by previous studies, exploring the issues of cybersecurity protective behaviors are essential (Vance et al., 2012; Schuetz et al., 2020). Cain et al. (2018) also argued that implementing good cybersecurity behavior can promote safe cyberspace and behaviors, hence reinforcing cybersecurity protective behaviors (CPB). Moreover, driving successful CPB has been debated to also depend on the efficient use of the security manager's information security intelligence (ISI) skills to manage employee behaviors in ways that tightly underpin and inspire increased CPB (Cain et al., 2018; Kemper, 2019).

Although there are many studies on cybersecurity, there aren't many studies that evaluate ISI skills (Corallo et al., 2020), especially in developing nations like Malaysia. Due to a lack of employee security awareness, poor security skills, inadequate security monitoring and enforcement, as well as inappropriate cybersecurity behaviors, cybersecurity threats still exist in many companies from various sectors (Ameen et al., 2021; Safa et al., 2019). Thus, deploying ISI skills is important to train and equip employees with adequate knowledge of cybersecurity and help them better understand the consequences of exhibiting pro-security actions in handling organizational data and information (Kimani et al., 2019). Congruent with the debates of Ameen et al. (2021), effective implementation of ISI skills can aid employees in developing their self-awareness towards cybersecurity issues. This can be more effective if the leaders implement efficient information security procedures and guidelines (Safa et al., 2019). Providing effective information security training and education (SETA Program) that is also known as procedural information security countermeasure (PCM), is essential since several employees are still negligent in complying with information security policies (ISPs) accordingly (da Veiga et al., 2020). However, given the distinct and continued volatility of the business in the cyberspace and security environment of organizations, it is yet unclear from the literature how ISI skills directly predict PCM and CPB. These clear gaps in the literature necessitate this study's motivation and thus, call for closer attention.

Based on the above review, this study is conducted to explore the skills of organizational security leaders relevant to combating cybersecurity threats and enhancing cybersecurity protective behavior among employees in today's era. ISI and PCM concepts have been adapted to develop a holistic cybersecurity protective behavior model because both components are essential in enhancing employee behavior to practice cybersecurity adequately. Thus, this study aims to contribute by exploring and providing an integrative framework that reflects the roles of PCM awareness and ISI skills to predictively influence CPB. The subsequent sections discuss both concepts and the research findings.

## 2. Literature Review

### Leadership Competencies

Northouse (2010) defined leadership as having the authority and capacity to persuade people to accomplish shared objectives. Leadership was defined by another researcher as "the process of influencing others to understand and agree about what needs to be done and how to do it and the process of facilitating individual and collective efforts to accomplish shared objectives" (Yulk, 2006, p. 8). Rowley and Sherman's (2003) additional definition emphasizes that leadership is a critical component of any organization since it influences the accomplishment of goals and objectives. In contrast, leadership was characterized by Bratton and Gold

(2012) in terms of intrapersonal and interpersonal attributes (behavior, traits, role, influence, position, and interaction between members or groups). Implicit in these definitions of leadership are the competencies a leader should have to achieve the desired organizational goals and objectives.

Good leaders often have the right leadership competencies. Cleveland and Cleveland (2018) contended that competent leaders usually have the passion to help others and are considered inspired leaders by their subordinates. According to earlier research, people's skills, abilities, cognitive intelligence, and social intelligence can all be used to measure a person's competencies (Boyatzis, 2011). Additionally, Korzynski et al. (2021) claimed that for staff to engage in both strategic and daily planning, they needed to possess leadership qualities. They assist in making an organization, department, or team's vision a reality in this way. Therefore, a leader with the right competencies will be able to improve the firm's performance. Today's business leaders are often assessed by their ability to relay brand consistency, authenticity and company transparency. They are judged on their corporate values, strategic vision, management practices and community contributions. However, forward-thinking leaders will keep information security on their priority list. Among the competencies that leaders should possess in guaranteeing business information security are business acumen, resilience, team-building skills, problem-solving skills, communication skills, collaboration skills, and strong interpersonal skills (Cleveland and Cleveland, 2018; Sussman, 2021; Triplett, 2022). A leader needs to be seen by the employees that their leader has the right cybersecurity competencies. Hassan (8 Mar 2022, Cybrary) argued that effective business leaders should take seriously on security compliance as an element of operations. Hassan further explained that leaders should be protective and able to manage thoroughly to guarantee business information security. This would relay confidence among the staff that their leaders are serious about growth and they are mindful of what is required to build a successful business.

Leaders who have the right cybersecurity competencies would reduce cybersecurity risk (Triplett, 2022). These highly competent leaders build and strengthen the cybersecurity workforce. These skilled cybersecurity leaders are critical for leading effective cybersecurity teams and defending organizations against ever-increasing cyber threats (McFadden, 2021). Furthermore, the employees' cybersecurity behavior is the outcome of how the firms' leader channels attention to their decision (Shaikh and Siponen, 2022). The decision made depends on the leader's intelligence to deal with indicated situations.

**Information Security Intelligence (ISI) Competencies and Cybersecurity Protective Behavior**

Depending on the size or culture of the business, the security leaders responsible for managing information security hold a variety of titles, including Chief Information Security Officer (CISO), Information Security Director (ISD), and Information Security Manager (ISM), among others. The job of this role, which is distinct from that of an information security expert, is dedicated to managing information security. According to Haqaf and Koyunchu (2018), they are typically in charge of ensuring the establishment of security processes, systems, policies, standards, and guidelines, communicating with all organization members about how to protect information assets, making security-related decisions, working with internal and external stakeholders for all operations, and supervising the security expert teams.

According to earlier research, a leader is crucial in raising employees' understanding of information security (Khando et al., 2021; Hwang et al., 2019). According to Hwang et al. (2019), managerial security participation appeared to have the strongest correlation with workers' awareness. From planning to implementation, the firm's CEO must be actively involved in all facets of cyber governance. Investments in cybersecurity must be treated as strategic investments, and this competency's growth must be closely supervised (Abraham et al., 2019). In earlier studies, the researchers recommended that businesses invest more in human capital rather than technology. This is due to the fact that most security events are brought on by internal personnel who are sloppy, negligent, or incapable of using security tools appropriately (Hong and Furnell, 2021; da Veiga et al., 2020). The management may support information security wholeheartedly, but if the internal employees do not understand the value of modeling information security behavior and do not care about it, the security goals will not be met.

In order to boost employees' information security compliance intention behavior, Kim, Hovav and Han (2020) also recommended that the company's security executives exhibit information security expertise and problem-solving skills. Other studies have shown that the information security leader is crucial to supporting

information security initiatives and ensuring the success of the organization's information security awareness programs (Hong and Furnell, 2021; Ameen et al., 2021). Employee engagement in adopting good cybersecurity behavior will decline if top management does not support the adoption of security rules and processes (Hasan et al., 2021). The company's top management should be proactive in its cybersecurity efforts. Previous research (Khando et al., 2021; Kim et al., 2020; Li et al., 2019) demonstrated a favorable effect of top management participation on the information security awareness program, which functions as a catalyst for the information security awareness of the employees.

The effectiveness of security decision-making will also be impacted by the security leaders' lack of cybersecurity knowledge and expertise (Ani et al., 2018). Additionally, it causes a decline in the effectiveness of information security management. According to other empirical studies (Khando et al., 2021; Humaidi and Balakrishnan, 2018), employees' shared understanding is determined by how they view management's role in the workplace and how persuasive security managers' communication is. Therefore, this study examined how security leaders' ISI influenced employees' understanding of information security procedures and how that aspect may have an impact on how they behave in terms of cybersecurity protection. The ability of security leaders to influence their subordinates to practice information security behavior, the ability to use accumulated knowledge from experience or training to detect security threats and techniques, as well as the degree to which the leader can respond promptly with appropriate countermeasures are all examples of information security competencies according to the current study. To that end, the ensuing hypotheses were created.

*H1: Information security competencies of security leaders positively affect employees' cybersecurity protective behavior. (This is a valuable ability to be had in a firm's security leader, which can make very valuable contributions towards raising positive cybersecurity protective behavior amongst the employees.)*

*H2: Information security competencies of security leaders positively affect employees' procedural information security countermeasure awareness. (In this case, if the information security leader has adequate competencies in handling cybersecurity issues in the organization, it will be able to improve employees' awareness of how to combat the issues.)*

**Procedural Information Security Countermeasure Awareness and Cybersecurity Protective Behavior**

If the employees are unaware of the information security policies and procedures, they cannot be effectively applied. According to a study by Li et al. (2019), employees who are knowledgeable about their company's information security policy and procedures are more equipped to handle cybersecurity activities than those who are not. Therefore, it is essential that these policies are implemented accurately and appropriately across the company and that they are actually communicated to all employees (Ahmad et al., 2021). Alghamdi (2021) asserts that it is crucial to make sure that every employee in the company is aware of the information security policies as this would improve their comprehension of information security. Thus, this will improve employees' information security protection behavior. According to earlier research, employees' behavior regarding cybersecurity compliance was directly influenced by their awareness of cybersecurity countermeasures (Donalds and Osei-Bryson, 2020; Kim et al., 2020). Employee security awareness can be raised and this can help to reduce human error and harmful behavior (Parsons et al., 2014). According to Safa et al. (2015), the organization should effectively develop security awareness programs and ensure that they are relevant and consistent because these factors are crucial for the effectiveness of this program.

In this study, the procedural information security countermeasure awareness (PCM) was adopted from a study by Kim et al. (2020) that has provided the rules and guidelines to help employees understand their roles and responsibilities in complying with standards for the use of organizational information and technology resources. In addition, PCM has a deterrent effect through ongoing organizational efforts that reinforce acceptable usage guidelines and emphasize the potential punishment for misuse of information assets (D'Arcy, Hovav and Galletta, 2009; Puhakainen and Siponen, 2010). Thus, the following hypothesis was constructed:

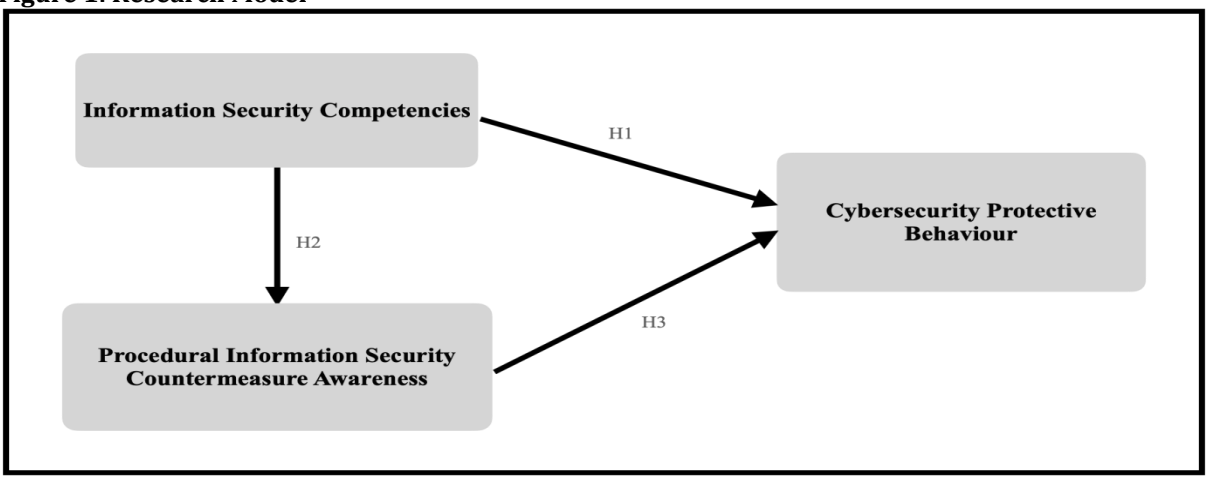
*H3: Procedural information security countermeasure (PCM) awareness positively affects employees' cybersecurity protective behavior. (Under this dimension, if the employees have good knowledge of cybersecurity countermeasure procedures, it will lead them to protect organizational assets properly in the cyber world.)*

**Research Model**

As discussed in the previous section, this study posits information security competencies of the security leaders and procedural information security countermeasure awareness as an independent variable.

Meanwhile, the dependent variable of this study was cybersecurity protective behavior which is focused on behavior related to device securement behavior, updating behavior and proactive behavior related to handling cybersecurity threats. The proposed model is shown in Figure 1.

**Figure 1: Research Model**




## 3. Research Methodology

The study's target respondents were employees from various companies in Klang Valley, Malaysia. A purposive sampling technique was utilized to find the ideal respondent for the study. The minimum sample size was determined using GPower calculating software. The minimum sample size needed was 40 because the model (Figure 1) had a maximum of three predictors, the effect size was big (0.35), and the power needed was 0.85. However, this study manages to receive a total of 245 data. Several difficulties have been taken into account for ethical considerations, including the confidentiality statement and informed consent for the respondents.

Using the IBM Statistical Package for Social Sciences (SPSS) version 26, the respondent profile was examined to begin the data analysis for the study. The IBM SPSS was also used to test data normality and any data error has been cleaned up. The measurement and structural model were investigated using the statistical method of partial least squares (PLS)-Structural Equation Modeling (SEM) utilizing the SmartPLS 3.3.6 version (Ringle et al., 2015). When examining proposed theoretical models, PLS-SEM focuses on explaining the variance in the dependent variable because it is primarily intended for exploratory research (Hair et al., 2014). PLS is the preferred data analysis method for the current study's context since it prioritizes prediction above parameter accuracy (Gefen, Rigdon and Straub, 2011). The following part goes through the study's measuring model and structural model.

## 4. Results

The majority of the respondents are female (n = 137) compared to male (n = 108). In terms of age, the majority of the respondents (n = 212) are under or equal to 40 years old, as opposed to the respondents who are above 40 (n = 33). The majority of respondents (n = 58) come from the education sector, which is followed by finance and banking (n = 45), and the transportation and automated (n = 28) sectors. The majority of respondents (n = 136) had a bachelor's degree or higher, which was followed by a diploma (n = 56), a master's degree (n = 27), and a professional degree (n = 12), among other levels of education. Other categories of respondents (n = 4) only completed their primary and secondary education.

In terms of their jobs, 64 respondents have managerial roles, while 75 hold executive positions. Academicians (n = 58), low-level positions (n = 9) and others (n = 39) made up the remaining slots. Compared to respondents with more than 10 years of experience, the majority of respondents (n = 147) have less than or equal to 10 years of work experience. In contrast to 93 respondents who said they had never faced an attack, the majority of respondents (n = 152) said they have encountered cybersecurity threats. The characteristics of the entire sample of respondents who took part in the study are summarized in Table 1.

**Table 1: Demographic Details**

| Demographic Variable | Frequency | Percentage |
|---|---|---|
| Gender | | |
| Male | 108 | 44.1 |
| Female | 137 | 55.9 |
| Age | | |
| Less than or equal to 40 years old | 212 | 86.5 |
| More than 40 Years old | 33 | 13.5 |
| Type of Industry | | |
| Education | 58 | 23.7 |
| Utilities | 19 | 7.8 |
| Construction | 10 | 4.1 |
| Health | 13 | 5.3 |
| Finance/Banking | 45 | 18.4 |
| Transport/Automotive | 28 | 11.4 |
| Manufacturing | 11 | 4.5 |
| Media | 5 | 2.0 |
| ICT | 6 | 2.4 |
| Food | 10 | 4.1 |
| Electric and Electronic | 4 | 1.6 |
| Others | 36 | 14.7 |
| Qualification | | |
| Professional Certificate | 2 | 0.8 |
| Diploma | 56 | 22.9 |
| Advanced Diploma | 6 | 2.4 |
| Bachelor Degree | 136 | 55.5 |
| Professional Degree | 12 | 4.9 |
| Master Degree | 27 | 11.0 |
| PhD | 2 | 0.8 |
| Other | 4 | 1.6 |
| Position | | |
| Administrative Staff | 9 | 3.7 |
| Executive Level | 75 | 30.6 |
| Assistant Manager | 10 | 4.1 |
| Manager | 18 | 7.3 |
| Senior Manager | 25 | 10.2 |
| Assistant Engineer | 1 | 0.4 |
| Engineer | 9 | 3.7 |
| Senior Engineer | 1 | 0.4 |
| Academic Staff/Academician | 58 | 23.7 |
| Others | 39 | 15.9 |
| Working Experience | | |
| Less than or equal to 10 years | 147 | 60.0 |
| More than 10 years | 98 | 40.0 |
| Do you have experience with cybersecurity threats? | | |
| Yes | 93 | 38% |
| No | 152 | 62% |
| Total (n) | 245 | 100 |

A common method bias (CMB) assessment was conducted because this study's data were acquired from a single source, as proposed by Podsakoff et al. (2003). To measure the presumed source of method variance as a covariate in the statistical analysis, this study employed the marker variable technique. The marker variable used in this study is made up of three unrelated items using the methods suggested by Rönkkö and Ylitalo

(2010). According to the CMB findings, adding marker variables had no discernible impact on either the Beta ($\beta$) value or $R^2$ changes.

The composite reliability (CR) index and the average variance extracted (AVE) index were used in this study to calculate the reliability of the measures. Both indices—0.7 for the CR index and 0.5 for the AVE index—were greater than the evaluation requirement for all measurements. Convergent validity evaluates the coherence between many constructs. According to Table 2, all values fell within the suggested range, suggesting convergent validity and internal consistency reliability (Hair et al., 2014).

The Heterotrait-Monotrait Ratio of Correlations (HTMT) was employed to evaluate the discriminant validity (Henseler, Ringle and Sarstedt, 2015). An HTMT value greater than 0.85 indicates a problem with discriminant validity. Referring to the recommendations made by Gold et al. (2001), who stated that the validity of the concept is still acceptable if the score is higher than the HTMT value of 0.90 and lower than 1. All of the HTMT values (Table 2) results are below the threshold level of 0.90, and the HTMT inference also demonstrates that none of the constructs' confidence interval levels showed a value of 1. These findings clearly reported that the discriminant validity of the constructs has been deemed acceptable and was not a serious threat in this study.

**Table 2: Convergent and Discriminant Validity**

| | | | | Discriminant Validity (HTMT) | | |
|---|---|---|---|---|---|---|
| Variables | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) | 1 | 2 | 3 |
| (1) Cybersecurity Protective Behaviour | 0.865 | 0.894 | 0.517 | | | |
| (2) Manager's Infosec Competencies | 0.946 | 0.965 | 0.903 | 0.586 | | |
| (3) Procedural Inforsec Countermeasure Awareness | 0.933 | 0.946 | 0.691 | 0.811 | 0.644 | |

The values of the corresponding loadings and cross-loadings were then assessed to see whether there were any issues with any specific variable indicators in the complete model. To find out if the items were equally loaded on all the constructs in addition to their own, cross-loadings were computed. For loadings to be deemed significant in the current study, a cut-off value of 0.7 or above was employed (Hair et al., 2014). According to the findings (Table 3), the majority of the indicators measuring a given construct had loading values of more than 0.6 for that construct. This led to results, which supported the validity of the indicators for each concept.

**Table 3: Cross Loadings**

| **Measurement Items** | **Procedural Inforsec Countermeasure Awareness** | **Cybersecurity Protective Behaviour** | **InfoSec Competencies** |
|---|---|---|---|
| Email Policies | 0.693 | 0.625 | 0.638 |
| Website Policies | 0.843 | 0.569 | 0.499 |
| Computer resources policies | 0.912 | 0.735 | 0.496 |
| Information system policies | 0.812 | 0.493 | 0.485 |
| Infosec Policies Training | 0.924 | 0.607 | 0.579 |
| Infosec threat briefing | 0.914 | 0.661 | 0.544 |
| Infosec education program | 0.614 | 0.490 | 0.266 |
| Consequences of IS Misuse | 0.885 | 0.732 | 0.507 |
| Updating behavior | 0.593 | 0.613 | 0.180 |

| Measurement Items | Procedural Inforsec Countermeasure Awareness | Cybersecurity Protective Behaviour | InfoSec Competencies |
|---|---|---|---|
| Updating behavior | 0.424 | 0.728 | 0.461 |
| Device securement behavior 1 | 0.389 | 0.612 | 0.154 |
| Device securement behavior 2 | 0.519 | 0.753 | 0.381 |
| Proactive awareness behavior 1 | 0.692 | 0.774 | 0.398 |
| Proactive awareness behavior 2 | 0.577 | 0.778 | 0.496 |
| Proactive awareness behavior 3 | 0.471 | 0.638 | 0.521 |
| Proactive awareness behavior 4 | 0.548 | 0.823 | 0.476 |
| Perceived Infosec Knowledge | 0.587 | 0.462 | 0.937 |
| Perceived Infosec Problem Solving | 0.625 | 0.589 | 0.958 |
| Perceived Social Competence | 0.538 | 0.484 | 0.956 |

T-values, p-values, and bootstrapped confidence intervals were obtained using the bootstrapping process with a resampling rate of 500. Table 4 displays the final results. The direct relationship between information security competencies and PCM awareness and CPB was examined in this study. Furthermore, the direct relationship of PCM awareness was also tested on CPB. There were three (3) hypotheses tested. The results have shown that all the hypotheses (H1 until H3) were supported. PCM awareness strongly influences CPB ($\beta$ = .669, t = 13.668, p < .000, $f^2$ = .647) compared to information security competencies ($\beta$ = .131, t = 2.154, p < .016, $f^2$ = .025). The results also indicated that PCM awareness explained 37.9% of the variance in information security competencies of the manager. This has shown that other possible variables can influence PCM awareness. Meanwhile, the information security competencies of the security leaders and PCM awareness explained 57.2% of the variance in CPB.

**Table 4: Hypotheses Testing Result**

| Hypotheses | Relationship | Beta Weight | Std Dev | T-Value | P-Value | 5.00 % | 95.00 % | f2 | $R^2$ | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| H1 | Infosec Competencies -> Cybersecurity Protective Behaviour | 0.131 | 0.061 | 2.154 | 0.016 | 0.036 | 0.233 | 0.025 | 57.2% | Supported |
| H2 | Infosec Competencies -> Procedural Inforsec Countermeasure Awareness | 0.616 | 0.039 | 15.636 | 0.000 | 0.547 | 0.677 | 0.612 | 37.9% | Supported |
| H3 | Procedural Inforsec Countermeasure Awareness -> Cybersecurity Protective Behaviour | 0.669 | 0.049 | 13.668 | 0.000 | 0.576 | 0.741 | 0.647 | - | Supported |

The blindfolding method, as shown in Table 5, was used to assess the predictive validity of the research model. Based on the blindfolding procedure, $Q^2$ evaluates the predictive validity of a large complex model using PLS. While estimating parameters for a model under the blindfolding procedure, this technique omitted data for a given block of indicators and then predicted the omitted part based on the calculated parameters. As a result, $Q^2$ demonstrates how well the model and PLS parameters may be used to reconstruct the empirically acquired data. According to the results, using an omission distance ($D$) of 7, this study obtained a $Q^2$ of 0.281, which is more than the cut-off value of 0.0 (Hair et al., 2014), thereby indicating that the research model in this study has predictive relevance. The relative impact of the research model calculated by

obtaining $Q^2$ showed that PCM has a strongly impacted (0.445) on CPB, while information security competencies of the manager indicated a small impact (0.014) on CPB.

**Table 5: Predictive Relevance Result**

| Dependent Variable | $Q^2$ | $Q^2$ *(excluded ISI)* | $Q^2$ *(excluded PCM)* | $q^2$ *(excluded ISI)* | $q^2$ *(excluded PCM)* |
|---|---|---|---|---|---|
| Cybersecurity Protective Behaviour | 0.281 | 0.277 | 0.156 | 0.014 | 0.445 |

**Discussion**

It has been demonstrated that procedural information security countermeasure (PCM) awareness is a crucial element in improving the cybersecurity protective behavior (CPB) of employees. The current finding is consistent with earlier research on human behavior and information security (Mausavi et al., 2020; Kim et al., 2020). According to Li et al. (2019), companies can be far more cautious about making sure that their employees are more responsible in cyberspace if they are aware of cyber security protection. Other studies that strongly showed how crucial it is for an organization to plan its security awareness program successfully (Hadlington et al., 2018) also lend credence to this. According to Mausavi et al. (2020), increased knowledge of cybersecurity protection has been a powerful motivation for excellent cybersecurity protective behavior.

This study has also found that information security competencies among firm leaders (ISI) can enhance employees' CPB. Information security leaders such as Chief Information Security Officers (CISO) or security managers are responsible for ensuring that the necessity for information security intelligence and the protection motivation for cybersecurity behavior is instilled in the organization's employees (Kim et al., 2020). The role of the CISO is even more crucial for organizations operating in modern business environments since the use of IoT in operating the business exposes a major security risk (Pang and Tanriverdi, 2022). In addition, from strategy to implementation, the CISO must actively participate in all facets of cyber governance (Hina, Selvam and Lowry, 2019). Investments in cybersecurity must be treated as strategic investments, and this competency's growth must be closely supervised. According to previous studies (Jeong and Zo, 2021; Balapour et al., 2020), companies should invest more in human capital rather than technology. This is due to the fact that the majority of security events are brought on by internal members who are careless or incapable of using security tools effectively (Wong et al., 2022). Although the top management fully supports information security, the security goals will not be met if the employees are ignorant of or uninterested in performing good information security behavior.

## 5. Managerial Implications and Recommendations

In terms of theoretical views, this study has highlighted the role of information security intelligence skills among security leaders in enhancing employees' cybersecurity motivation to practice cybersecurity behavior adequately, especially in this modern era. This study extended the concept of PMT by introducing a new construct (information security intelligence skills) that is essential in combating cyber-attack in this new era. The COVID-19 pandemic has forced many businesses to change their work lifestyles from working at the office to a hybrid work environment (Yeoh et al., 2022). These new work environments create new vulnerabilities for businesses and the rise of sophisticated cyber-attacks is very disturbing. Thus, organizations need to adapt their security management accordingly (Ahmad et al., 2021).

In terms of practical view, this study lies in the fact that it will help business organizations to determine the flaws that are present in the system, for example, cases of data security theft or compromise of encrypted information. It would also help them understand how these flaws make their system vulnerable. Thereby, it will help the organizations develop measures that can help them determine how these issues can be resolved. Therefore, it is important of strategizing information security planning in the organization before developing and implementing information security policies and the SETA program. It depends on the success of adopting information security policy and organizational strategies to combat cyber-attacks, according to Li et al. (2019), to ensure that information security technology solutions are implemented successfully. Therefore, information security should be prioritized at the board level of a corporation so that technical or information

security officers are also responsible for cybersecurity in addition to everyone else. This is urgent when previous findings had found that most internal security incidents are a consequence of misuse actions including privilege abuse, unapproved hardware, embezzlement, ignorance of information security policies and data mishandling (Torten, Reaiche and Boyle, 2018). The top management needs to consider how to make this better to raise employee understanding of procedural information security countermeasures. The effectiveness of security approaches and processes (Hwang et al., 2019) adopted in the organization, particularly in metropolitan areas, can be increased as a result, reducing security-related negligence.

**Conclusion**

This study has been conducted to achieve a few important things.

First of all, the results of the study help future researchers to better understand the factors motivating the awareness of employees and cybersecurity protective behavior, particularly the employees who work in today's business environments. In this direction, the study will also try to understand the role of the managers who have a responsibility to play in enhancing information security awareness and how it translates into better attitudes and behavior towards this issue.

Secondly, this study analyzed the current situation in today's business environment, concerning the necessity for cybersecurity awareness since cybersecurity threats are rapidly evolving. The management of the company should organize and design information security training, awareness programs (SETA Programs), and implement ISPs to demonstrate support for information security behavior. Employees can learn about organizational ISPs through information security training, awareness campaigns, and the implementation of ISPs (Ameen et al., 2021; Koskosas et al., 2011). These initiatives aim to introduce and inform employees about the significance of using security countermeasures to avert information security threats and the impact of these threats on the organization.

In addition, top management should ensure that ISPs during training and awareness programs clearly define employee responsibilities, authorized and prohibited uses of the systems, reporting procedures for system threats, definitions of penalties for violations, and the availability of a mechanism to update ISPs (Whitman, 2004). Moreover, the firm's management is also responsible to ensure that the employees working in the organization have a high sense of cybersecurity protective awareness. To ensure that, the firm's security management team led by Chief Information Security Officer (CISO) must take proactive steps to educate the employees about cybersecurity protective measures. The security management team is also responsible to determine what constitutes good cybersecurity behavior for the employees. It is then their responsibility to take feedback on whether these behavior points are being followed or not by all the employees (Whitman and Mattord, 2019).

The most important role of the security management team is to promote a positive cybersecurity protective attitude amongst the employees. They achieve this by educating the employees, providing them with training and organizing workshops (Humaidi and Balakrishnan, 2018). In addition to that, they are responsible to ensure the fact that the necessity for information security intelligence and the protection motivation for cybersecurity behavior is instilled among the employees of the organization (Kim et al., 2020). The role of the security management team is even more crucial especially in modern business environments, since the use of IoT and cloud computing is evolving (Lee, 2021).

Nevertheless, future studies should conduct a quantitative analysis of the present situation and the measures that have been taken by the organizations operating in the digitalization business environment. The study helps the current researcher to better understand the issue at hand, namely the importance of information security intelligence skills and the factors motivating the behavior of employees in the organization, towards cybersecurity and protection. It is also hoped that future researchers will explore further the role of several factors including the role of the ISIs and the firm's management in influencing the attitude and behavior of the employees towards developing awareness about cybersecurity protection and countermeasures to be made.

This study can prove to be very useful in serving as a basis for broader and more detailed research about the current issue for getting a more generalized perception. It has also proven useful in addressing the various

issues; hence it can be utilized for solving any flaws that exist, effectively and efficiently. Lastly, through this study, an attempt will be made to increase focus on the ways in which the current flaws can be improved. Thus, the future study will encourage to exploration other methods through which the modern organizations will be able to address this situation in a better manner and introduce improvements to their current situation.

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# A Review of the Business Management Capability and Adaptability among Malaysian Contractors in the SCORE Program

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**Abstract:** The selection of contractors for the project is one of the important tasks faced by the client such as developers and government agencies. To ensure that the client has selected a reliable contractor which has a good previous record, the Construction Industry Development Board (CIDB) Malaysia has established one program named SCORE by assessing seven (7) scopes of assessment which are business performance, financial capability, technical capability, project management, procurement management, best practices, and management ability. Thus, this study was done to assess the level of capability and adaptability of Malaysian contractors in the business management aspect (Scope 1). This study adopted a mixed methodology involving quantitative through secondary data and qualitative research methods through interviews. The data collected for this study is through secondary data from CIDB'S database which cover from the year 2017 until 2021. Besides that, a series of interview sessions were done to find out further suggestions for the improvement of Malaysian contractors. The findings have shown that business performance among Malaysian contractors is one of the lowest scores as compared to other scopes. Thus, this study has proposed several suggestions to increase the performance of Malaysian contractors, especially in business performance such as holding awareness programs and coaching programs.

**Keywords**: *Malaysian Contractor, Contractor's Capability, Business Performance, Financial Management, SCORE, assessment, construction sector.*

## 1. Introduction and Background

The construction industry has been known as one of the demeaning sectors related to 3D (Dirty, Dangerous and Difficult) causing some major projects to fall behind schedule (Bernama, 2021). Although various issues were highlighted in the construction sector, the construction sector continued to perform better in the fourth quarter of 2022 with a growth of 15.7% while overall 2022 posted a rebound of 8.8% after two years in the declining trend due to the COVID-19 pandemic (Department of Statistics Malaysia (DOSM), 2023). Thus, the quality of contractors in construction projects is important to ensure the construction sector can maintain the contribution towards the Growth Domestic Product (GDP) of Malaysia. The contractor evaluation program is necessary to ensure that every work done by the contractor meets the criteria set. In addition, it makes it easier for the client, project owner, and developer to choose the best and most competent contractor for a project. It can reduce the risk of the construction project not being completed, the time for the completion of the project not being met, the quality of the building not meeting the criteria, and various other risks. Besides that, assessment can improve the contractor management process by the project team and contractor evaluation allows a job done by the contractor to be evaluated based on the quality of the work. Furthermore, it helps to improve the quality of contractors. Through the contractor evaluation program, the contractor can see the weaknesses that need to be improved for each evaluation scope.

Therefore, indirectly the overall quality of the company can be improved from various angles. The latest study by Alnsour et al. (2023) has focused on the environmental dimension, economic dimension and social dimension. The study also added other two factors which are lean manufacturing and culture. However, this study will be focusing on the business aspects of the contractor in measuring their capabilities in performing construction projects. The Contractor Capability and Capability Assessment Program (SCORE) is a specific program developed by CIDB in collaboration with SME Corp to measure the capabilities of local and foreign contractors in Malaysia to enhance the image of the construction industry in line with the Construction Industry Transformation Program (CITP) 2016-2020 which in line with the core of 'Improving Quality, Safety,

and Professionalism in the Construction Industry'. SCORE-CIDB is implemented on local contractors through analysis of the answers given by contractors to the seven parameters set (CIDB, 2018). The seven parameters are:

- Business Performance
- Financial Capability
- Technical Capability
- Project management
- Procurement Management
- Best Practices
- Management Ability

Each parameter is evaluated with a maximum score of 30 with a total of 210 marks. The results of the score evaluation according to the percentage will be classified according to the stars starting from 0 stars up to 5 stars. Details of stars and percentage marks are in Table 1.

**Table 1: Star Rating According to Marks**

| Star | Marks (%) |
|---|---|
| 0 | 0-10 |
| ★ | 11-30 |
| ★★ | 31-50 |
| ★★★ | 51-70 |
| ★★★★ | 71-84 (min marks: 10/30) |
| ★★★★★ | 85-100 (min marks: 15/30 |

As of September 2021, a total of 125,485 contractors have been registered with the Construction Industry Development Board (CIDB) Malaysia as shown in Table 2. Based on the analysis that has been carried out by CIDB, the number of SCORE participants is still low when compared to the total number of contractor registrations. In comparison, only 7,308 contractors participated in SCORE, making the percentage only 5.82%. This percentage can be categorized as low participation and lack of support from the industry.

**Table 2: Total Number of Contractor's Registration, 2021**

| State | No. of Contractor's Registration | No. of SCORE Application |
|---|---|---|
| Johor | 12,902 | 876 |
| Kedah | 7,495 | 342 |
| Kelantan | 7,143 | 422 |
| Melaka | 3,928 | 229 |
| Negeri Sembilan | 5,625 | 358 |
| Pahang | 6,907 | 335 |
| Perak | 8,942 | 324 |
| Perlis | 1,754 | 58 |
| Pulau Pinang | 6,200 | 296 |
| Sabah | 12,934 | 431 |

| State | No. of Contractor's Registration | No. of SCORE Application |
|---|---|---|
| Sarawak | 9,407 | 456 |
| Selangor | 21,975 | 1872 |
| Terengganu | 7,029 | 330 |
| WP Kuala Lumpur | 12,541 | 930 |
| WP Labuan | 488 | 37 |
| WP Putrajaya | 215 | 12 |
| **JUMLAH** | **125,485** | **7308** |

**Source:** (Construction Industry Development Board (CIDB), 2022).

Based on the study done by CIDB in 2021, the SCORE application shows a level of decrease starting from 2019 until 2021. The significant decrease is in 2021 with a percentage decrease of 10.09%. The decrease in the percentage of SCORE applications is due to the assessment renewal period which is carried out every two years when compared to the assessment renewal period which is carried out once a year in 2017 and 2018 as shown in Table 3.

**Table 3: Percentage of Score Application (2017- 2021)**

| Year | Percentage of SCORE Application |
|---|---|
| 2017 | 29.84% |
| 2018 | 30.98% |
| 2019 | 13.97% |
| 2020 | 11.45% |
| 2021 | 10.09% |

Therefore, a study on SCORE analysis shall be conducted to find out the level of business performance amongst the contractor and be able to suggest some improvements to improve the quality of contractors through the identification of the scope that needs to be improved. The findings from this analysis could benefit the industry and indirectly can increase the capability of Malaysian contractors, especially in the business management aspect.

## 2. Literature Review

The determination of project success is through the ability to fulfill the targets such as meeting deadlines, within expenditure budget, and quality of work done. Thus, it is important to select a contractor who has the competency to deliver results that are in accordance with the client's expectations. Most of the previous researchers highlighted various factors of a contractor's capability. A similar scope in measuring contractor's performance is the study done by Arof et al. (2018) highlighted seven (7) factors which are quality performance, time performance, cost performance, environmental performance, health and safety performance, productivity performance and human resource performance. It was found that human resource performance is the most important criterion in assessing a contractor's performance. Shukery et al. (2018) have adopted Analytic Hierarchy Process (AHP) method to determine a Flexible Performance-Based Contractor Selection System (FPCSS). The findings have shown that the previous project work standard is the main factor to be selected followed by the inability to execute contracts satisfactorily or comply with the deadline. The indices of potential performance have shown that expertise.

In related project types and labor, adequacy was also the main reason to be selected for the project. Hatush & Skitmore (1997) in their study have done interview sessions to identify the factors of contractor selection in the tender process and criteria that are considered during bid evaluation. The findings have found out the main factors to be selected in the prequalification process are technical resources and references. This factor involved several criteria which are financial capability, previous record employees, professional skills, main plant and equipment and many more. This contradicts the study done by Banaitiene & Banaitis (2006) which has listed out 15 weightage of contractor evaluation criteria which are:

- Bid price
- Legal Activity
- Adequacy of contractor
- Insurance
- Claims and contractual dispute
- Failed contracts
- Bankruptcy possibilities
- Competitiveness
- Clients' appreciation
- Quality assurance
- Qualification of technical personnel
- Experience
- Type and size of past projects
- Environmental protection
- Safety and health at work

The study found that bid price is the main factor contributing to contractor's selection followed by claims and contractual 0dispute and safety and health at work. The least factor is experience and the type and size of past projects. Construction contractor selection is frequently done during the tendering process. Although a client has the option to award a contract to the company that offers the lowest price and the shortest construction cycles, tendering typically prevents a precise evaluation of a tenderer. The price is becoming a more and more common deciding factor when selecting a tender in procedures. Most customers used this strategy in recent years (Lee et al., 2014). Watt et al. (2010) identified nine (9) tender evaluation criteria using 222 respondents. From the survey done, the majority of the clients agree that past project performance is the main criterion in the tender evaluation followed by technical expertise. However, organizational experience and company standing were the least criteria in the tender evaluation. Project management expertise also plays an important role in the tender evaluation criteria. Rashvand et al. (2015) have argued that the selection of contractors shall be based on the financial stability, technical ability, and management capability of contractors. The organization claims that the prequalification process was complicated by the inability to differentiate between contractors due to high uncertainty (poor discriminatory criteria); that is, even though only a small number of contracting firms were acknowledged as eligible to be awarded the contract, it is very challenging to formulate a decision model that allowed optimal selection among these firms.

All successful businesses had strong financial standing and had the necessary tools and resources (technical skills) to finish the mission. On the other hand, since these were the only outcome criteria taken into consideration and the chosen candidates had almost identical schedules and cost overruns from their prior projects, it was difficult to determine whether the overruns were their fault or the result of outside, uncontrollable causes. As a result, the assessment of management capability was not given serious consideration. Therefore, the choice of the final contractor was made solely based on the lowest tender bid price. The final review of the contractor's performance after the project was finished, in the director's opinion, was insufficient and was not a suitable method of evaluation. He believed that what was required was more precise, "real-time," information that could be used for quick review. Construction contractors are categorized based on their performance using the ELECTRE TRI technique, according to a proposal made by De Araujo et al. (2017). As a result of the model, contractors are categorized into three categories which are good contractors, moderate contractors, and bad contractors. The definition of a good contractor is one who meets the needs of the business and performs well on evaluations. In this manner, the company ought to hire

them for the next initiatives. While moderate contractors can attend firms as expected, they still need to fix a few performance-related issues.

The business should let them know about the issues and only approve fresh contracts once the performance of the contractors has improved. However, bad contractors perform poorly in performance reviews, and the construction firm should avoid using them for any further projects. Cash in hand, product quality offered and price offered are the important factors in contractor's selection in Malaysian public construction projects. On the other hand, the least top ten criteria were found to be quality control, familiarity with work location, staff qualification, financial guarantee, technology and work method, staff experience in industry, equipment, tools and machinery, company management system, technical manpower and quality management system (Rashid et al., 2018). Idrus et al. (2011) adopted the severity index and ranked the criteria for selecting the main contractor using a sample of 150 respondents. From the survey conducted, it was found that track performance, financial capacity and technical capacity are the main criteria in selecting the main contractor in the construction projects.

The client can learn about a contractor's past experiences by looking through them, but whether or not these projects were successfully completed can only be determined by looking into the contractor's performance. Since taking on projects is the construction industry's major line of work, the project's quality, cost, and time objectives become crucial because they are the primary determinants of customer satisfaction. This finding was supported by Shukery et al. (2016) that past performance is important in the contractor's selection. Quality of work in a past project, frequency of previous failure and percentage of previous work completed are the main elements in the past performance criteria. Dave et al. (2017) have listed five (5) main criteria for contractor's re-qualification and bid evaluation which are financial soundness, technical ability, management capability, health and safety and reputation. Each of these main criteria has its own sub-criteria as shown in Table 5.

**Table 5: Main Criteria and Sub-Criteria for Contractor's Pre-Qualification and Bid Evaluation**

| | |
|---|---|
| **Financial Soundness** | • **Financial stability**<br>• **Credit rating**<br>• **Banking arrangements and bonding**<br>• **Financial status** |
| Technical ability | • Experience<br>• Plant and equipment<br>• Personnel<br>• Ability |
| Management capability | • Past performance and quality<br>• Project management organization<br>• Experience of technical personnel<br>• Management knowledge |
| Health and Safety | • Safety<br>• Experience modification rating<br>• OSHA Incident rate<br>• Management safety accountability |
| Reputation | • Past failures<br>• Length of time in business<br>• Past owner/contractor relationship<br>• Other relationships |

The study done by Okereke et al. (2022) has shown that three important factors in contractor selection are managerial capability and competent supervisory staff, technical ability and financial soundness. Another important factor in choosing contractors for civil engineering projects is the bid price. In some building markets of some countries, the practice of basing contract awards or contractor selection on bid prices, particularly the lowest bid price, is still in use. The procedure hasn't produced the desired outcome in terms of ensuring that such a contractor can deliver. The study also found out the benefits of contractors' selection

in the tender. The findings have elaborate that the selection of a contractor enables the client or project owner to select contractors who are performers for the project, facilitate the achievement of project success and the objectives within the scheduled time and cost; and minimize project risks. Most of the previous research touch on past performance, technical performance and overall project success. This is supported by a study done by Doloi et al. (2011) found that technical planning and controlling expertise of the contractor is key to achieving success on projects. Lack of literature has discussed the contractor's business performance. Thus, this study highlighted the aspect of business performance affecting the contractor's capability in construction projects.

## 3. Research Methodology

This study uses mixed methods, quantitative and qualitative methods combined as a data analysis medium. Data collection involved secondary data from the CIDB database and face-to-face interviews with the industry. The research method used is quantitative through analysis of the evaluation scope and CIDB SCORE elements.

### Data Collection Methods

**Secondary Data from the CIDB Database:** Secondary data is data that refer to reference material. For example, books from the library, the internet, and so on. For this study, secondary data is data received from the CIDB database including information on contractors participating in SCORE, year of participation, stars obtained, total marks for Scope 1, Scope 2, Scope 3, Scope 4, Scope 5, Scope 6, and Scope 7, average SCORE marks and percentage of SCORE marks.

**Face-to-Face Interview:** Face-to-face interviews were conducted with five respondents to obtain appropriate views and suggestions regarding the improvement of the SCORE program. A large number of articles, book chapters, and books recommend coaching and suggest anywhere from 5 to 50 participants as sufficient (Morse, 2000).

## 4. Results

This section presents sets of results of applicants of SCORE in Scope 1 (Business Performance) using several statistical methods which are descriptive statistics, regression analysis, Analysis of Variance (ANOVA), and gap analysis. Referring to Table 4 shows the comparative percentage of contractor registration and SCORE registration. In comparison, 2018 showed the highest participation percentage of 30.98% followed by 2017 at 29.84%. However, there is a decrease starting from 2019 until 2021 where each only gets a participation percentage of 13.97%, 11.45% and 10.09%.

**Table 4: Percentage Comparison of Contractor Registration and SCORE Registration**

| Year | Grade | Total Contractor's Registration | SCORE Participation | Difference Percentage (%) |
|---|---|---|---|---|
| 2017 | G2 | 3,966 | 1381 | 34.82 |
| | G3 | 3,664 | 461 | 12.58 |
| | G4 | 1,019 | 311 | 30.52 |
| | G5 | 1,538 | 199 | 12.94 |
| | G6 | 481 | 129 | 26.82 |
| | G7 | 2,103 | 1290 | 61.34 |
| **TOTAL** | | **12,771** | **3771** | **29.84** |
| 2018 | G2 | 10,451 | 2712 | 25.95 |
| | G3 | 7,734 | 993 | 12.84 |

| Year | Grade | Total Contractor's Registration | SCORE Participation | Difference Percentage (%) |
|---|---|---|---|---|
| | G4 | 2,277 | 533 | 23.41 |
| | G5 | 872 | 413 | 47.36 |
| | G6 | 3,098 | 256 | 8.26 |
| | G7 | 4,281 | 2914 | 68.07 |
| **TOTAL** | | **28,713** | **7821** | **30.98** |
| 2019 | G2 | 22,939 | 2885 | 12.58 |
| | G3 | 15,861 | 1030 | 6.49 |
| | G4 | 4,971 | 526 | 10.58 |
| | G5 | 5,999 | 413 | 6.88 |
| | G6 | 2,059 | 259 | 12.58 |
| | G7 | 8,603 | 2985 | 34.70 |
| **TOTAL** | | **60,432** | **8098** | **13.97** |
| 2020 | G2 | 23,566 | 3388 | 14.38 |
| | G3 | 17,664 | 984 | 5.57 |
| | G4 | 5,289 | 578 | 10.93 |
| | G5 | 6,491 | 403 | 6.21 |
| | G6 | 1,989 | 240 | 12.07 |
| | G7 | 8,776 | 1715 | 19.54 |
| **TOTAL** | | **63,775** | **7308** | **11.45** |
| 2021 (until September) | G2 | 24,178 | 2930 | 12.12 |
| | G3 | 18,327 | 888 | 4.85 |
| | G4 | 5,384 | 467 | 8.67 |
| | G5 | 6,518 | 353 | 5.42 |
| | G6 | 2,000 | 227 | 11.35 |
| | G7 | 8,821 | 1598 | 18.12 |
| **TOTAL** | | **65,228** | **6463** | **10.09** |

**Descriptive Statistics:** Descriptive statistics are analyzing data by percentage, and frequency and by using Measure of Central Tendency (MCT) - mean mode and median. In descriptive statistics, the type of data analysis often involves bivariate analysis, which is by using only one variable. For this study, most analyses use the mean to find out the average of the data. The formula of the average is as follows:

$$\bar{x} = \frac{\sum fx}{n}$$

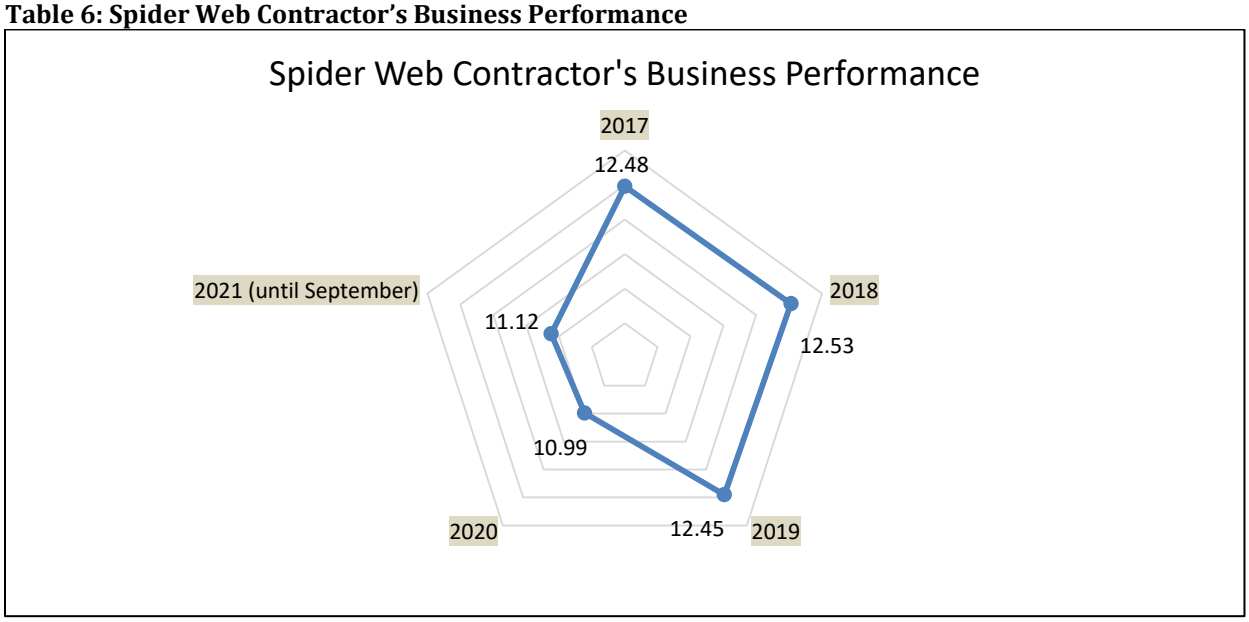
Where;
$\bar{x}$ = mean
f = frequency of each class
$x$ = mid-interval value of each class
$n$ = total frequency

**Table 5: Average of Business Performance**

| Year | 2017 | 2018 | 2019 | 2020 | 2021 (until September) | Average |
|---|---|---|---|---|---|---|
| Scope 1 (Business Performance | 12.48 | 12.53 | 12.45 | 10.99 | 11.12 | **11.91** |

**Spider Chart Analysis:** A Spider chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on an axis starting from the same point. Spider charts are also known as web charts, radar charts, star charts, star plots, spider web charts, irregular polygons, polar charts or Kiviat diagrams. Spider charts are useful for seeing which variables score high or low in a data set, making them ideal for displaying performance. For this study, a spider chart was developed using the average for Business Performance for the years 2017 until September 2021.

**Table 6: Spider Web Contractor's Business Performance**




Based on Table 5 and Table 6, the total average of the contractor's business performance achieved in the SCORE program is 11.91 out of 30 marks. The highest average score for contractors' business performance is in 2018 followed by 2017 and 2019 with 12.48 and 12.45 average scores, respectively. The lowest average score is in 2020 followed by 2021 with 10.99 and 11.12 average scores respectively.

**Gap Analysis:** Gap analysis is a process used to compare current performance with expected and expected performance. This analysis can identify the current situation by measuring several factors. Contractor grade, stars earned and scope of evaluation are factors used in this analysis. Several suggestions for improvement can be identified when a gap analysis is conducted. For the entire SCORE participation data of 33,461, only 3479 re-participations, which is a percentage of 10.40%. The re-entry details are as Table 7.

**Table 7: Re-participations in the SCORE Program**

| Participation | Number of Participation |
|---|---|
| 2 times participation | 3420 |
| 3 times participation | 39 |
| 4 times participation | 20 |
| **TOTAL** | **3479** |

**a) Distribution of Contractors according to Grade Changes:** In gap analysis, changes in contractor grade are studied before and after evaluation. A negative change means there is an increase in grades after the assessment. A positive change means there is a drop in grades after the assessment. A zero-change means there is no difference in grades before and after the assessment. Table 8 shows the contractor's gap analysis. Throughout the year 2017 until September 2021, the majority of contractors do not have any gap from the previous contractor grade with a percentage of 29.92%. However, the second highest percentage (11.64%) recorded a significant difference of negative five (-5) for contractor grades. The third highest percentage (11.38%) recorded a positive percentage of five (+5) for the contractor grade. Cumulatively, the positive difference (35.2%) exceeds the negative difference (34.87) by 0.33%.

**Table 8: Contractor's Gap Analysis**

| Contractor's Gap | Total Difference | Difference Percentage (%) | Cumulative |
|---|---|---|---|
| -6 | 3 | 0.086 | |
| -5 | 405 | 11.64 | |
| -4 | 190 | 5.46 | 34.87 |
| -3 | 168 | 4.83 | |
| -2 | 184 | 5.29 | |
| -1 | 263 | 7.56 | |
| 0 | 1041 | 29.92 | 29.92 |
| 1 | 267 | 7.67 | |
| 2 | 186 | 5.35 | |
| 3 | 172 | 4.94 | 35.2 |
| 4 | 199 | 5.72 | |
| 5 | 396 | 11.38 | |
| 6 | 5 | 0.14 | |
| **TOTAL** | **3479** | **100.00** | |

**b) Distribution of Contractors According to Star Changes:** Table 9 shows the star gap obtained from 2017 until September 2021. The highest percentage of no star difference is 40.33% followed by a difference of negative one (-1) of 24.17%. The third highest percentage is a positive one (+1) star difference of 23.80%. Cumulatively, the negative disparity (29.981%) is higher than the positive disparity (29.639%) by 0.349%.

**Table 9: Gap Analysis for Star Obtained**

| Star Difference | Total Difference | Difference Percentage | Cumulative |
|---|---|---|---|
| -4 | 1 | 0.029 | |
| -3 | 9 | 0.26 | 29.981 |
| -2 | 194 | 5.58 | |
| -1 | 841 | 24.17 | |
| 0 | 1403 | 40.33 | 40.33 |
| 1 | 828 | 23.80 | |
| 2 | 186 | 5.35 | 29.639 |
| 3 | 16 | 0.46 | |

| | | |
|---|---|---|
| 4 | 1 | 0.029 |
| **TOTAL** | **3479** | **100.00** |

**Regression Analysis:** Regression analysis is one of the analyzes used to find out the relationship between the response variable or commonly referred to as the dependent variable against one or more predictor variables or independent variables. The analysis used is ordinal regression where the awarding of stars is identified through score factors, bumiputra status, and contractor grade. In this analysis, 0 and 1 stars are labeled as low ratings, 2 and 3 stars are categorized as medium ratings, and high ratings if the contractor obtains 4 and 5 stars. Awarding stars to contractors is analyzed according to score, bumiputra status, and contractor grade. The analysis used is ordinal regression, giving stars identified through score factors, bumiputra status, and contractor grade. In this analysis, 0 and 1 stars are labeled as low ratings, 2 and 3 stars are categorized as medium ratings, and high ratings if the contractor obtains 4 and 5 stars. Based on the analysis conducted as shown in Table 10, business performance factors, financial capability, technical capability, project management, procurement management, best practices, and management capability play an important role in determining the star. For each unit increase in business performance score, the probability of getting a better rating is 1.81 (81% increased chance).

**Table 10: Ordinal Regression Output for Business Performance**

| Factor | Coefficient | Odds Ratio | 95% Confidence Interval Odds Ratio |
|---|---|---|---|
| Business Performance (SCOPE 1) | 0.5910 | 1.8058 | (1.6724,1.9616) |

**Analysis of Variance (ANOVA):** An ANOVA test is a type of statistical test used to determine if there is a statistically significant difference between two or more categorical groups by testing for differences of means using a variance. Analysts use the ANOVA test to determine the influence that independent variables have on the dependent variable in a regression study.

**Comparison of Business Performance by the Star:** Each score is compared according to the stars earned by the contractor on average. Comparisons are made to determine whether there is a significant difference or not. ANOVA analysis and Tukey-HSD test were used for comparison purposes. Table 11 shows a comparison of business performance scores between stars. On average, contractors with low stars have low business performance scores. There is a significant difference in the business performance score for all the stars except those who get 4 and 5 stars. The average score difference is shown in Table 11.

**Table 11: Comparison of Business Performance Scores between Stars**

| Star | Difference | 95% Confidence Interval Odds Ratio | p-value |
|---|---|---|---|
| 1 vs 0 | 5.3246 | (3.643, 7.005) | 0.000 |
| 2 vs 0 | 10.6202 | (8.951, 12.288) | 0.000 |
| 3 vs 0 | 15.873 | (14.200, 17.547) | 0.000 |
| 4 vs 0 | 22.007 | (20.046, 23.969) | 0.000 |
| 5 vs 0 | 24.053 | (21.465, 26.641) | 0.000 |
| 2 vs 1 | 5.295 | (5.025, 5.565) | 0.000 |
| 3 vs 1 | 10.549 | (10.251, 10.846) | 0.000 |
| 4 vs 1 | 16.683 | (15.617, 17.748) | 0.000 |
| 5 vs 1 | 18.728 | (16.732, 20.725) | 0.000 |
| 3 vs 2 | 5.253 | (5.036, 5.471) | 0.000 |
| 4 vs 2 | 11.387 | (10.341, 12.433) | 0.000 |
| 5 vs 2 | 13.433 | (11.447, 15.419) | 0.000 |
| 4 vs 3 | 6.133 | (5.080, 7.187) | 0.000 |
| 5 vs 3 | 8.179 | (6.189, 10.169) | 0.000 |
| 5 vs 4 | 2.045 | (-0.191, 4.283) | 0.096 |

**B) Score comparison of Business Performance by Year:** Scores for business performance were compared by year. The analysis used was the analysis of variance and the Tukey HSD test. If the p-value is less than 0.05, it means that there is a significant difference in average scores between the years being compared. The results are as in Table 12. For the business performance score, there is no significant difference between 2017 and 2018, 2017 and 2019, and 2018 and 2019. While there is a significant difference in business performance between 2020 and 2017, 2018 and 2019 that is the average business performance score in 2020 is low compared to the years in other years.

**Table 12: Business Performance Score According to Year**

| Year | Difference | 95% Confidence Interval Odds Ratio | p-value |
|---|---|---|---|
| **Scope 1 (Business Performance)** | | | |
| 2018 vs 2017 | 0.0320 | (-0.304, 0.368) | 0.994 |
| 2019 vs 2017 | 0.051 | (-0.386, 0.284) | 0.979 |
| 2020 vs 2017 | -1.041 | (-1.500, -0.582) | 0.000 |
| 2019 vs 2018 | 0.083 | (-0.355, 0.188) | 0.860 |
| 2020 vs 2018 | -1.073 | (-1.488, -0.658) | 0.000 |
| 2020 vs 2019 | -0.990 | (-1.404, -0.576) | 0.000 |

**Face-to-Face Interview Findings:** The interview session was done with five (5) respondents from the industry objectively to find further suggestions to improve the business performance among Malaysian contractors. Overall, most of the respondents have suggested six (6) main elements that CIDB should consider which are coordination, Implementation, Awareness, Separation, Addition, and Incentive. Table 13 shows the details of the suggestions mentioned by the respondents.

**Table 13: Suggestions from Face-to-Face Interview Session**

| Element | Suggestion |
|---|---|
| coordination | Coordination between CIDB and Contractor Compliance Check (CCA) |
| Implementation | Project owner validation of work performance |
| | The implementation of SCORE needs to be more clear, focused and strong |
| | Obliging subcontractors to have a SCORE certificate |
| | 1. Tighten the implementation of SCORE to foreign contractors by making it mandatory to get 4 stars and above<br>2. Take into account technical and financial strength |
| Awareness | Promotion and dissemination of information about the importance of SCORE |
| Separation | 1. Separate the questions according to the contractor's grade and trend.<br>2. G7 contractors are classified according to procurement value |
| Addition | Considering the green card as one of the Best Practices |
| Incentive | Free training for contractors on how to answer SCORE questions |
| | More worthwhile incentives to contractors (eg cheaper BIM licenses) |

## 5. Discussion and Conclusion

**Discussion:** Based on the analysis, the SCORE application shows a decrease from 2019 until 2021. The significant decrease is in 2021 with a percentage of 10.09%. Overall, the average business performance from 2017 until September 2021 is 11.91 out of 30 scores. This finding shows that the contractors are still lacking in the aspect of business performance. A gap analysis was conducted to compare the grade of contractors and stars obtained in the SCORE program. Most of the contractors increase their grade of the contractor and it shows that the Malaysian contractor is moving forward to the positive side and getting ready to become e big contractor. However, although there is increasing the grade of contractors, the star obtained mostly did not change significantly. It may be because of the complexity of questions in the SCORE program and the inadequacy of documents requires. One of the programs that can be created to increase business performance is marketing strategy training. This course is suitable for small and medium contractors on how to maintain business through marketing. For this marketing strategy exercise, CIDB can include elements such as developing a strategic framework for business development, identifying risks through SWOT and PESTEL methods, identifying demand trends, digital marketing methods and marketing research. Besides that, a course related to customer relationship management can also be created. Customers are the most important factor in the survival of a business. Feedback received from customers is an important point in improving the quality and performance of the business. A customer management course should include the concept of quality customer service, effective communication and interpersonal relationships, quality counter and telephone service, customer feedback time period and medium of obtaining customer feedback.

**Conclusion:** The selection of a competent contractor is very important to appoint in the projects. Seven scopes in the SCORE program have highlighted the important elements that should be considered in the selection which are business performance, Financial Capability, Technical Capability, Project management, Procurement Management, Best Practices, and Management Ability. Thus, based on the analysis conducted, several recommendations have been discussed which may increase the level of capability and adaptability of Malaysian contractors, especially in the business performance area. Some of the recommendations made are to increase the level of awareness among contractors through campaigns and promotions. Besides that, improvement in the SCORE question should suit the grade of the contractor and the nature of the contractor's business.

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# A Blessing in Disguise: Covid-19 Pandemic and the Emergence of E-Payment

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**Abstract:** E-payment offers efficiency in terms of speed, security, convenience, and cost, especially during this pandemic. The study involves monthly data that spans from January 2016 to June 2021. This study aims to investigate selected payment channels and instruments' influence on the retail e-payment transaction. The study is also interested to examine the interaction effects of Covid-19 on the relationship between credit card usage and retail e-payment transaction. The study employs Newey-West standard error regression in achieving the objectives. It is proven that traditional e-payment channels such as ATMs do not support the emergence of e-payment development in the country. The findings reveal Covid-19 significantly influences the emergence of e-payment in various ways. Unsurprisingly, internet banking usage showed great potential during the pandemic with a substantial increment since 2020. Oppositely, a credit card gives an adverse impact on the e-payment transaction and the impact is more apparent during the pandemic. In response to the new norm post-pandemic, the study suggests emphasis should be given to crucial e-payment infrastructures, particularly internet banking and debit card to foster the harmonization of the e-payment eco-system in Malaysia. Covid-19, despite its disastrous effect on society, blesses and supports the Financial Sector Blueprint 2022–2026.

**Keywords**: *Payment System, Financial Institutions and Services, Central Banks and Their Policies, Money.*

## 1. Introduction and Background

Financial technology became a vital agenda of the financial services industry and future economy. Financial services industries grew in the year 2020 due to the emergence of Covid-19. Automatically it changed how people make their day-to-day transactions. Consumers move to a cashless payment system because it can reduce the spreading of the Covid-19 epidemic (Yakean, 2020). At once, this situation spurs fintech and the adoption of digital banking services. Covid-19 surge for digital and electronic payments and services to flourish (Mansour, 2021). Electronic payment (e-payment) is more competitive in terms of higher operational efficiency from expedient payments and receipts of funds. On top of that, e-payment represents an eco-friendlier environment and offers a lower transaction cost. According to the Financial Sector Blueprint 2011 – 2021, electronic payment is one of the nine focuses that show the importance of e-payment (Bank Negara Malaysia, 2010). Through these initiatives embarked the development of technology and innovation by offering a greater payments landscape.

E-payment usage volume per capita increased by 13.57% in the year 2020 as compared to the year 2019. Covid-19 has enhanced the digital economy and its contribution Growth Domestic Product (GDP) by 20% in 2020 (FINTECH Malaysia, 2021). According to Khan et al. (2021) pandemic Covid-19 increased limited mobility therefore it will increase the usage of e-payment methods. On top of that, these disasters also influence choices of payment mode by consumers and its effects on the supplier side. Referring to the Central Bank of Malaysia Act 2009, the payment system is defined as any system or arrangement for the transfer, clearing or settlement of funds or securities. In essence, this facilitates companies, businesses and consumers to transfer funds to one another. E-payment can be divided into two, Large Value Payment System (SIPS) that include real-time electronic transfer of funds and securities system (RENTAS). Second is Retail Payment System which can be divided into three categories is Retails Payment Systems (e.g., shared automated teller machine (ATM) network, Interbank GIRO, direct debit), Retail Payment Instruments (e.g., credit card, credit card, debit card) and Retail Payment channels (e.g., internet banking, mobile banking).

Following figures exhibit the trend of Internet banking, ATM withdrawal, ATM Payment, debit card and credit cards. Figure 1 shows that transaction value for retail payment systems for Internet banking represents an upward trend from 2016 until 2020. It proves that consumers tend to move and adapt to new ways of transaction. Internet banking remains a prominent digital payment method. According to Remolina (2020), the digital transaction is the best solution for pandemic-related challenges. Figure 2 and Figure 3 show the trend of the transaction value for ATM withdrawal and payment respectively. Both transactions show a downward slope in 2020. Consumers tend to shift to other methods. It proved that e-payment grew in 2020 when consumers tend to use more online and contactless transactions. Covid-19 surge in consumers whereby a person in Malaysia made about 170 e-payment as compared to 150 in 2019 (FINTECH Malaysia, 2021). Debit card transactions in Figure 4 show an upward trend. This situation proved that consumers have decided to use debit as one of the methods of e-payment. Due to the pandemic, consumer payment behavior changed. Consumers preferred making payments through cashless payments more frequently than in prior pandemics (Kotkowski & Polasik, 2021). Figure 5 explained the value for credit card usage downward sloping in 2020. Users are reluctant to make payments through credit cards because users fear job and income loss due to this emergence. Automatically consumers will cut back from spending more using credit cards (Kantur & Özcan, 2021).

**Figure 1: Transaction Value-Internet Banking**

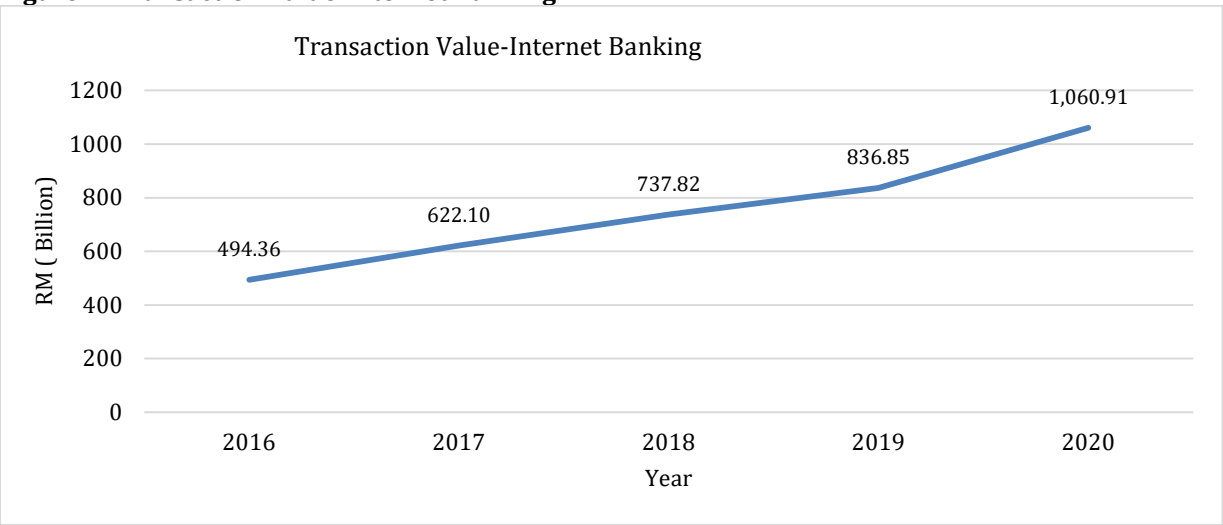



**Figure 2: Transaction Value-ATM (WD)**

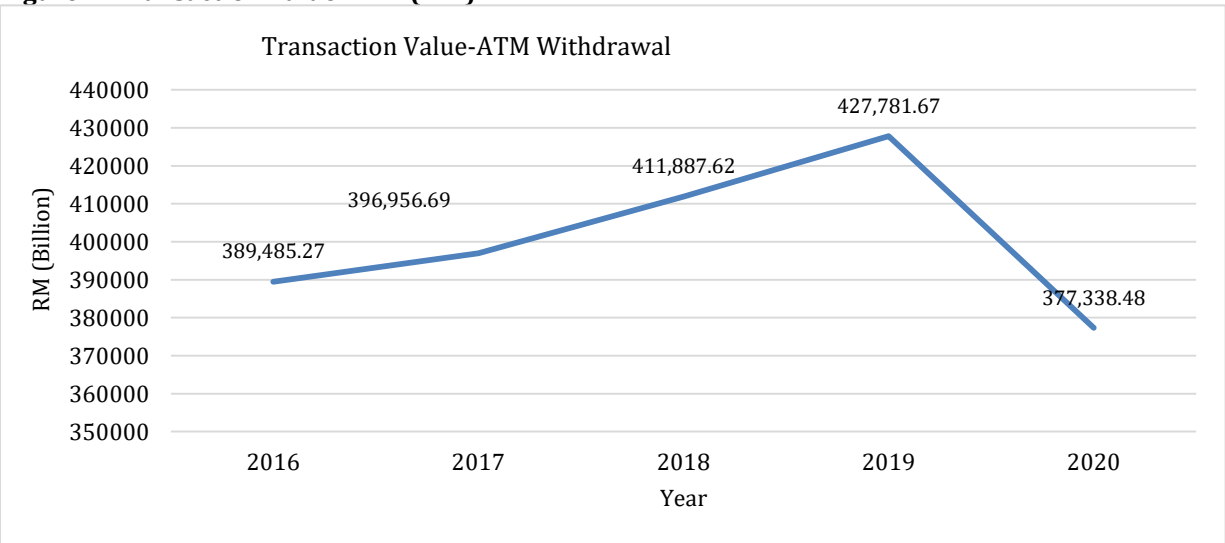


**Figure 3: Transaction Value-ATM(Deposit)**

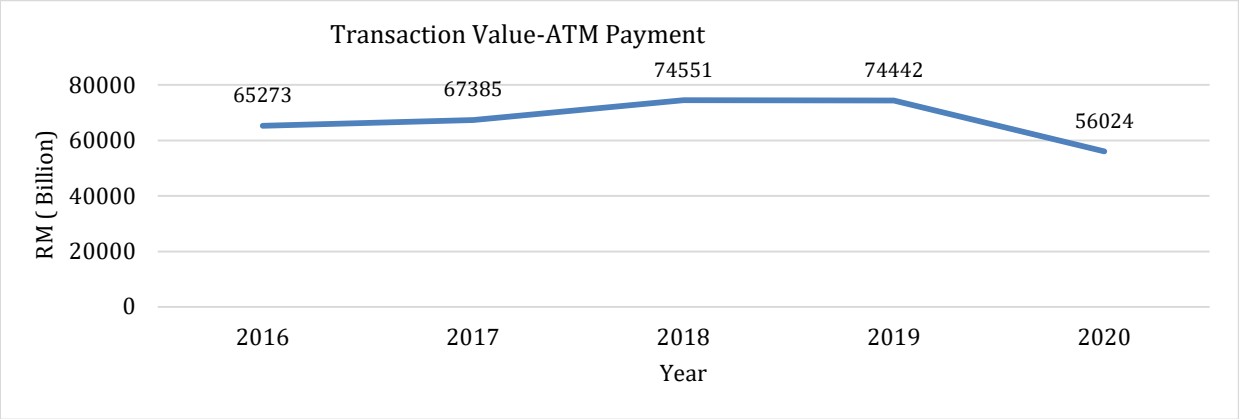



**Figure 4: Transaction Value-Debit Card**

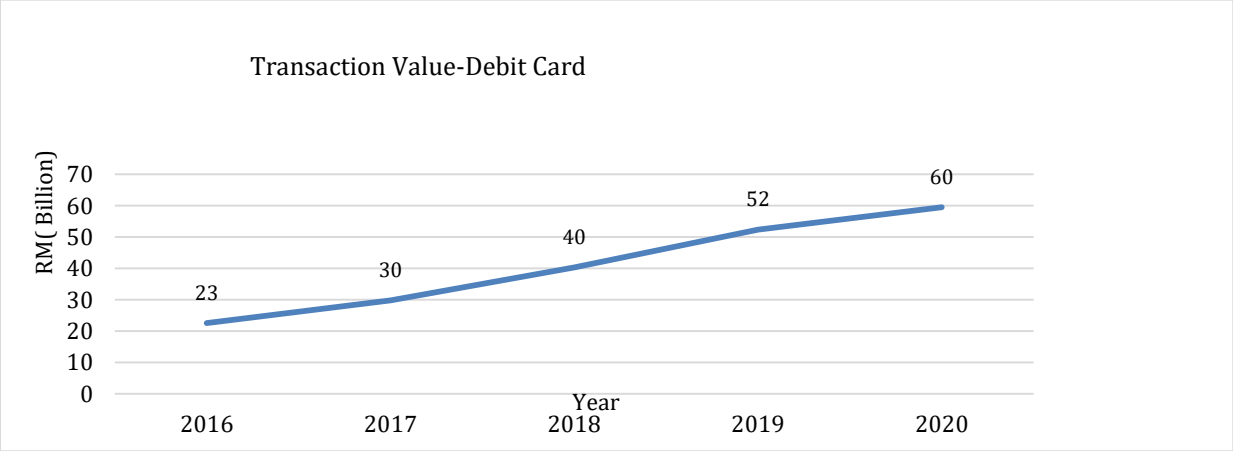
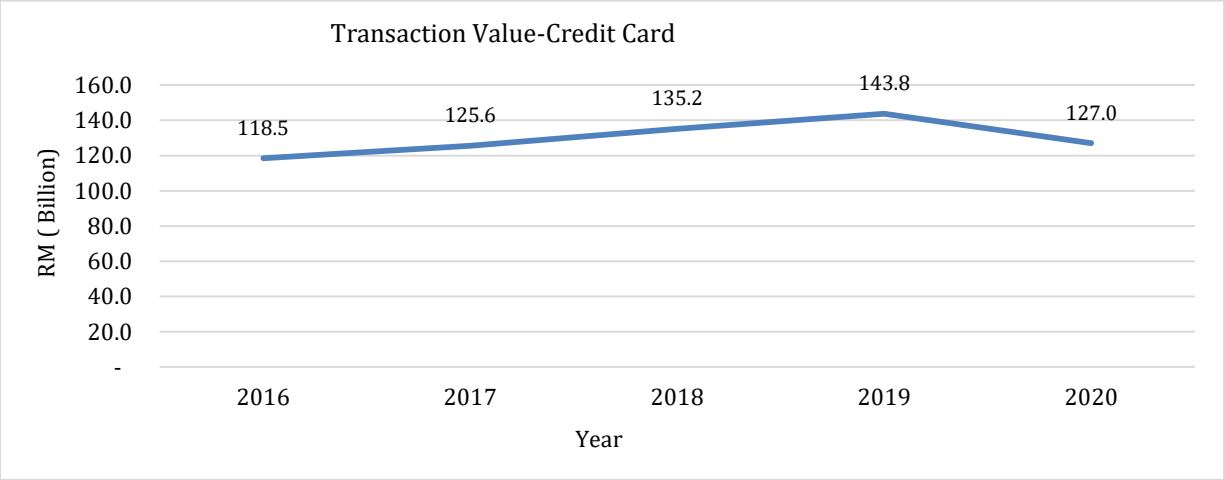



**Figure 4: Transaction Value-Credit Card**




The main objective of the study is to measure the significant relationship between payment instruments and payment channels in e-payment systems. The study also motivated to examine the interaction effects of Covid-19 on the relationship between credit card usage and the e-payment system. The study structures the paper as follows. Section 2 presents the debatable arguments on e-payment. Section 3 explains the data and methodology employs to achieve the proposed objectives. Section 4 interprets the results followed by a thorough discussion. The study ends the discussion with a conclusion and recommendations in Section 5.

## 2. Literature Review

In this digitalization era, many countries encourage the usage of electronic payment in a day-to-day transactions regardless of the amount. The implementation of electronic payment earned a warm response during the awakening of the pandemic Covid-19. This is due to the users being aware of the importance of contactless transactions. Since the awakening of Covid-19, the electronic payment system has become an area of concern for scholars thus, leads to ongoing debates. Recent literature focus on the issue of electronic payment usage among retail users. Not to mention, there are vast studies that examine the issue from a business perspective. Some studies debate over the payment channels and payment instruments' efficiency and preferences inter alia, Daragmeh et al. (2021); Mansour (2021) and Undale et al. (2021). However, this study focuses on the emerging electronic payment given, in the pandemic era. Specifically, the study investigates to what extent the payment instruments and channels react toward electronic payment. Examples of payment instruments are credit and debit cards. Meanwhile, example of payment channels is Automated Teller Machine (ATM) payment, ATM withdrawal and Internet banking. Traditionally, consumers use cash in their daily transactions regardless of small or large transactions. Due to that reason, the consumers have to bring along the notes everywhere. This exposed them to the risk of being snatched while having a lot of notes in their purse or wallet. Those consumers that normally hold more cash are older people (Simatele & Mbedzi, 2021). This is possibly due to older people being more comfortable transacting with cash like previously. Moving forward, there are innovative ways of managing daily transactions.

The banks offer credit cards and debit cards as means of payment. Consumers can use those cards for purchasing. The former card is short-term financing. This implies that consumers purchase the item on credit and pay later. Meanwhile, a debit card is similar to cash. It uses the money available in its account. Consumers are not allowed to make transactions beyond the available account balance. However, not all businesses are ready to adopt card-based terminals. This is due to the businesses are unwilling to absorb the fees charged on the credit card (Simatele & Mbedzi, 2021). Cornea (2021) highlights that credit card users most likely do not spend for impulsive consumption because of the nature of the card which, is short-term financing. The users are wise in making a financial decisions. In another vein, Trinh et al. (2020) point out that credit card induces users to spend more. Despite the convenience and ease to use, users prefer credit cards and debit cards due to the cashback and reward schemes offered. To collect more points, the users tend to spend more and achieve the reward goals. A study by Abdul-Muhmin (2010) finds credit card is a substitute for large transaction of other payment methods, for instance, debit card and cash. Senali et al. (2021) reveal consumers in Sri Lanka prefer to use debit cards due to the unavailability of the facility in the rural area. Due to that reason, consumers prefer to use cash in their transactions. On the other hand, Yakean (2020) states that Thailand users opt for a debit card to pay utility bills. This is because it directly deducts from their deposit accounts. Semerikova (2020) highlights debit card usage in Russia is very popular relative to the credit card. The Russian prefers debit card because of their disfavor for being indebted.

Their assumption is living in debt is awful. Additionally, a study by Chawla and Joshi (2019) disclose consumers in India prefer debit cards as a means of payment relative to Internet banking, mobile wallet and credit card. The rapid pace of advancement introduced a non-physical wallet, which is the electronic wallet (e-wallet). It is a platform that allows consumers to store money for digital transactions. Examples of e-wallets in Malaysia are, Touch 'n Go e-wallet, GrabPay, Boost, MAE and CIMB Pay. Aji and Adawiyah (2021) bring out that e-wallet users highly tendency to spend more than credit card users. This is due to the e-wallet is more convenient and provides a seamless transaction. According to Simatele and Mbedzi (2021), user preference depends on the retailer's supply of payment instruments. In other words, it is a two-sided market. The users can and are only able to use related payment instruments if only the retailer provides the facility. The authors find e-wallet is the second most widely accepted payment method after cash. This indicates retailers in Zimbabwe are preferred to use e-wallets rather than other instruments. This is possibly due to the e-wallet is an easier and quicker transaction (Ibrahim et al., 2021). Withdrawing cash from an ATM is costly. There is a certain amount of surcharge imposed on every withdrawal, especially at different ATM bank issuers. Simatele and Mbedzi (2021) bring out; the surcharge hinders cash withdrawal that leads to less preference for cash in payment methods. Supporting the argument, Świecka and Grima (2019) find cash withdrawal incurs a high cost which includes the fee charged and the time consuming to reach the bank and

time taken for withdrawing of cash. Oppositely, Arango-Arango et al. (2018) disclose ATM surcharge is able to increase the cash usage.

This is due to the ATM surcharge is immaterialize and less significant for large withdrawals. Thus, it is not an issue for users who are highly likely to hoard a large amount of cash. According to Mansour (2021), emerging of digital payment given in the pandemic Covid-19 era caused changes in payment behavior among consumers. Despite credit cards, debit cards, ATM payments and ATM withdrawals, one of the trending payment methods is Internet banking. Internet banking is the platform that allows for Internet bank transfers. It allows the user to transfer money or transact using a smartphone, tablet or other supported devices with internet access. The users can transfer to the account in the same bank or differently. During the hit of Covid-19 pandemic, users prefer to use Internet banking which is more secure and safe as compared to other means of payment (Mihajat, 2021; Yakean, 2020). This is because the banknotes are able to transmit Covid-19. Due to that reason, the users opt for online banking than other payment methods due to online banking is contactless payment. The better response to the use of Internet banking is supported by the top-up of e-wallets (Aji & Adawiyah, 2021). The study explains the data and methodology applies in the following section.

## 3. Research Methodology

The study aims to investigate the development of electronic payment in Malaysia, commonly known as e-payment. The model identifies e-payment related activities as a whole in measuring the convention of e-payment in the country. Worth noting, the study limits the analysis to a retail payment system, while excluding the large value payment system (SIPS). Time series data were obtained from the central bank, Bank Negara Malaysia via the payment statistics-payment system portal to collect the main interest variable which is the monthly data of total e-payment. Specifically, the study collects the most recent 6.5-year data span from Jan 2016 to June 2021 and contains 66 observations. Selected payment channels and instruments are included in the model as the explanatory variables. Notably, the study includes the pandemic crisis of Covid-19 to explore a different insight brought into the market during the period. The study identifies the crisis period starting from January 2020 to date. The study also incorporates the interaction between credit card usage and the Covid-19 period in the model to observe if there is any different effect on e-payment during and before the crisis. One control variable which is the unemployment rate is also fused into the model. Table 1 exhibits all variables used in the model with the definition and proxy.

**Table 1: Variables Definition and Proxies Measurement**

| | Notation | Definition | Proxy Measurement |
|---|---|---|---|
| *Dependent Variable* | | | |
| E-payment | EPAY | Total electronic payment systems, comprise Interbank GIRO, FPX and direct debit. | Monthly volume of total e-payment transactions (million) |
| *Independent Variables* | | | |
| Credit Card | CRC | Credit card transaction | Monthly value of credit card transactions (MYR billion) |
| Debit Card | DRC | Debit card transaction | Monthly value of debit card transactions (MYR billion) |
| ATM Payment | ATMP | Automated Teller Machine payment transaction | Monthly value of ATM Payment transaction (MYR million) |
| ATM Withdrawal | ATMW | Automated Teller Machine withdrawal transaction | Monthly value of ATM withdrawal transaction (MYR million) |
| Internet Banking | INT | Internet banking transaction | Monthly value of Internet banking transactions (MYR billion) |
| Covid-19 | COVID | Pandemic period of Corona Virus | 1 = Covid-19 period,<br>0 = otherwise |
| *Control Variable* | | | |
| Unemployment | UE | Malaysia unemployment level | Month over month, standardize unemployment rate (%) |

Preceding the estimation, the study performs relevant diagnostic tests to ensure appropriate models and methodology were employed throughout the process. The diagnostic test utilizes the Augmented Dickey-Fuller Unit Root test to test the potential stationary issue in the time series data. The mean Variance Inflation factor (VIF) is computed to detect any serious multicollinearity issue, while Breusch-Pagan/Cook Weisberg test is employed to identify if there is any heteroscedasticity issue. Last but not least, the study uses the Breusch-Godfrey LM test for autocorrelation diagnostic. The econometric equation for the estimation is presented in equation 1 and followed by the proposed hypotheses:

$$EPAY_t = \rho_0 + \rho_z CRC_t + \rho_2 DRC_t + \rho_3 ATMP_t + \rho_4 ATPW_t + \rho_5 INT_t + \rho_6 COVID_t + \rho_7 CRC_t * COVID_t + \rho_8 UE_t + \mu_t \quad (1)$$

**H1:** Credit card transactions significantly influence the retail e-payment transaction volume in Malaysia.
**H2:** Debit card transactions significantly influence the retail e-payment transaction volume in Malaysia.
**H3:** ATM payment transactions significantly influence the retail e-payment transaction volume in Malaysia.
**H4:** ATM withdrawal transactions significantly influence the retail e-payment transaction volume in Malaysia.
**H5:** Internet banking transactions significantly influence the retail e-payment transaction volume in Malaysia.
**H6:** The retail e-payment transaction volume in Malaysia significantly differs (higher or lower) during and before the pandemic Covid-19.
**H7:** Covid-19 significantly affect the influence of credit card on the retail e-payment transaction volume in Malaysia.

## 4. Results

The study diagnoses potential data issues for the proposed model. The Augmented Dickey-Fuller testing identifies all data are stationary with no unit root issue. Mean VIF is less than 10 suggests there is no serious multicollinearity issue. Though, the Breusch-Godfrey LM test and Breusch-Pagan/Cook-Weisberg test are significant at the 1 percent level indicates the potential serial correlation and heteroscedasticity problem. Subsequently, the study provides estimation with Newey-West standard errors to remedy the autocorrelation and heteroscedasticity issue. The model F-statistic is significant at the 1 percent level propose the model is fit and acceptable. Table 2 presents the Newey-West standard errors regression that contains 66 observations. The main research interest is the e-payment proxied by the total volume of retail e-payment systems. The explanatory variables encompass the e-payment instrument that is credit card and debit card transaction in value. The payment channels embrace ATM payment, ATM withdrawal and Internet banking. Covid-19 and the unemployment rate represent the dummy of the pandemic period and control variable respectively. The Covid-19 period embodies 19 percent of the overall data while the remaining data represent the period before the pandemic. The estimation recognizes credit cards and debit cards to be important determinants of the retail e-payment system volume. Similarly, internet banking is also found to be statistically significant to the retail e-payment system in Malaysia. ATM payment and withdrawal however are not considered crucial in the emergence of retail e-payment systems.

Unsurprisingly, the estimation reveals Covid-19 is statistically significant at a 10 percent level postulates the retail e-payment system is significantly higher during the pandemic as compared to before the crisis. As expected, during the Covid-19 period, retail transactions are more inclined to electronic payment systems rather than the usual traditional transaction before the pandemic. During this period, one has limited alternatives as many traditional options are not available. Access to conventional payment systems was blocked due to health and safety measures taken by the authorities. This initial reason is probably only valid until a certain extent when the new transition becomes a new norm for users. The shift from the conventional payment system to electronic payment becomes visible and the new paradigm is supported by the availability of many digital platforms to assist the payment mechanism (Mansour, 2021). The emergence of the e-payment system becomes smoother, particularly for retail transactions due to the strong support of the government in promoting a cashless society. Before the crisis, this effort is not fully braced by the merchant because of fee charges and the cost factor. Interestingly, during the crisis, most of the merchants do not have many choices, but to adapt to the new payment system, The Covid-19 pandemic, although undoubtedly damaging to the country, instead become a blessing to the emergence of the e-payment eco-system in Malaysia.

**Table 2: Emergence of E-Payment Estimation**

| | Coefficient | t-value/z-value |
|---|---|---|
| Credit Card | **-4.0061**** | -2.6800 |
| | (1.4933) | |
| Covid-19 | **36.4784*** | 1.7000 |
| | (21.5181) | |
| Covid-19 x Credit Card | **-2.7751*** | -1.7000 |
| | (1.6364) | |
| Normal Period | **[-4.0061]***** | -2.6800 |
| Covid-19 | **[-6.7812]***** | -5.5100 |
| Debit Card | **6.3787***** | 2.8500 |
| | (2.2397) | |
| ATM Payment | -0.0011 | -1.4600 |
| | (0.0007) | |
| ATM Withdrawal | 0.0003 | 0.3700 |
| | (0.0007) | |
| Internet Banking | **0.4435**** | 2.2900 |
| | (0.1940) | |
| Unemployment | -0.4131 | -1.1800 |
| | (0.3498) | |
| Constant | 19.9354 | 1.3800 |
| | (14.4044) | |

**Note:** *** is significant at the 1% level, ** is significant at the 5% level, and * is significant at the 10% level.

Standard errors are in parentheses and the marginal effects are in brackets. Credit Card refers to credit card transaction (monthly value of credit card transaction (MYR billion)), Covid-19 refers to the pandemic period of Coronavirus (dummy variable), Debit Card refers to debit card transaction (monthly value of debit card transaction (MYR billion)), ATM Payment refers to Automated Teller Machine payment transaction (monthly value of ATM Payment transaction (MYR million)), ATM Withdrawal refers to Automated Teller Machine withdrawal transaction (monthly value of ATM withdrawal transaction (MYR million)), Internet Banking refers to internet banking transaction (monthly value of internet banking transaction (MYR billion)), Unemployment refers to Malaysia unemployment level (month over month, standardize unemployment rate (%)). The study further investigates the interaction effect of Covid-19 on the relationship between credit card payment instruments and retail e-payment systems in Malaysia. Without the interaction, the credit card is found to be negative and significant at a 5 percent level towards e-payment. The finding implies the more credit card usage, the lower the e-payment volume. This is explicable by taking credit cards as a substitute instrument relative to other available payment instruments and channels. Unlike a credit card, other instruments and channels such as debit cards, ATM payment and withdrawal as well as internet banking require a sufficient amount of deposit before any transaction can be conducted. The credit card is a decent available payment alternative relative to others expressly for those who have a shortage of financial capacity. In this case, credit card usage is not an option but rather mediocre because of financial constraints.

Due to this reason, credit card users do not have open access to use other payment instruments, channels or systems. This scenario does not promote the emergence of a retail e-payment system, although the usage of credit card transactions is snowballing. The situation has become pellucid as suggested by the interaction term between Covid-19 and credit cards. The interaction term managed to reject the null hypothesis and substantiate the alternate hypothesis 7 at a 10 percent significant level. The marginal effect presents in Table 2 postulates a negative relationship between credit card and retail e-payment systems both before and during the pandemic. The above scenario is true before the pandemic and becomes more evident during the crisis. During Covid-19, with an increase in credit card transactions, the retail e-payment system drops even more relative to before the pandemic period. During the crisis, users with more financial constrain are more prone to use a credit card, but unable to opt for other e-payment alternatives. This causes to further decline in e-payment volume during the Covid-19 pandemic. On the contrary, a decrease in credit card transactions during Covid-19 leads to a substantial increase in the retail e-payment volume that is higher than before the crisis period. This group of users is less affected by the crisis and has income stability. Hence, in its place of

using a credit card during the pandemic, for precaution and safety measures they switch to other e-payment alternatives (Mihajat, 2021; Yakean, 2020). Another payment instrument that is commonly used by Malaysian is the debit card. Unlike a credit card, debit card usage is credited directly from the cardholder's account. Therefore, the users must ensure there is a sufficient amount in the account before the usage. Different from credit card usage, a debit card is not considered a substitute for other e-payment alternatives.

It is better known as the debit card is complimentary to other available e-payment options. In other words, given the customers have an adequate amount in their account; they can opt to either use a debit card or any other electronic payment at the same time. This scenario supports the relationship between a debit card and retail e-payment in Malaysia, where greater debit card usage fosters a more e-payment system as a whole. Oppositely, customers with a lesser amount in the account need to reduce their debit card usage together with other e-payment alternatives. Indeed, these customers may need to switch to credit card transactions whenever possible. The study accomplishes the alternate hypothesis 2 while rejecting the null hypothesis. The positive relationship between the two is significant at the 1 percent level. The two retail e-payment instruments, credit and debit cards are both significant in determining the retail e-payment system, but in different ways. Debit card transaction is one of the best instruments to encourage the emergence of a retail e-payment system while credit card usage may not be a good instrument to promote the growth of the e-payment system in Malaysia. Due to this reason, commercial banks come out with solid initiatives to reassure the usage of debit cards such as by smoothing the process of debit card application when it is directly attached to the savings account offered to customers. Furthermore, unlike a credit card, there is no income level qualification for one to have their own debit card.

On the other hand, taxation imposed on credit cardholders by the government is one way to dampen the usage of credit cards and is also another measure to promote customers to switch from credit to debit cards instead. From another perspective, banks rely on the credit card to earn more income from finance charges as well as from income diversification such as late payment penalties. This justifies the need for the banks to still offer and promote the issuance of credit cards, regardless of their adverse effect on the emergence of the retail e-payment system in Malaysia. The rise of the e-payment eco-system in Malaysia, particularly in the retail system is also supported by the e-payment channels that include ATM payment, ATM withdrawal and Internet banking. Similar to arguments discussed for credit and debit cards earlier, ATM payment and ATM withdrawal are negatively and positively related to the retail e-payment system in Malaysia respectively. ATM or the Automated Teller Machine provides services including credit card and financing repayment as well as a cross-border cash withdrawal. The former refers to ATM payment while the latter refers to ATM withdrawal. As compared to other electronic payment alternatives, ATM payment is probably one of the least convenient ways of repayment (Świecka et al., 2021). Using this channel, users are required to reach the nearest ATM and to be physically present to make any transaction. Hence, ATM payment is one of the oldest and traditional ways of making payments.

Ignoring other new and innovative e-payment channels, these users stick to their conventional ways of dealing with banking transactions. This behavior does not support the arrival of other sophisticated electronic payment systems. Thus, the more ATM payment transaction, the lesser it will contribute to the development of the e-payment system in Malaysia. On the other hand, the acceptance of the more advanced retail e-payment system resulted from the least favorable preference for ATM payment relative to other available e-payment systems. As for ATM withdrawal, the positive relationship with the retail e-payment system in the country is explicable because Malaysia is still emerging in promoting a cashless society. Regardless of government efforts to create a cashless ecosystem in the country, many other factors hinder the process and progress. Among other, the reluctance of merchants to convert into a cashless transaction in avoiding registration and terminal fees and charges (Simatele & Mbedzi, 2021). Due to this reason, ATM withdrawal is still one of the desirable channels to obtain cash, even though there are many other electronic payment channels. Whenever possible, users would also choose other instruments and channels in parallel to ATM withdrawal, thus boost up the retail e-payment volume in Malaysia. This is predominantly true during the flourishing economic condition where the income level is stable. The relationship between both ATM payment and ATM withdrawal is however found to be insignificant as the study fails to reject the null hypotheses 3 and 4.

The study, however, managed to find significant evidence of the crucial relationship between another e-payment channel, internet banking and retail e-payment system in Malaysia. Internet banking is found to positively influence the e-payment system and is significant at a 5 percent level. The more users' preferences use Internet banking, the greater potential for the e-payment system in the country to grow. Internet banking which started in Malaysia more than two decades ago since 2000 provides many services as offered by other e-payment instruments and channels. Inter alia, internet banking delivers common banking transactions as well as utility, card and loan repayment platforms. As the Internet banking system in the country is becoming more stable and secure, this e-payment channel turns out to be one of the most desirable electronic payment options. This is particularly the reason that Internet banking is a fast and convenient way to perform transactions virtually. In the early inception of Internet banking in 2000, the main hindrance to promote Internet banking is trust and security issues (Kim et al., 2010). As time goes by, this issue is diluted with more evidence of the existence of stable and secured Internet banking transactions. In recent years, the acceptance of Internet banking becomes vibrant and thus directly promotes the emergence of the e-payment system in the country. The control variable, unemployment is negatively related to the retail e-payment system in Malaysia. Although the study did not manage to find any significant evidence, the negative relationship indicates that greater unemployment causes lower individual income levels, thus impede the emergence of the retail e-payment system.

## 5. Conclusion and Recommendations

The main objective of this study is to analyze the way forward to support the Malaysian retail e-payment ecosystem. The study includes selected important e-payment instruments and channels to investigate the influence of each medium in promoting electronic payment in Malaysia. Critically, the study incorporates the recent unfortunate event of the Covid-19 pandemic in the proposed model. As Malaysia is dynamically heading towards a cashless society, Automated Teller Machine (ATM) payment and withdrawal are becoming less favorable channels for the development of the retail e-payment system. Many banks have decided to minimize their investment in the ATM as an investment now is diverted to other financial technology initiatives. Debit cards and Internet banking are adjudged to be vital in supporting the emergence of the retail e-payment system in Malaysia. A top-down approach from the regulator is explicit in promoting debit card and internet banking usage with numerous initiatives channelled via banks to consumers. This resurgence is aligned with the focus areas of the Malaysian Financial Sector Blueprint 2010–2020, particularly in accelerating the electronic payments eco-system to improve economic efficiency as well as to assure financial inclusion for all Malaysian. Persistence with the agenda, the effort continues with Financial Sector Blueprint 2022–2026. The Blueprint, in the effort to modernize the key infrastructures in managing the shock of the pandemic, accelerates the adoption of e-payment in the country.

Oppositely, credit card portrays an adverse effect on the development of the retail e-payment system in Malaysia. With significant influence from credit cards, the volume of retail e-payment may be obstructed by the surge of credit card transactions. The effect is more apparent during the Covid-19 period. Fortuitously, during this period, there are significant growth in retail e-payment volume with the new norm of promoting contactless payment and transactions. React as a blessing in disguise, the Covid-19 period is the finest time to encourage e-payment among Malaysian. To observe a greater impact on the emergence of the e-payment eco-system in Malaysia, regulators and banks may need to minimize the usage of credit cards, especially during the crisis period. To sum up, the Covid-19 pandemic does leave a black mark and dark history in Malaysia and the globe. Nevertheless, the pandemic gracefully embraces the e-payment system in the country with new norms and practices. The regulator and banks need to exploit the pandemic as a stepping stone in accelerating a comprehensive electronic payment ecosystem in Malaysia. Among others, by facilitating and giving more incentives to both banks and consumers to use the debit card and internet banking.

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# The Effects of Dynamic Capabilities on Firm's Financial Performance

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**Abstract:** Firms often face significant challenges to stay competitive in the present economic environment, thus, dynamic capabilities are vital as it is a substantial factor in accomplishing better business performance. This study involved yearly data of 62 firms in the ACE market that engaged with dynamic capabilities, the data was collected from the year 2012-2021. The data was gathered from the firm's annual report and has been analyzed using two-step GMM. Generally, the ACE market is consistently associated with inferior performance and capital compared to the main market. Hence, the market has the possibility of being delisted and affecting capital market performance. Therefore, this study includes dynamic capabilities in the ACE market to study the market's performance. The results obtained are consistent with the theory, whereby changes in dynamic capabilities contributed to a positive return on the firm's performance. However, the small capital nature of the ACE Market limits the investment in the dynamic capabilities. This study concluded that more priority to be given to the awareness of dynamic capabilities in the current competitive era. The result proved that the investment in the dynamic capabilities improved the performance of the Ace market even though some of the firms in the ACE market ignored dynamic capabilities due to capital constraints. Thus, policymakers should play their role in providing grants for the firms in the ACE Market to improve the investment in dynamic capabilities.

**Keywords**: *Firm's Financial Performance, Dynamic Capabilities, ACE Market, GMM, RBV Theory.*

## 1. Introduction and Background

A Firm's financial performance primarily reflects the business sector's overall growth and financial health over a specified period. The performing firm will maximize shareholders' wealth and profitability and then eventually sustain its business. Therefore, determinants of the performance of firms have been a focus of academic research for a long time in accessing achievement (Kaawaase, Bananuka, Peter Kwizina, & Nabaweesi, 2020). Successful firms represent a significant component of developing nations. Hence, numerous economists deliberate them parallel to an engine in determining their economic, social, and political development. To survive in a competitive business environment, every firm should operate in conditions of solid performance. Therefore, assessing the performance of organizations has always been one of interest to management teams of organizations and researchers. Researchers have extended efforts to determine measures for the concept of performance. Considering the vital of a firm's financial performance, various evaluation tools have been established to appraise and enhance a firm's viability.

Financial indicators, such as return on equity, return on assets, profit margin, sales growth, capital adequacy, liquidity ratio, and stock price, are used by analysts and researchers to analyze the firm's financial performance. Apart from that, researchers also have extended the evaluation of performance by looking at the relationship between performance and other related factors, especially on the item that could give value added to the firm's financial performance. Hence, this study is focusing on the changes in the dynamic capabilities of a firm in affecting its financial performance. The world is a global village, and everything is changing fast. The environment of the business market is becoming very dynamic. Only the best can survive, and the rest will go home. The first thing that the whole organization needs is a dynamic capability so that it can adapt to the dynamic environment. Thus, dynamic capabilities are essential in the current condition. Dynamic capabilities indicate a firm's ability to integrate, build and reconfigure its internal and external competencies to address rapidly changing business environments. The relationship between a firm's financial

performance and dynamic capabilities is becoming an exciting issue, especially in severe economic turbulence. Additionally, when firms are seeking new solutions to survive and develop their business.

These days, the business arena has become more globalized; thus, the organization needs to find new ways to maintain its existence as the businesses face more intense competition and rapidly changing consumer preferences (Wendra, Sule, Joeliaty, & Azis, 2019). There have been several different attempts to explain the indirect effect of dynamic capabilities on firm performance. Hence, this study is attempting to study the direct relationship between dynamic capabilities on a firm's performance in the ACE market. Therefore, organizations must balance their dynamic capabilities proactively with demand so that competitive advantage can be achieved along with business victory (Teece, 2018). Capabilities are the term within the Resource-Based View Theory; the best way to differentiate between resources and capabilities is that resources are the organization's own, and capabilities refer to the organization's ability. Generally, capabilities tend to arise over time as firms take action to build strategic resources. Dynamic capability has been viewed as an expanded paradigm for accomplishing competitive advantage. Therefore, all firms need to renew and reconfigure their capabilities to cater to sudden exogenous changes to attain superior performance (Pervan, Curak, & Pavic Kramaric, 2018). This study is vital as firms nowadays are facing significant challenges to stay competitive in the present economic environment. Especially firms in the ACE Market, as the firms, could not survive in the current market environment. Since the ACE Market is the platform for listing medium-and small-sized firms. The ACE Market keeps on changing, and one of the main reasons behind the listing and delisting is derivable to inconsistent financial performance (Isa, 2019). Therefore, including dynamic capabilities in the sponsor-driven market could enhance its financial performance.

**Background of the ACE Market**: The ACE market comprises small to medium size firms. This is a perfect market to start up for firms and firms controlled by entrepreneurs seeking progressive capital by listing their firms publicly. The ACE Market is reasonable for the firms that probably won't have a huge and high amount of capital to invest in their firm in the Main Market but would presumably have a solid, strong product or service portfolio, which if given more capital. The ACE Market is not only limited to the technology sector like MESDAQ, and it is sponsor-driven. Thus, this implies that firms from any industry or size can apply to be listed in the ACE Market, which is intended to offer a more efficient and specific way. The firms also do not have to give the track records like how is required in Main Market as the guidelines and regulations for listing in the ACE Market are less stringent. In this study, the average changes in R&D deployment are proxies for dynamic capabilities for 62 firms in the ACE Market from 2012 to 2021. From the data gathered it can be concluded that the ACE Market firms are not concerned about dynamic capabilities. As the changes in R&D are in a declining trend. There is a downhill trend. The data for dynamic capabilities are primarily extracted from the firms that have changed in the R&D deployment. Previously 81 firms have been selected as a sample, however, a total of 19 firms have been excluded because the firms did not have changes in R&D at all. Meaning the firms are not concentrating on the investment in dynamic capabilities.

Nevertheless, RBV theory stipulates, to achieve superior performance, the prime importance is intangible assets and capabilities (Bleady, Hasaballah, & Ibrahim, 2018). However, it shows that firms in the ACE market do not involve much in R&D due to capital issues. A previous study by Jeng& Pak (2016) found that the size of the firms influences the investment in R&D. Hence, corresponding to the ACE market characteristics that consist of small-medium size firms with lower market capitalization. In addition, the ACE Market of Bursa Malaysia has not exhibited good performance for an extended period; also, in terms of the number of listed firms lower than the Main Market (Isa, 2019; Shinozaki, 2014). Figure 1.3 below exhibits the number of firms listed in the Main Market and the ACE Market from 2012 to 2021. Comparing both markets, the ACE Market shows the lowest number of firms listed. Since the share capital of the ACE Market firms is usually smaller than those on the Main Market, they are less liquid. Subsequently, share prices tend to fluctuate quickly compared with the Main Market counters. Also, the ACE Market's performance is uncertain; thus, it is highly riskier than the Main Market (Shari, 2019). Resulting in the lower market participants investing in the ACE Market. Additionally, the Main Market firm is always more valuable because many institutional investors do not buy the ACE Market stocks. Thus, dynamic capabilities are compulsory to enhance the ACE Market performance in a business environment that is more complex and demanding nowadays.

## 2. Literature Review

**Firm's Financial Performance:** Financial performance is the achievement of the firm's finances for a specific period covering the assortment and allocation of finance measured by capital adequacy, liquidity, solvency, efficiency, leverage, and profitability. The firm's capacity to oversee and control its resources is called financial performance. Income, accounting reports, profit loss, and capital change can be the premise of data for corporate superiors in management to make decisions. It is essential to comprehend fundamental analysis and technical analysis and learn to understand its budgetary conduct through financial aspects, financial management, and accounting. Moreover, financial performance plays a vital role in the organization's overall performance. It measures the organization's monetary well-being and viability in utilizing the assets to produce income from the business (Fatihudin & Mochklas, 2018). Generally, financial ratios have long been analyzed as measures of a firm's financial conditions to predict corporate success and failure (Masa'deh, Tayeh, Jarrah & Tarhini, 2015). The most common performance measurement in finance is financial ratios (Naz & Ijaz, 2016). Usually, a firm's financial performance is the primary concern for investors and creditors because it will provide information on a firm's economic conditions for their investments' safety and profitability.

Financial performance has a more prominent effect on growth opportunities also the success and failure of business organizations, as it is a critical need in all economic decision-making (Chashmie & Fadaee, 2016). Generally, in measuring a firm's financial performance, ROA and ROE are widely used indicators by investors, creditors, and managers (Samiloglu, Oztop, & Kahraman, 2017). Some of the researchers used Tobin's q. However, Dybvig and Warachka (2015) said that the research's theoretical and empirical analysis demonstrates that Tobin's q does not measure a firm's financial performance since underinvestment increases rather than decreases Tobin's q. There have been quite some previous studies conducted a study between dynamic capabilities and financial performance that used ROA as a proxy specifically in terms of profitability ( Duho & Onumah, 2019). On the other hand, return on equity is the ability of the firm to generate a profit using the asset. Academically, higher ROE represents a better organization's profitability, as it measures the firm's ability to gain profitability efficiently concerning the firm's stockholders' equity. ROE is very suitable to represent the profitability of an organization apart from ROA (Fatihudin & Mochklas, 2018).

**Dynamic Capabilities:** Dynamic capabilities refer to "firms' ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece, 1997). Dynamic capabilities encompass "the management of capabilities and resources of all functions of the firms, with the overall objective to get a competitive advantage" (Arranz, Arroyabe & Fernandez, 2020). The researcher found that leading firms achieve rapid product and process innovation responses by developing dynamic capabilities (Wendra et al., 2019). Moreover, the researchers found that dynamic capacities expand the RBV hypothesis in which a firm's resources are used to gain a competitive advantage (Teece et al., 1997). Dynamic capabilities were utilized to allude to the firm's capacity. Dynamic capabilities were used to refer to the firm's ability to renew the firm's competencies over time to address changes in the business environment through integration, reconstruction, and reconfiguration of functional skills, resources, and competencies, including them in strategic changes (Teece et al., 1997).

**The Objective of the Study:** To examine the effect of dynamic capabilities in influencing the firm's financial performance in the ACE Market. Since the ACE Market is the platform for listing medium-and small-sized firms in Malaysia, samples are explored across firms listed on the ACE Market in Bursa Malaysia. The ACE Market is the most important market that allows medium-and small-sized firms and entrepreneurs to try and inject more capital into their firms.

## 3. Research Methodology

In general, this study consists of two proxies in measuring a firm's financial performance, namely, return on asset (ROA) and return on equity (ROE). $ROA_{it}$ (return on asset) and $ROE_{it}$ (return on equity) are financial performance indicators for firm $_i$ in year $_t$. Data was collected from the audited annual reports, and the period of the analysis is from 2012 to 2021. The data was obtained from 62 firms in sponsor-driven markets in Malaysia (The ACE Market). In obtaining a robust evaluation, the General Methods of Moment (GMM) panel

estimator is used to estimate the dynamic relationship between dynamic capabilities and a firm's financial performance in the ACE Market. This study uses the GMM model established by Arellano and Bond (1991); the well-developed GMM estimator can produce consistent results in the presence of heteroscedasticity and resolve autocorrelation by differencing (Baltagi, 2008). GMM can combine this dynamic nature of relationships to provide practical tools to deal with endogenous issues. Due to the endogenous lag-dependent variable or explanatory variable, the FE or RE panel model may not be applicable (Ibrahim & Law, 2016). In addition, GMM can also control endogenous problems (Roodman, 2009). Consistent with the previous work (Al-Hamadanya et al., 2020; Zhang, 2021), the latter also considers the endogenous effect and considers GMM for regression. Table 1 exhibits all variables used in the model with the definition and proxies.

**Table 1: Variables and Proxies, Summary of Variables**

| Variables | Indicators | Proxies |
|---|---|---|
| Financial Performance | Return on Assets | Net Profitit/Total Assetit (Al-Musali & Ku Ismail, 2014) |
| Financial Performance | Return on Equity | Net Profitit/Equityit (Al-Musali & Ku Ismail, 2014) |
| Dynamic Capabilities | Changes in R&D | Percentage Changes in R&D (% increase in R&D development) (Dadashinasab & Sofian, 2014) (1/2) {[(R&Dt-1 – R&Dt-2) / R&Dt-2 ] + [( R&Dt-2 – R&Dt-3) / R&Dt-3 ]} x 100 |
| Size | Firm size | Natural logarithm of total assets of the firm |
| Leverage | Total liabilities/ total asset | Total liabilities/ total asset |

The econometric equation for the estimation is presented in equations 1 and 2 and followed by the proposed hypotheses:

Model 1

$$ROA_{it} = \alpha_{it} + \beta_0 + \delta ROA_{it-1} + \beta_8 DC_{it} + \beta_5 LSZE_{it} + \beta_6 LEV_{it} + \mu_i + \omega_{it} \quad (1)$$

Model 2

$$ROE_{it} = \alpha_{it} + \beta_0 + \delta ROE_{it-1} + \beta_8 DC_{it} + \beta_5 LSZE_{it} + \beta_6 LEV_{it} + \mu_i + \omega_{it} \quad (2)$$

**H1:** There is a significant linear relationship between dynamic capabilities and ROA of the firms in the ACE Market.

**H2:** There is a significant linear relationship between dynamic capabilities and the ROE of the firms in the ACE Market.

## 4. Results

**Table 2: Descriptive Statistics**

| Variable | Observation | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| ROA | 620 | -0.0680 | 0.7626 | -14.391 | 10.614 |
| ROE | 620 | -0.1193 | 0.9644 | -21.652 | 2.784 |
| DC | 438 | 0.5685 | 4.8637 | -0.09 | 0.9855 |
| SZE | 620 | 6.76E+07 | 1.22E+08 | 1049000 | 1.32E+09 |
| LEV | 620 | 0.3286 | 0.4895 | 0.002 | 9.573 |

Table 2 presents the statistical description of all the variables during the sample period from 2012 to 2021. It shows that firms listed in the ACE Market are experiencing more negative returns than positive ones. The mean values display that -0.0680 and -0.1193 dropped in the ROA and ROE of the 62 firms in the ACE market. The mean value of ROA indicates, on average, for every RM 1 from the total assets, the firms experience negative returns of (RM 0.0680). For ROE, on average, for every RM 1 invested in the total equity, the firms are experiencing a negative return (RM 0.1193). The minimum value for ROA and ROE are -14.391 and -21.652. The maximum value for ROA and ROE are 10.614 and 2.784. Both proxies of return have a standard deviation below 1, showing that the data for ROA and ROE are clustered around the mean value. The value of DC (dynamic capabilities) indicates the independent variable of this study, which is measured by changes in

R&D deployment. The number of observations for dynamic capabilities is different from the other variable because all the variables in this study are from 2012-2021 (10 years) for 62 firms. Thus, the 620 observations have been derived from the number of years multiplied by the number of firms. However, the number of observations for dynamic capabilities is 438 due to unbalanced data.

There is a missing value of 182 as there are only 19 firms have all the values of changes in R&D from 2012-2021; the rest of the 43 firms do not have changes in R&D deployment every year from 2009-2018. The dynamic capabilities mean value of 0.5685 signifies that for every 1% increase in R&D deployment, the firms in the ACE market generated 56.85% of value creation (profit). The minimum value of dynamic capabilities is -9%, and the maximum value is 98.55%. The descriptive statistics results designate those dynamic capabilities to play a crucial role in enhancing a firm's financial performance in the ACE Market. It shows that dynamic capabilities could generate 56.85% value creation in the market. This is persistent with the previous works of literature, which concluded that dynamic capabilities impact the firm's financial performance (Wendra et al., 2019). Due to the rapid global evolution of the knowledge economy and increased competition, organizations face challenges to sustain their competitiveness. In this challenging and dynamic business environment, dynamic capabilities have become an essential element of corporate growth, survival, and competitiveness (Adnan, Abdulhamid & Sohail, 2018; Claver-Cortes, Zaragoza-Saez, & Gonzalez Illescas, 2018; Singh & Rao, 2016).

Therefore, dynamic capabilities have become a common goal for every firm to achieve strategic goals. This study's first control variable is the SZE proxied by the total asset. On average, the firms in the ACE Market have RM 67,600,000 in total assets. Total assets refer to the sum of the book value of all assets owned by the firms. The maximum value for the total asset is RM1,320,000,000, and the minimum value of RM 1,049,000. The descriptive statistics show a positive relationship between the SZE and the value creation of the firms. Meaning, the higher the size of the firms (total asset), the higher the return will be. The total asset is essential as it shows the firm's ability to generate revenue, increase business values and simplify the running of the business. Moreover, the more assets a company has amassed, the more sales and potential profits the company may generate (Tiwari & Vidyarthi, 2018). Finally, the second control variable of this study is LEV (leverage), measured by the firm's total debt/total assets in the ACE Market. This variable indicates the usage of leverage in the firms listed on the ACE Market. Leverage amount also reveals whether or not the firms have loans and, if so, how the firm credit financing compares to assets.

The mean value of 0.3286 implies that for every RM 1 of the firm's total asset, the company finances the asset by using RM 0.3286 of total debt for business operations and improving firm performance. The descriptive statistics show a maximum value of 9.573 and the minimum value of 0.002. Denotes that the firm finance RM 9.573 of debt for every RM 1 of total assets. This amount is considered a high amount of leverage as the value of 95.73% of the firm's leverage shows that the firm has more debt than assets. Furthermore, from the mean value of the total asset (firm size), it can be concluded that at the mean value of RM 67,600,000, the firm finance debt of RM 22,213,360 (67,600,000 x 0.3286) to run the business operations. This is mainly because of the low capital issues firms face in the ACE Market. According to the rule of thumb for leverage ratios, a firm's ideal level of leverage should be 50% or less. In other words, no more than half of the firm's assets should be financed by debt. From a risk perspective, a debt ratio of 0.4 (40%) or lower is considered better, while a ratio of 0.6 (60%) or higher makes borrowing and managing debt more challenging (Yao, Haris, Tariq, Javaid & Khan, 2019).

**Table 3: Estimated Result**

| Variable | Notation | Model 1 (ROA) | Model 2 (ROE) |
|---|---|---|---|
| lag DV | L.ROA/L.ROE | 0.654*** | 0.359*** |
| | | (0.032) | (0.025) |
| Dynamic capabilities | DC | 0.259*** | 0.485*** |
| | | (0.056) | (0.087) |
| Size of the firms | lsze | 0.327*** | 0.463*** |
| | | (0.051) | (0.083) |
| Leverage | lev | 0.123** | 0.069 |
| | | (0.052) | (0.077) |

| | | |
|---|---|---|
| Constant | -5.938*** | -8.444*** |
| | (0.875) | (1.443) |
| Observations | 397 | 397 |
| Number of Firms | 62 | 62 |
| Number of Instruments | 26 | 26 |
| AR(2) | | |
| (p-value) | 0.789 | 0.985 |
| Hansen | | |
| (p-value) | 0.615 | 0.549 |

**Notes:** ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively, while values in parentheses are the standard errors.

Referring to Table 3 above, the relationship between dynamic capabilities, Model 1, and Model 2, is positive at a 1% significant level. Showing that the investment in dynamic capabilities increased the firm's financial performance. The finding is consistent with the previous studies ( Pundziene, Nikou, & Bouwman, 2021; Rehman & Saeed, 2015; Wilden & Gudergan, 2017), whereby the researcher has proven that dynamic capabilities significantly helps in improving a firm's financial performance. Moreover, previous research proved that dynamic capability under the Resource-Based View Theory (RBV) is considered one of the most influential theoretical frameworks for understanding how companies gain a competitive advantage and maintain this advantage over time (Barney et al., 2001). In particular, due to more and more unpredictable environmental challenges (such as the global financial crisis, climate change, and emerging economies), the dynamic capability approach has become more influential (Pundziene et al., 2021). The result of this study verified that, in Model 1, for every 1% increment in the changes in R&D (dynamic capabilities), this could create a value creation of 25.9% to the firm's return on the asset. In model 2, for every 1% increase in the changes in R&D, the firms in the ACE market will be able to attain a positive return of 48.5% in return on equity. The effect of dynamic capabilities on the firm performance in the ACE market shows a positive.

Therefore, the firm should increase and maintain a good investment amount in R&D to attain superior performance. Moreover, according to Makkonen, Pahjola, Olkkonen & Koponen (2014), dynamic capabilities help adapt to environmental changes in highly dynamic environments. A dynamic business environment is a condition where the business is rapidly changing, including vigorous market activity, constantly developing new products, constantly expanding markets, constantly evolving technologies and social revolutions. However, this study explores the ACE Market, which does not involve much in such an environment. Still, it can attain an excellent result on the effect of dynamic capabilities on the firm performance. Thus, this study validated the finding of Wendra et al. (2019), whereby dynamic capabilities are needed in all firms. It does not matter whether the firm is involved in a rapidly dynamic environment. Therefore, the influence of dynamic capabilities on a firm's financial performance (direct relationship) is strong and contributes to a higher impact. In addition, regarding the control variables, for Model 1, the result of SZE is consistent with Xu and Li (2020), whereby a positive and significant relationship of 4.919 between SZE and ROA. The higher the firm's total assets, the higher the firm's return on assets in the ACE Market.

However, for Model 2, SZE and ROE obtained a negative and significant 1% result (-0.255), this is supported by Buallay (2019); theoretically, the relationship between firm size and performance is unclear, but there is a consensus regarding the effect of firm size on performance. Large firms may perform better with more resources and capabilities and higher efficiency (Alipour, 2011). Concerning the control variable of leverage, the relationship between leverage and Model 1 is positively significant at 5%. Thus, an increase in leverage by 1% will increase the return on the asset by 12.3%. The finding is in line with the result of Buallay et al. (2019) and Soewarno and Tjahjadi (2020). Therefore, the increase in leverage will increase the ROA of the firms in the ACE market. The finding is also relevant to the fact that the capital of the ACE Market is small. Therefore, companies tend to borrow to raise funds to operate the business. However, in Model 2, leverage tends to be insignificant with ROE. This finding parallels the previous literature, as the relationship between leverage and a firm's financial performance can be positive (Yao et al., 2019), negative relationship (Xu & Li, 2019; Xu & Wang, 2019), or insignificant relationship (Buallay, Cummings & Hamdan, 2019; Tran & Vo, 2018) like this study for Model 2. This is because different firm comes in different sizes (total asset) and different levels of

leverage (total liabilities/ total asset); thus, the result and contributions of this control variable to the ROA and ROE may provide different results (Tran & Vo Duc, 2020).

## 5. Conclusion and Recommendations

Based on the limitation of data on dynamic capabilities, the researcher would recommend future studies to broaden the scope of the research; for example, by doing a cross-country study can be done between Malaysia and other emerging markets. Also, a comparison between sectors can be done, such as financial and manufacturing sectors, hence better understanding of the needs of dynamic capabilities can be based on the sector can be obtained. In addition to profitability, future research can also consider other aspects of financial and non-financial performance, such as liquidity, productivity, and asset efficiency. Lastly, in the future, the researcher should include additional control variables as this study only focuses on two control variables, such as the firm's leverage and size, since these are the most used control variable for studies of a firm's financial performance. However, in the future, a firm's specific variables, such as corporate governance mechanism, ownership structure, and age, can be used as control variables in the analyses.

**Conclusion:** In conclusion, this study answers the effect of dynamic capabilities on the firm's financial performance proxied with ROA and ROE. The results are relevant to the nature of dynamic capabilities that can help to improve a firm's performance. With dynamic capabilities, a firm can integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece et al., 1997). Studies have proven that dynamic capabilities are needed as firms face significant challenges to stay competitive (Claver-Cortes et al., 2018). Also, dynamic capabilities help explain why some firms are more successful in creating competitive advantage in a dynamic market than others (Teece et al., 1997). Furthermore, dynamic capabilities are an extension of the Resource-Based View theory. It defines the firm as a bundle of resources and capabilities persistent over time but heterogeneous between firms (Ambrosini, Bowman, & Collier, 2009). Thus, firms possessing value, rare, inimitable, and non-substitutable resources and capabilities can implement value-creation strategies that lead to sustainable competitive advantages (Barney, 1991). However, having such resources and capabilities does not guarantee the value creation and the development of competitive advantages; hence, dynamic capabilities are required (Claver-Cortes et al., 2018; Fernandes et al., 2017). Due to the close relationship with a competitive advantage, the literature has extensively explored the relationship between corporate dynamic capabilities and performance (Seo, Woo, Mun, & Soh, 2021).

Moreover, most of the literature generally supports a positive link between dynamic capabilities and a firm's financial performance (Seo et al., 2021). Scholars further believe that there is a specific function in a company's dynamic capabilities that can better explain its contribution to competitive advantage and a firm's financial performance (Karna, Richter, & Riesenkampff, 2016; Pezeshkan et al., 2016). The concept of dynamic capabilities has been of interest to researchers. This interest can be explained by increased awareness of the impact of dynamic functions on competitiveness, business practices, and performance results (Dharni & Jameel, 2021). Dynamic capabilities are related to organizational changes that promote innovation and improve the evolutionary adaptability of the enterprise (Anwar et al., 2018a). The importance of dynamic capabilities has long been recognized. It is the only way to be superior to the other firms, sustain competitive advantage, and back in improving a firm's financial performance (Teece et al., 1997; Adnan et al., 2018). Also, the concept of dynamic capabilities is the only answer for some firms that still can be more successful than others in establishing competitive advantages in dynamic markets (Teece et al., 1997). Accordingly, the finding of this result backs the RBV theory whereby dynamic capabilities help improve firm performance (Wendra et al., 2019). Both Model 1 and Model 2 are reliable.

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# Engaging Lean Six Sigma Approach Using DMAIC Methodology for Supply Chain Logistics Recruitment Improvement

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**Abstract:** The purpose of this research paper is to demonstrate the adaptability of lean six sigma using the DMAIC method in reducing the time spent on recruiting new employees for the Supply Chain Logistics Department. Six Sigma is a data-driven, disciplined technique and methodology for reducing defects in any phase, to achieve six standard deviations between the mean and the closest design limit, as modeled by the DMAIC method (Define, Measure, Analyze, Improve, and Control). DMAIC is a method for optimizing, improving, and securing business processes and designs. The DMAIC improvement phase is a key component of Sig Sigma tools. The study focuses on the time spent in the recruiting process of new hires for the supply chain logistics site. The recruiter was interviewed to gather secondary data. Using the Lean Six Sigma DMAIC approach, process efficiency has increased, processes have become faster, and data is more easily accessible. Following the implementation of improvement solutions, the time from the improvement stages can be reduced with the current process using lean six sigma approaches. The company was able to make significant improvements by utilizing its lean six sigma implementation skills, saving time and money while improving quality. The study evaluates prior research and makes recommendations for future research.

**Keywords**: *Lean Management, Six Sigma, Supply Chain Management, DMAIC, Quality Improvement.*

## 1. Introduction

Motorola created the Six Sigma quality improvement management technique in 1985. Based on statistical indicators and standards, a new strategy for quality improvement has been proclaimed. The Six Sigma methodology seeks to enhance two areas of business operations: profitability and speed. The great majority of individuals in today's economy give services rather than generate things and products. The bulk of these services are inefficient, and if the same thing occurs in one facility, multiple manufacturers would generate an abnormally large quantity of faulty items and shut down rapidly. Six Sigma is a robust collection of tools for increasing the accuracy and quality of these services to levels only seen in precision manufacturing. At least 25% of the Fortune 200 companies have a dedicated Six Sigma program. However, the majority of these implemented programs are focused on large-scale improvements in error and process measures, which can be linked to employee motivation. Six Sigma has mostly been used for introduction since Motorola brought it to the commercial sector in 1985. Six Sigma is currently employed in many domains, including facilities management and maintenance, online market research, supply chain improvement, and non-manufacturing industries including healthcare management, management accounting, and supply chain logistics management (Sundram et al., 2016). In addition, the formula and the identification of relevant Six Sigma development theories have been supplied.

**Problem Statement:** Finding, recruiting, and retaining talented people is difficult in today's competitive work environment. Because there are fewer skilled people and competition is heating up. In light of this scarcity, organizations must meet stringent requirements to successfully recruit, select, and retain quality employees. Recruiting and hiring the right people is becoming increasingly complicated. Because of its high cost, talent acquisition has always been a stumbling block in terms of business productivity. This will require some time. Although study after study has shown that high employee turnover costs money, time, and productivity, hiring is frequently hurried and superficial. When it comes down to it, most managers are looking for a warm body. Recruiting employees is an expensive endeavor. This procedure is also required for any business to stay afloat in the marketplace. As a result, even hiring the right person can be costly.

The time cost of an internal recruiter, the time cost of a recruiter's assistant in reviewing resumes and performing other recruitment-related tasks, the time cost of the person conducting the interviews, drug screens, and background checks, and various pre-employment assessment tests are all examples of potentially high costs in the recruiting process alone. Organizations must go above and beyond merely paying a competitive wage to recruit talented individuals, particularly in the sector of supply chain logistics. Because there are so many job opportunities available right now, candidates are difficult to please. They are searching for organizations that can provide a range of rewards, possibilities for growth, and an atmosphere in which they may learn and flourish. If a firm does not fulfill these requirements, job seekers may seek employment with another company that does. As a consequence, organizations must first identify what they can offer prospective workers before emphasizing their greatest attributes when recruiting individuals. Focuses on large-scale gains in error and process measurements that may be connected to employee motivation. Six Sigma has mostly been used in production since Motorola brought it to the commercial sector in 1985. Six Sigma is currently employed in many domains, including facilities management and maintenance, online market research, supply chain improvement, and non-manufacturing industries including healthcare management, management accounting, and supply chain logistics management (Sundram et al., 2016). In addition, the formula and the identification of relevant Six Sigma development theories have been supplied.

## 2. Literature Review

Six Sigma is defined as the identification and management of consumer needs and requirements. To improve business processes and reduce costs (Brewer & Eighme, 2005). in the meantime, according to a study (Rudisill & Clary, 2014), Lean Six Sigma is technically defined as Realistic strategies, techniques, and tools for optimizing procedures and achieving transactions Achieving goals and solving problems to improve organizational efficiency. Six Sigma focuses on the number of opportunities in a process that can lead to defects rather than quantity defects to avoid quality problems. In terms of methodology, the basic and systematic DMAIC approach is recognized in this Six Sigma perspective as presented in Table 1. DMAIC is a method that is supposed to start from the definition of the problem and ends with solutions for lasting improvement as in Figure 1.

**Table 1: DMAIC Steps and Descriptions**

| STEPS | DESCRIPTION |
|---|---|
| Define | Identifying the problem and project goals. |
| Measure | The process of measuring and identifying waste that occurs at each stage of the manufacturing process was carried out. |
| Analyze | Analyze the collected data and information to determine the root cause. |
| Improve | By modifying or redesigning, existing processes and procedures. |
| Control | Maintaining the improved processes to improve them in the future. |

**Figure 1: DMAIC Methodology**

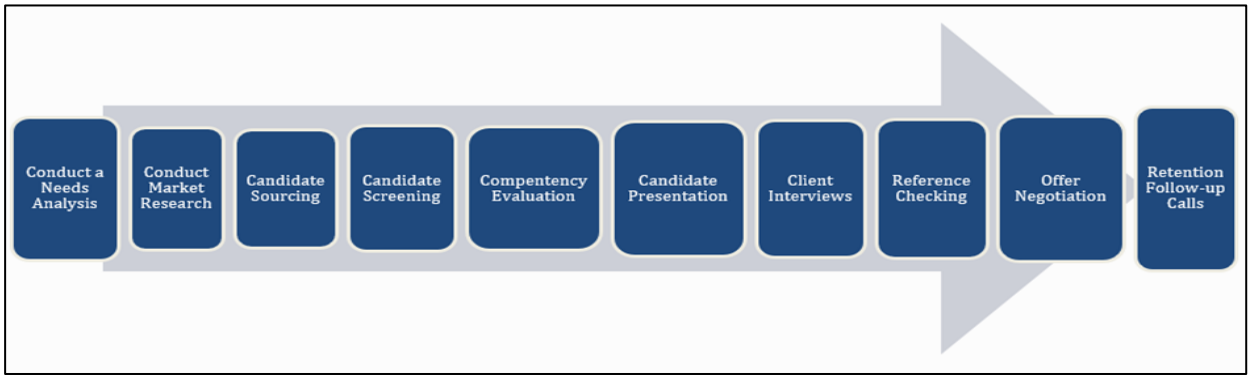
The defining phase aims to understand and determine the right project for the client's business needs and strategies. Studies show that brainstorming, tree diagrams, process flowcharts, and cause-and-effect

diagrams (fishbones) are Six Sigma methods that can help understand these processes (Almasarweh & Rawashde, 2016). The measurement phase, includes the current process baseline, data collection, measurement validation system, and determining the process capability concerning the objective. The identification and data validation is the most important activity in this process. The analysis phase is to understand the key input variables of the process that affect the project's goals and identify problems in the manufacturing process that cause defects. It is needed to ensure it generates the potential causes of why the problem occurred or not performing to complete the task. Improve phase aims to conduct the experiment in which all the information is gathered, and the list of potential solutions was developed to improve the flow of the projects that allow removing the problems' root causes. Finally, the control phase ensures that the action item generated in the Improve phase is well implemented and maintained adequately. To maintain long-term changes, all staff should be aware of how the enhanced process will result in operational and financial gains (Foster, 2007; Rasi, et al., 2021).

**Introduction to Recruitment:** Employees aim to acquire a competitive edge in Supply Chain Logistics Management via dedication and competent employees, which is a typical new approach to management (Munir et al., 2021; Vatumalae et al., 2022; Storey, 1992). Employees are emphasized as a vital resource for the organization in this new strategy. Supply Chain Logistics Management, which comprises a strategy plan for managing and motivating personnel and is regarded as a practice that helps an organization's performance (Ali et al., 2020; Syakirah et al., 2020; McKenna et al., Beech, 1995), is one of the primary contributors. Supply Chain Logistics management is a commercial and academic activity theory that seeks to generate a competitive edge in the market via the development of strategic plans for workforce management in an organization (Schuler & MacMillan, 1984). The next phase is to recruit applicants when the post has been established and the attributes of particular ideal candidates have been discovered (Robertson and Smith, 2001). Costello (2006) defines recruitment as "the processes used to obtain a talent ready to serve an organization at the right time and place so that both the people and the organization benefit." In other terms, recruitment is the process of supplying a company.

The process of recruiting qualified individuals for a position is known as recruitment. Jovanovic (2004) describes the selection method. Work planning and forecasting may help with successful recruiting. Finding the necessary technical skills and matching your chemistry to the company culture should be the first line of defense in building a complete team that brings out the best in each member (Noor Asleena et al, 2020). According to Barber, recruiting refers to an organization's processes, actions, and procedures for finding competent staff to assist it accomplish its objectives. Newell and Shackleton (2000) define recruitment as "the process of attracting candidates to contribute their skills, qualities, and competencies required to fulfill the job requirements for the organization." Figure 1 illustrated the definition of recruiting centers on an organization's attempts to find, attract, and influence the hiring choices of competent applicants.

**Figure 2: Supply Chain People Recruitment Process**

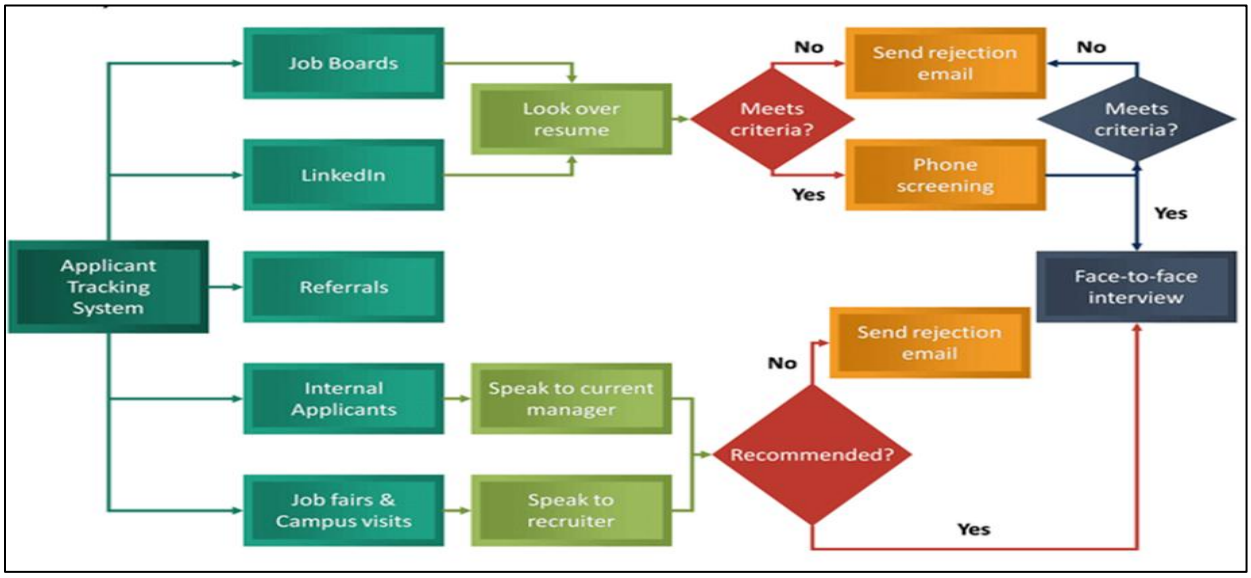



## 3. Research Methodology

Over the years, companies have implemented various tools into the Six Sigma technique throughout time to make it more effective and reduce any gaps during its implementation. (Thakore, Dave, Parsana, & Solanki,

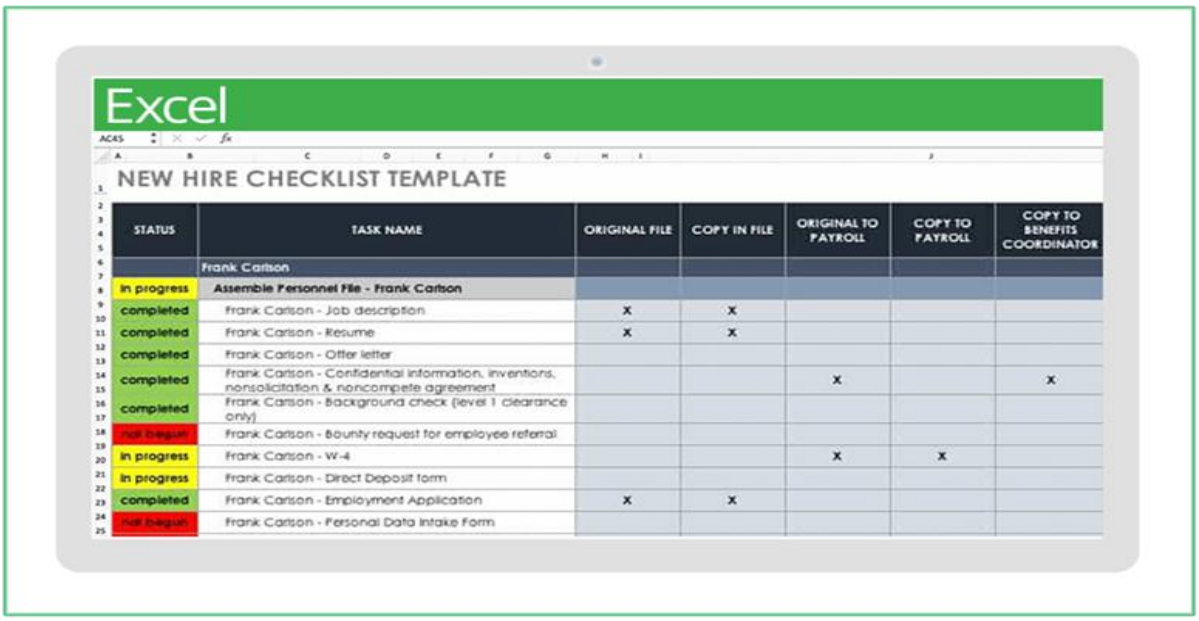
2014). Flow charts check sheets, Pareto diagrams, cause and effect diagrams, histograms, scatter diagrams, and control charts are seven basic methods to help with the quality improvement process. Figure 3 is a flowchart representing a process or procedure that uses symbols to describe the sequence of steps or phases involved. The studies showed that the defects using Pareto analysis could discover major and minor contributors to those defects. Then use the cause-and-effect diagram to identify the root cause of each error. This causal diagram (Fishbone diagram) is very useful for displaying process anomalies in the following formats: Excessive fluctuations in the process. The histogram is a quick and useful visualization tool that displays frequency distribution and historical data to identify process variability.

**Figure 3: Supply Chain Recruitment Process**




Check sheets as in Figure 4 are specific forms that can systematically help with a user's data in a document business. Data is collected and stored on a tally sheet to record the frequency of specific events during the data collection period. Error position check tables, tally check sheets and defect cause check sheets are three of the most common forms of testing leaves (Hensley & Dobie, 2005).

**Figure 4: Check Sheet for Supply Chain People Recruitment**



Excel

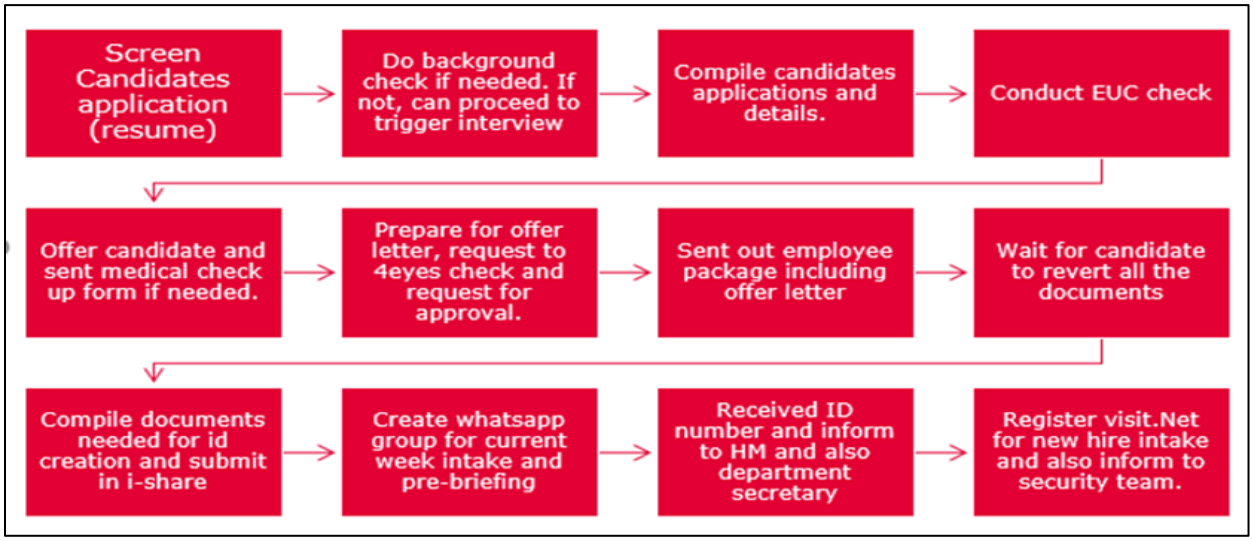
NEW HIRE CHECKLIST TEMPLATE

| STATUS | TASK NAME | ORIGINAL FILE | COPY IN FILE | ORIGINAL TO PAYROLL | COPY TO PAYROLL | COPY TO BENEFITS COORDINATOR |
|---|---|---|---|---|---|---|
| | Frank Carlson | | | | | |
| In progress | Assemble Personnel File - Frank Carlson | | | | | |
| completed | Frank Carlson - Job description | x | x | | | |
| completed | Frank Carlson - Resume | x | x | | | |
| completed | Frank Carlson - Offer letter | | | | | |
| completed | Frank Carlson - Confidential information, inventions, nonsolicitation & noncompete agreement | | | x | | x |
| completed | Frank Carlson - Background check (level 1 clearance only) | | | | | |
| not begun | Frank Carlson - Bounty request for employee referral | | | | | |
| In progress | Frank Carlson - W-4 | | | x | x | |
| In progress | Frank Carlson - Direct Deposit form | | | | | |
| completed | Frank Carlson - Employment Application | x | x | | | |
| not begun | Frank Carlson - Personal Data Intake Form | | | | | |

Now we want to understand how businesses can achieve better results with Six Sigma. Companies adopt the DMAIC. DMAIC (an acronym for Define, Measure, Analyze, Improve and Control) refers to a data-driven improvement cycle used for improving, optimizing, and stabilizing business processes and designs in the following way:

**Define:** Using suitable Six Sigma tools, failure to satisfy the SLA for recruiting was identified as a problem or issue. As illustrated in the figure below, the topic was made into a charter document that addressed the recruitment process from beginning to end. The goal of recruitment and selection is to develop methods that will help the HR department pick the best applicants for the position (Jaffal et al., 2017). In certain circumstances, the needed skills, talents, and understanding of the organization may be recruited. Smith et al. (1989) argue that the more efficient the recruiting stage is, the less essential the selection procedure becomes. When a firm chooses to hire to fill a vacancy, the first step is to do a job analysis. Following the completion of the job analysis, the organization will have a clear picture of the specific job requirement and will be able to begin the recruitment process to attract qualified candidates for the position. In certain circumstances, the needed skills of the organization may be gained via recruiting. A recruiting method is separated into three parts. The first stage is to do a job analysis to acquire all essential information about the job needs and set hiring criteria. The second portion deals with hiring. The selection technique, the third aspect, is used to measure the degree of success and compatibility of employees inside the organization by analyzing the candidate's talents and traits. From selection to the recruitment and selection process to ensure that the relevant abilities are recognized to guarantee performance (Rana & Kaushik, 2018). Figure 5 depicts the team-based recruiting procedure.

**Figure 5: Recruitment Process in a Team**




**Measure**: The employee develops a thorough map of the present process and completes CTQ Trees (Critical-to-Quality trees). CTQ trees are the primary quantifiable qualities of a product or process that must meet specified performance requirements or restrictions to satisfy the customer. CTQ Trees are used to divide requirements into more measurable components. It now records and assesses its present process performance at the enhanced goal sigma level.

**Analyze Phase 1**: Using appropriate six sigma techniques, the employee has now determined the factors affecting recruitment success. They are listed as:

- Full understanding of the recruitment needs of the department.
- Determine the right approach for the recruitment campaign
- Selecting the message
- Selecting the right media for recruitment.
- Shortlisting candidates.

- Make an offer with terms and conditions
- Referral and Referral Process.

**Analysis Phase 2**: The employee now identifies key factors for recruiting success. To do this, it surveys goods (selected people or those who have received an offer) who have not been on a recent trip.

**Improve**: The worker is now able to identify various courses of action by using strategies such as producing reflection and benchmarking. Recorded, piloted, verified, and finally put into use, the improved process map (new replacement method) is now complete. Employees will be able to realize profits with the next recruiting drive that is being conducted. Other advertising agencies are carrying on with business as usual. It does not have a process for learning from either its own errors or the mistakes of others (and it does not have an approach to conclusions that are driven by facts, and it does not have management support for acceptance of recommendations made upon arrival).

**Control**: During the process of making improvements, the worker should put in place appropriate control measures to achieve results that can be kept up for a considerable amount of time. It establishes a control plan and an assessment checklist to guarantee that the intended behavior change takes place, and it checks for errors in many locations along the process. Finally, once it has a better procedure in place, as well as the removal of vulnerabilities, delays, mistakes, and communication (in the appropriate locations), it can begin to recruit the greatest personnel more effectively. In a nutshell, the guiding principle behind the Six Sigma methodology is to use an approach that is methodical, scientific, and data-driven to produce the best possible process (since the best doesn't remain forever, it is necessary to engage in continuous improvement and to undertake more improvement projects periodically).

## 4. Conclusion

While Supply Chain Logistics is not a central element of most silo-operating businesses, HR processes have a substantial effect relating to the people management in an organization (Mkumbo et al., 2019; Nurul Syakirah et al., 2020; Rajagopal et al., 2016; Selvaraju et al., 2019; Siti Noor Roseamirah et al., 2020; Sundram et al., 2018a; Sundram et al., 2018b). It is the responsibility of the responsible staff to keep workers on board while also meeting the financial requirements of the company. Payroll, time and attendance management, leave policy, stock options, and a number of other aspects of compensation and benefits are all supported by the Supply Chain Logistics department. To improve these HR procedures, you may want to think about implementing some Six Sigma initiatives, such as shortening the amount of time needed to make cheque deposits or speeding up a study of whether or not an employee is eligible for a performance review. There is a possibility that Six Sigma initiatives, such as the enhancement of pay systems for remote workers, may be required. Errors in databases containing personnel information may be reduced by finding them. The HR staff has the responsibility of addressing problems such as employee absenteeism, the settlement of conflicts, health and safety concerns, union negotiations, interpersonal communication, and discrimination and harassment complaints.

Through compliance monitoring and auditing as well as systems that improve communication between employees and managers, it is possible to implement Six Sigma projects to combat discrimination and harassment in the workplace. Projects based on the Six Sigma methodology may, among other things, focus on career progression and succession planning, leadership, change management, workplace planning and organization, and performance improvement. The basic tasks of the recruiting team include things like staffing, doing background checks, choosing personnel, and training and retaining them. They are accountable for coming up with training and development programs, as well as scheduling such programs, for both new workers and those who are already employed. In addition to this, they are responsible for overseeing staff contracts, both permanent and temporary, as well as personnel relocation and outsourcing. In addition to this, they are required to conduct exit interviews and address concerns connected to the termination of employment. Employees might be given projects consisting of self-study and assessment modules to complete. Prompt answers to applicants, the removal of needless security checks, and Six Sigma projects that can be handled by the Supply Chain Logistics department are some examples of projects that boost the success rate of job offers.

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# A Verification of Okun's Law: The Case of Southeast Asian Countries

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**Abstract:** The study investigates the relationship between unemployment and economic growth in selected Southeast Asian countries using annual time series from 2000 to 2020. Panel OLS, fixed effect, and Random effect were performed with an error correction method to ascertain the relationship between explanatory variables and response. The error correction term indicated a long-run relationship between unemployment and economic growth. The study used two models to evaluate the relationship between unemployment and economic growth. Model one explains how economic growth affects unemployment, while model two is devoted to examining the effect of unemployment on economic growth. The test results for model one indicated that the Random effect is the best-fitted model and concluded that economic growth has no significant influence on unemployment. However, Foreign Direct Investments makes a negative influence on unemployment. Further, model two investigates the effect of unemployment on economic growth, where Pooled OLS was selected. According to the test statistics, it can be concluded that unemployment harms economic growth, while Foreign Direct Investments and Inflation have a positive influence on economic growth. However, trade openness makes a negative effect on economic growth. Therefore, it can be concluded that the validity of Okun's law in Southeast Asian countries is limited.

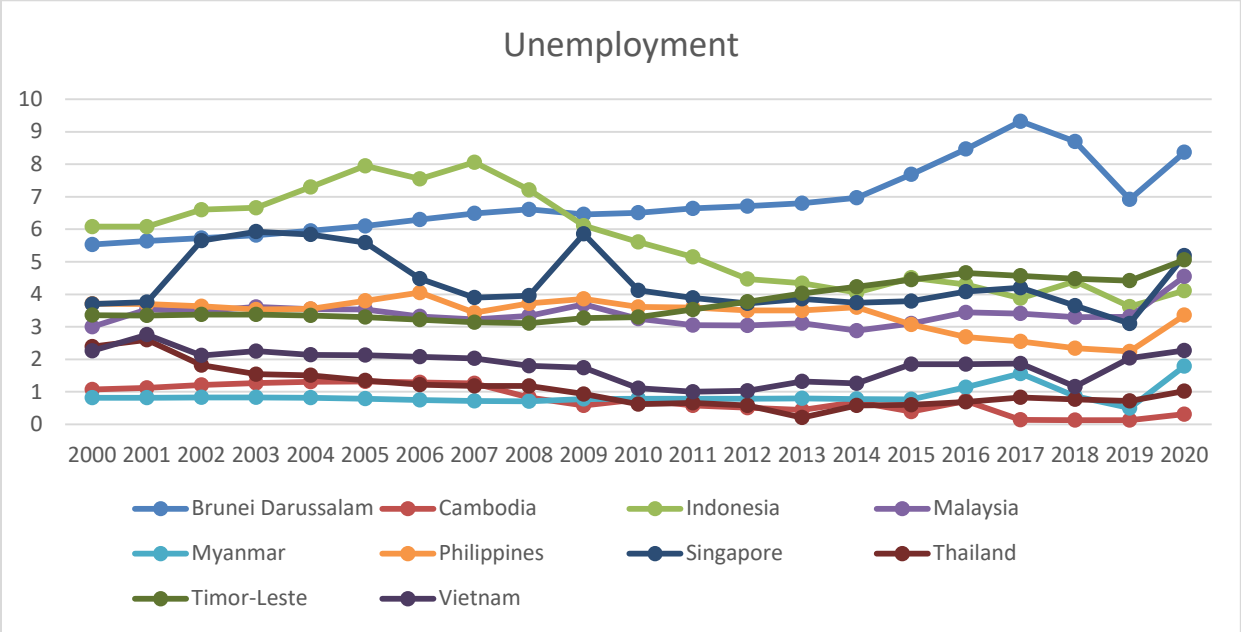
**Keywords**: *Unemployment, Economic Growth, Okun's law.*

## 1. Introduction and Background

Unemployment is a multi-faceted economic problem that indicates an imbalance in economic activity. Furthermore, because it influenced society's social structure, it is classified as a social phenomenon. Many scholars claim that economic growth leads to higher employment and lower unemployment (Nebot et al., 2019; Glefer, 2020; Kim et al., 2020; Hjazeen et al., 2021). The economic and social aspects of unemployment contribute to its complexities, needing an in-depth analysis to understand the causes and ramifications and propose effective solutions. Underemployment occurs when people's incomes are insufficient to cover their basic needs (Warsame et al., 2022). There is also "disguised unemployment," in which workers accept positions below their education and experience level (Earle & Sakova, 2000). Hence, unemployment is a universal problem with economic and social consequences. Because the outcome of the changes happens in the labor market is directly linked to domestic production that eventually reveals the economic status of a country because unemployment leads to consuming goods and services without contributing to the production that makes a negative influence on the economic growth of a country (Huang et al., 2020).

Melvin Okun, in 1962, looked at the statistical relationship between GDP and unemployment. He presents Okun's law by stating that a country's GDP must expand at a 3% rate for one year to produce a 1% drop in the unemployment rate. In contrast, a 1% rise in the unemployment rate reduces the country's domestic production by 2%. However, empirical literature shreds evidence that Okun's law is not valid for all countries, and some scholars have found an insignificant relationship between unemployment and economic growth (Kenton, 2022; Dankumo et al., 2019; Pasara & Garidzirai, 2020). Further, some schools of thought highlight that structural unemployment is one of the prominent factors determining the significance of unemployment towards economic growth (Adham, 2021). Figure 1 and 2 shows the economic growth and the unemployment rate in Southeast Asian countries.

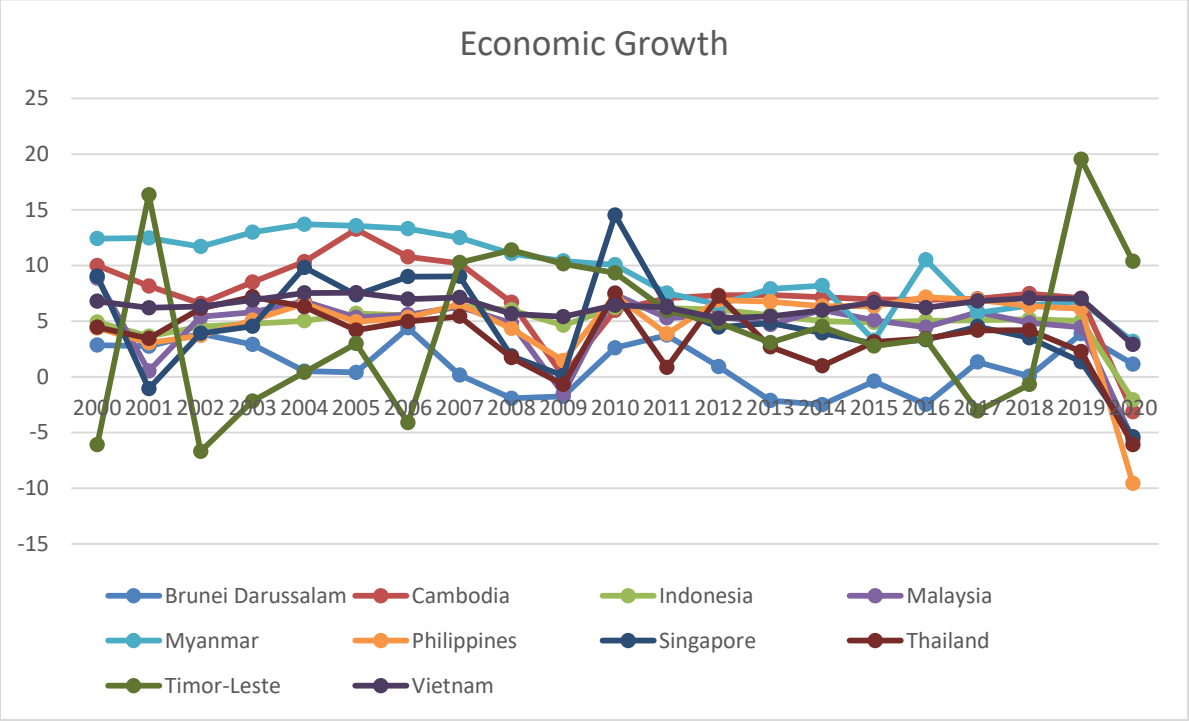
**Figure 5: Unemployment Diagram of the Southeast Asian Countries**




Source: World Bank

Figure 1 shows the percentage changes in South Asian countries over the 21 years from 2000 to 2020. In 2000, the highest unemployment rate was reported in Indonesia, but it reduced the unemployment rate to 4 percent by 2020. By 2020, the highest unemployment rate was reported by Brunei, and the rate was just over 8%, while Cambodia reported the lowest rate. Further, other countries have managed to maintain under 6%.

**Figure 6: Economic Growth Diagram of the Southeast Asian Countries**




Source: World Bank

Figure 2 shows the economic growth of Southeast Asian countries. This figure indicates that, in 2000, the lowest economic growth was reported by Timor-Leste, and it was below negative 5%. However, in 2020, the highest economic growth was reported by Timor. In 2020, the lowest economic rate was reported by the Philippines, and the report rate reached negative 10%. Further, in 2020, most countries reported negative economic growth except Brunei, Vietnam, and Timor-Leste.

According to International Monetary Fund (IMF), October 2022 highlights Southeast Asia becoming the world's dominant economy. J.P. Morgon June 13th, 2022 report claims that South East Asia will be the next hub for multinational companies worldwide. As a result, this research aims to investigate the presence of Okun's rule in Southeast Asian economies by studying the correlation coefficient between unemployment and economic growth, which affects the global economy both directly and indirectly.

Furthermore, the results contribute to the body of knowledge and shed light on the direction of future studies. Apart from the empirical contribution, this study assists the government and policymakers shape and sharpen their policy decision toward sustainable economic policy decisions. The remaining sections of the paper are organized as follows. Section 2 provides a brief overview of Okun's Law hypothesis and past research on the relationship between unemployment and national income. Section 3 describes the data collection and analysis techniques. Section 4 contains the findings and discussion. Section 5 brings the research to a close.

## 2. Literature Review

Okun's Law, introduced by Arthur Okun in 1962, emphasized the negative relationship between unemployment and economic growth. In accordance with the Okun rule, a country's unemployment rate and GDP growth rate should have a significant adverse correlation when unemployment fluctuates over time. Okun asserts that a 1% increase in unemployment results in a 2% decrease in GDP. Rather, a 1% reduction in unemployment results in a 3% boost in GDP.

Ayesha et al. (2018) stated that Economic status, political stability, and globalization significantly affect a country's unemployment rate. Meanwhile, Dankumo et al. (2019) stated that there is a long-run correlation between political instability, the corruption rate of the country, economic growth, and unemployment. However, there is no significant influence by other factors except political instability, which negatively impacts economic growth. Furthermore, Imran et al. (2015) claimed that unemployment significantly affects economic growth. Confirming the same, Qamar et al. (2016) stated that higher unemployment rates significantly negatively impact GDP per capita. Blazquez and Cantarero (2018) confirmed the negative relationship between unemployment and economic growth in European countries. According to Louail and Benarous (2021), Algeria reveres Okun's law. Dritsakis and Stamation (2018) also laid out a long-term unidirectional causal association between economic growth and unemployment in EU member countries. Alrakhan et al. (2022), on the flip side, confirm the bidirectional negative association between economic growth and unemployment in Indonesia. Hjazeen et al. (2021) discovered a long-run link between unemployment and economic growth in Jordan.

Bayrak and Tatli (2018) said inflation, economic growth, and savings have a negative impact on youth unemployment negatively affect youth unemployment. Butkus et al. (2022) stated that unemployment among the young generation deviates across the economic sector they are dealing with. Furthermore, they stated that changes in the economic sector in which they work impacted unemployment. For example, changes in the construction industry have a greater impact on male employees than on female employees. Butkus et al. (2020) stated that the unemployment rate among males and youth significantly standout with changes in GDP.

Farhat et al. (2021) found that Asian countries follow Okun's Law, while Elhorst and Emili (2022) confirmed that Dutch provinces followed the same. Blinova et al. (2020) stated that a change in production volume makes a dynamic variation in the unemployment rate in Russia. According to Warsame et al. (2022), there is long-run and short-run cointegration between economic growth and inflation and the unemployment rate in Somalia. Further, they stated that inflation gets inconsequential to unemployment in the long run but has a

negative association in the short run. Ahiadorme (2020) stated that there is a short-run relationship between unemployment and economic growth in Sub-Saharan countries. Danova and Vozarova (2020) make the same assumption, claiming that there is a short-run direct causal relationship between changes in unemployment and economic development. Farhat et al. (2021) confirmed Okun's law's applicability to Southeast Asian countries. According to Karadzic et al. (2021), Okun's legislation applies to Montenegro.

Soylu et al. (2018), for example, found a correlation between unemployment and economic growth in Eastern European countries. While Conteh (2021) asserted that there is no substantial association between unemployment and economic growth in Liberia. Pasara and Garidzirai (2020) found the opposite. It claims that the unemployment rate does not affect economic growth in the near run. It states that the unemployment rate has no significant influence on economic growth in the short run. However, in the long run, unemployment adversely affects economic growth.

## 3. Research Methodology

**Data and sample acquisition:** The analysis includes ten (10) Southeast Asian nations as a sample, including Malaysia, Cambodia, Brunei, Indonesia, Myanmar, the Philippines, Singapore, Timor-Leste, Vietnam, and Thailand, with the sample period encompassing twenty-one years from 2000 to 2020.

Two models were employed in the study to assess the relationship between unemployment and economic growth. At the same time, as generic models, the control variables were foreign direct investments, inflation, and trade openness, which are depicted below.

UNP= ƒ (GDP, INF, FDI, OPN)
GDP= ƒ (UNP, INF, FDI, OPN)

Where; UNP indicates unemployment and GDP represent Economic growth. INF indicates Inflation, while FDI and OPN indicate Foreign Direct Investment and Trade Openness, respectively. Its stochastic form specifies the model:

Model1; $UNP_{it} = \beta_1 - \beta_2 GDP_{it} + \beta_3 INF_{it} - \beta_4 FDI_{it} - \beta_5 OPN_{it} + \varepsilon_{it}$ (3.3)

Model2; $GDP_{it} = \beta_1 - \beta_2 UNP_{it} + \beta_3 INF_{it} + \beta_4 FDI_{it} + \beta_5 OPN_{it} + \varepsilon_{it}$ (3.4)

**Data analysis**

Data were analyzed with long panel data analysis techniques. According to Okun, the impact of economic growth on unemployment is assessed by the percentage change in the real growth rate over a given time divided by the percentage change in the unemployment rate over the same period. This assumption can be expressed mathematically as follows.

$\Delta U_t = \alpha + \beta \Delta \log Y_t + \Delta \epsilon_t$

Where the symbol Δ indicates the absolute change from the previous period, α denotes the constant, β denotes the Okun coefficient, Ut indicates the unemployment rate at time t, $Y_t$ is the economic growth rate (log since we're talking about percentage changes), and $\varepsilon_t$ indicates the error term. If economic growth is zero, the intercept equals the change in unemployment. A high intercept value indicates that eliminating unemployment will be more difficult, or that more growth would be required to avert further unemployment. If many countries are included, the formula must be adjusted.

$\Delta U_{it} = \alpha \sum_{i=1}^{n} \beta_{it} C_i + \sum_{i=2}^{n} \beta_{it} C_i \Delta Y_{it} + \Delta \varepsilon_{it}$

In equation 3.6, $\Delta U_{i,t}$ is the change in the country's i unemployment at year t, $C_i$ is the country's i dummy variable (other than for country 1 to avoid perfect collinearity) and $\Delta Y_{it}$ is output growth for country i in period t. Because rapid output growth is associated with a declining unemployment rate, whereas sluggish or negative growth is associated with a rising unemployment rate, this coefficient is typically negative.

***Panel unit root testing***

Many panel unit root tests are intended to test the null hypothesis of a unit root for each series in the panel. On the other hand, the formulation of the alternative hypothesis is a contentious issue that is heavily dependent on the assumptions made about the nature of the panel's homogeneity/heterogeneity (Pesaran, 2011). The unit root null hypothesis is therefore expressed as follows:

$H_0$; $\beta_i = 0$ for all i.
While the alternative hypothesis can be written as

$H_1$; $\beta_i < 0$

One disadvantage of tests based on such alternative hypotheses is that they typically have power even if not all units are stationary; thus, a rejection is not conclusive evidence that all series are indeed stationary. In the case of large N and T, however, panel unit root tests will lack power if the alternative given above is used. A better option for large N and T panels is provided by;

$H_1$; $\beta_i < 0$, i = 1, 2, ..... $N_1$, $\beta_i = 0$, i = $N_1$ + 1, $N_1$ + 2, .....N,

Because there are many countries (N = 10) and a long period (T = 31 years) in this study, stationarity is tested using the second alternative hypothesis.

***Pooled OLS model***

Generally, Pooled OLS estimation presents the linear relationship between variables in the pooled data set. Here it assumes that the model presents the linear function and has no endogeneity problem. Moreover, it assumes that data shows homogeneity and no stochastic characteristics in independent variables. Hence, the study followed the pooled OLS to measure the nexus of unemployment and economic growth.

***Fixed effect model***

The least-square dummy variable is a way of taking into account the uniqueness of each cross-section, in this case, the countries. Allowing the intercept to vary for each sector while presuming that the slope coefficients remain constant across sectors or periods achieves this. Fixed effects models have been applied to social and economic problems. The study uses the fixed effect model to estimate the impact of unemployment on economic growth when all intercept coefficient varies among the countries. The equation is as follows.

$$UNP_{i,t} = \theta_1 + \theta_2 D_{2i} + \theta_3 D_{3i} + \theta_4 D_{4i} + \theta_5 D_{5i} + \theta_6 D_{6i} + \theta_7 D_{7i} + \theta_8 D_{8i} + \theta_9 D_{9i} + \theta_{10} D_{10i} + +\beta_1 GDP_{i,t} + \beta_2 INF_{i,t} + \beta_3 FDI_{i,t} + \varepsilon_{i,t}$$

Where; 10 dummy variables were introduced since the number of cross sections (countries) is ten. while $\beta_1$..... $\beta_3$ are the coefficients of the independent variables. finally, $\varepsilon_{i,t}$ is the error term.

***Random Effect model***

Here it assumes that there is an unobserved effect in the model but does not correlate with independent variables. It tests the group and time influence for the error variance. Therefore, the study followed the Random effect model to estimate the relationship between explanatory and response variables.

***Breusch – Pagan Lagrange Multiplier Test***

This test was performed to examine whether the Pooled Ordinary Least Square method is better than the Panel.

***Hausman Test***

This test is utilized to distinguish the random effect LS from fixed effect LS models. The alternative hypothesis is to select the fixed effects model. The Hausman test is carried out to examine whether there is a relationship between the unique errors and the model's regressors.

## 4. Findings and Discussion

The data set spans over twenty-one years, from 2000 to 2020, for 10 Southeast Asian countries, and there were 211 observations. Missing values were adjusted using the interpolation technique. Table 1 summarizes the data set's general attributes, which shows the common description of the variables used in this study.

**Table 3: Summary Statistics**

| | UNP | GDP growth | FDI | INF | OPN |
|---|---|---|---|---|---|
| Mean | 3.1087 | 0.0486 | 5.4326 | 4.3820 | 24.3985 |
| Maximum | 9.3200 | 0.1356 | 29.6904 | 57.0745 | 27.2241 |
| Minimum | 0.1400 | -0.1053 | -2.7574 | -2.3150 | 16.6213 |
| Std. Dev | 2.2100 | 0.0377 | 6.1750 | 6.7495 | 2.3548 |

Source: Author's EViews computation

Table 1 presents the attributes of the data set and shows the Central tendency of dispersion of variables.

**Panel Unit Root Test**

Using the panel unit root test, the stationarity of the four variables is investigated with four criteria named; PP-Fisher Chi-square, ADF-Fisher Chi-square, Im, Pesaran and Shin W-stat, Levin, Lin & Chu.

**Table 2: Panel Unit root test**

| OPN | | INF | | FDI | | GDP | | UNP | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I1 | I0 | I1 | I0 | I1 | I0 | I1 | I0 | I1 | I0 | tests |
| -5.2106 (0.0000) | -1.5768 (0.0574) | -11.4249 (0.0000) | -4.1652 (0.0000) | -12.9599 (0.0000) | -3.8821 (0.0001) | -9.3217 (0.0000) | -0.6921 (0.2444) | -5.5845 (0.0000) | -1.0395 (0.1493) | Levin, Lin &chu |
| -7.1042 (0.0000) | -2.1731 (0.0149) | -12.6824 (0.0000) | -4.3783 (0.0000) | -12.2461 (0.0000) | -4.5069 (0.0000) | -10.2815 (0.0000) | -2.7234 (0.0032) | -8.0482 (0.0000) | -0.4629 (0.3217) | Im, Pesaran and Shin W-stat |
| 80.5065 (0.0000) | 36.5717 (0.0060) | 156.961 (0.0000) | 60.4698 (0.0000) | 150.747 (0.0000) | 60.7507 (0.0000) | 125.271 (0.0000) | 45.7779 (0.0009) | 136.570 (0.0000) | 28.4093 (0.1000) | ADF-Fisher Chi square |
| 94.2579 (0.0000) | 15.394 (0.6347) | 854.642 (0.0000) | 79.3155 (0.0000) | 369.345 (0.0000) | 73.0397 (0.0000) | 177.002 (0.0000) | 47.2073 (0.0005) | 92.1003 (0.0000) | 22.4026 (0.3191) | PP-Fisher Chi-square |

Source: Author's EViews computation

According to Table 2, The Levin, Lin & Chu unit root test shows that UNP, GDP, FDI, and OPN are stationary at first difference while INF is stationary at its level. The Im, Pesaran, and Shin, W-stat show that only UNP is stationary at first difference while the rest of the variables are stationary at their level series. The ADF-Fisher Chi-square shows that UNP and FDI are stationary at first different while the rest are stationary at level. Finally, the PP-Fisher Chi-square shows that UNP, FDI, and OPN are only stationary at first difference while the other variables are stationary at level.

**Model 1: Examine the effect of Economic growth on Unemployment**

***Multi Collinearity test***

Multicollinearity was measured with the Variance Inflation Factor (VIF) and tolerance ratio (1/VIF). Based on the results shown in Table 3, it is confirmed that there is no multicollinear issue in the data set.

**Table 3: Multi-collinearity Test**

| Variable | VIF | 1/VIF |
|---|---|---|
| GDP | 1.25 | 0.799 |
| INF | 1.33 | 0.750 |
| FDI | 1.09 | 0.919 |
| OPN | 1.38 | 0.730 |
| Mean VIF | 1.26 | |

Source; Author's STATA computation

***Pooled Ordinary Least Squares***

The study used the Pooled OLS method to estimate the relationship between dependent and independent variables; the test statistics are shown in Table 4.

**Table 4: Pooled least squares**

| Variables | coefficients | St. Error | t-stat | probability |
|---|---|---|---|---|
| C | 2.6362 | 1.9203 | 1.37 | 0.171 |
| GDP | -17.0715 | 4.4801 | -3.81 | 0.000 |
| FDI | -0.0197 | 0.0254 | -0.77 | 0.439 |
| INF | -0.0328 | 0.0258 | -1.27 | 0.204 |
| OPN | 0.0636 | 0.0753 | 0.85 | 0.399 |

Source; Author's EViews computation

Table 4 shows the test results for pooled least square, and the coefficients of GDP indicate that gross domestic production adversely affects unemployment. However, there is no significant effect of other variables on unemployment. Then the study followed the fixed effect model to examine the relationship, and the results are shown in Table 4.

***Fixed effect model***

Fixed effect estimation was performed to evaluate the nexus between unemployment and explanatory variables.

**Table 5: Fixed effect**

| Variables | Coefficients | Std. Error | t-Statistics | Probability |
|---|---|---|---|---|
| C | 5.1265 | 1.3306 | 3.85 | 0.000 |
| GDP | -0.2673 | 1.8182 | -0.15 | 0.883 |
| FDI | -0.0573 | 0.0200 | -2.86 | 0.005 |
| INF | -0.0011 | 0.0102 | -0.12 | 0.907 |
| OPN | -0.0691 | 0.0534 | -1.30 | 0.197 |
| Prob > F test vale | 0.000 | | | |

Source: Author's EViews computation

Table 5 indicates the result of the fixed effect analysis. The probability values confirm that only Foreign Direct Investment significantly influences unemployment. To select the best-fitting model, the study followed the Breusch Pagan LM test and the F value of the fixed effect. F value confirms that the fixed effect is more fitting than the pooled effect model. Further, Table 6 indicates the results from the Breusch Pagan LM test.

**Table 6: Breusch Pagan LM test**

| Effects Test | statistics | probability |
|---|---|---|
| Chi-square | 19.17 | 0.0000 |

Source; Author's EViews computation

Table 6 confirms that the fixed effect model is the best method to explain the relationship between variables since the probability value is less than 0.05.

***Random Effect model***

The study moves forward with random effects to select the best-fitting model from fixed and random effects. The Random effect test results are shown in Table 7.

**Table 7: Random effect**

| Variables | Coefficients | Std. Error | z-Statistics | Probability |
|---|---|---|---|---|
| C | 4.9862 | 1.4679 | 3.40 | 0.001 |
| GDP | -0.3940 | 1.8340 | -0.21 | 0.830 |
| FDI | -0.0561 | 0.0200 | -2.81 | 0.005 |
| INF | -0.0016 | 0.0103 | -0.15 | 0.878 |
| OPN | -0.0634 | 0.0533 | -1.19 | 0.235 |

Source: Author's EViews computation

Table 7 illustrates the Random effect model results for the relationship between unemployment and explanatory variables. According to test statistics, only FDI shows a significant relationship with unemployment. Therefore, to select the best model among fixed effect and random effect, the study followed the Hausman test, and the results are shown in Table 8.

**Table 84: Hausman Test**

| Test Summary | Chi-sq stat | probability |
|---|---|---|
| FE and RE | 6.98 | 0.1369 |

Source; Autor's EViews computation

Hausman test values in Table 8 confirm that the random effect is more appropriate than the fixed effect. Hence, the final model to present the relationship between unemployment and explanatory variables is shown below;

$$UNP_{it} = 4.9862 - 0.0561FDI_{it}$$

It found that there is no significant effect of economic growth on the unemployment of Southeast Asian countries. However, foreign direct investment has a negative influence on unemployment. This indicates that when FDI increases in Southeast Asian countries, unemployment gets reduced since it makes more opportunities to start new ventures and projects that generate more and more employment chances for the locals.

**Model 2: Evaluate the effect of unemployment on economic growth**

***Multicollinearity test***

The study followed the multicollinearity test when economic growth is the dependent variable and the outcomes are shown in Table 9. Test results confirm that there is no multicollinear issue in the data set.

**Table 9: Multi-collinearity Test**

| Variable | VIF | 1/VIF |
|---|---|---|
| UNP | 1.08 | 0.925 |
| INF | 1.28 | 0.780 |
| FDI | 1.06 | 0.941 |
| OPN | 1.32 | 0.759 |
| Mean VIF | 1.19 | |

Source; Author's STATA computation

***Pooled Ordinary Least Squares***

To estimate the effect of unemployment on economic growth, the study first occupied the pooled OLS estimation and Table 10 shows the finding from the data analysis.

**Table 10: Pooled least squares**

| Variables | coefficients | St. Error | t-stat | probability |
|---|---|---|---|---|
| C | 0.1414 | 0.0287 | 4.92 | 0.000 |
| UNP | -0.0043 | 0.0011 | -3.81 | 0.000 |
| FDI | 0.0009 | 0.0004 | 2.20 | 0.029 |
| INF | 0.0012 | 0.0004 | 3.03 | 0.003 |
| OPN | -0.0037 | 0.0011 | -3.15 | 0.002 |

Source; Author's EViews computation

According to Table 10, all the independent variables show a significant relationship with economic growth, while unemployment has a negative relationship means that while unemployment decreases, economic growth gets increases. Because there is more labor force involvement in economic activities, thus, results in higher growth. However, FDI and Inflation show a positive relationship, which means that economic growth can be achieved when foreign investment increases. Furthermore, when inflation gets high economic growth increases because high prices motivate more and more investors to attract to the market, and production goes up. However, trade openness negatively impacts growth because allowing foreign traders to enter the local market demotivates the local producers, and the consumers are more attracted to buy high-quality products from foreign suppliers at a lower price. Then the domestic production gets decreases.

***Fixed effect model***

However, to assess the fixed effect of explanatory variables on economic growth, the study followed the fixed effect model and the results are illustrated in Table 13

**Table 11: Fixed effect**

| Variables | Coefficients | Std. Error | t-Statistics | Probability |
|---|---|---|---|---|
| C | 0.3052 | 0.0526 | 5.80 | 0.000 |
| UNP | -0.0004 | 0.0008 | -0.15 | 0.883 |
| FDI | 0.0015 | 0.0008 | 1.90 | 0.060 |
| INF | 0.1409 | 0.0383 | 0.55 | 0.583 |
| OPN | 2.9017 | 1.0299 | -5.25 | 0.000 |

Source: Author's EViews computation

Table 11 shows no significant effect of unemployment on economic growth. In contrast, FDI and trade openness significantly positively affect domestic production. Therefore, to evaluate the best-fitting model between Pooled OLS and fixed effect, the study followed the Breusch Pagan LM test, and the test results are shown in Table 12.

**Table 12: Breusch Pagan LM test**

| Effects Test | statistics | probability |
|---|---|---|
| Chi-square | 0.01 | 0.9192 |

Source: Author's EViews computation

Table 12 confirms that Pooled OLS is much more appropriate than the fixed effect. However, the study also utilized the random effect to examine whether the Random effect is better than the fixed effect. The results are shown in Table 13.

***Random Effect model***

The model assumed no correlation between explanatory variables and unobserved effects.

**Table 13: Random effect**

| Variables | Coefficients | Standard Error | z-Stats | P-value |
|---|---|---|---|---|
| C | 0.1913 | 0.0355 | 5.38 | 0.000 |
| UNP | -0.0035 | 0.0015 | -2.37 | 0.018 |
| FDI | 0.0010 | 0.0005 | 1.93 | 0.054 |

| | | | | |
|---|---|---|---|---|
| INF | 0.0008 | 0.0004 | 1.95 | 0.052 |
| OPN | -0.0057 | 0.0014 | -3.98 | 0.000 |

Source: Author's EViews computation

Table 13 illustrates the results for random effect and found that all the variables significantly influence economic growth. Hence, to estimate whether the random effect is more appropriate than the fixed effect, the study followed the Hausman test, and the test statistics are presented in Table 14.

***Hausman Test***

This test was carried out to determine the optimal model among fixed and random effects.

**Table 14: Hausman Test**

| Test Summary | Chi-sq stat | probability |
|---|---|---|
| Cross-section Random | 36.56 | 0.0000 |

Source: Autor's EViews computation

According to Table 14, the Hausman test confirms that the fixed effect model is much more appropriate to be presented than the random effect model since the probability value is less than 0.05.

Furthermore, it was discovered that Pooled OLS outperforms the fixed effect model. Hence, it can be concluded that Pooled OLS is the best-fitting model to interpret the relationship of UNP, FDI, INF and OPN with economic growth. Therefore, the final model can be resented as follows;

$$GDP_{it} = 0.1414 - 0.0043UNP_{it} + 0.0009INF_{it} + 0.0012FDI_{it} - 0.0037OPN_{it}$$

The final equation presents the relationship between GDP and UNP with control variables. According to the equation statistics, unemployment negatively influences economic growth and shows that when unemployment rises by 1 percent, economic growth will decrease by 0.004 percent. Further, inflation positively influences the EG and shows that a one percent increase in inflation boosts the economy by 0.0009 percent. Same as FDI, the one percent increment in FDI increases the EG by 0.0012 percent. However, trade openness negatively influences EG and illustrates that a one percent increase in trade openness makes the economy decrease by 0.0037 percent.

**Discussion of Results**

This study discusses the nexus of unemployment and economic growth. Moreover, this study also compares how Okun's law is valid in Southeast Asian countries. Therefore, the main objective of this study is to ascertain how unemployment affects economic growth and vice versa. The sample consists of ten (10) Southeast Asia countries and the sample period was 21 years spanning from 2000 to 2020, which was utilized to confirm the applicability of Okun's law in these nations. Following the basic introduction, the study focused on the nexus between economic growth and unemployment. Additionally, this study also explores how unemployment affects economic growth with fixed effect, random effect, and pooled OLS to determine the best-fitting model. In addition, the study's significance is how the findings of this study make the pathway to future research and helps to understand the nexus between economic growth and unemployment.

Two models were utilized, and model 1 described the results for pooled OLS, fixed effect, and random effect models. After undergoing several statist techniques to evaluate the best-fitting model, the Random effect model was selected. According to the Random effect model, foreign direct investment is the only significant variable that influences unemployment. There is a negative influence of FDI on unemployment. However, there is no significant relationship between economic growth and unemployment. This indicates that unemployment does not be subject to the economic growth of Southeast Asian countries.

The second model is utilized to evaluate the impact of unemployment on economic growth with other control variables. According to the test results, Pooled OLS was selected as the best-fitting model. As per Pooled OLS results, all the independent variables (UNP, FDI, INF, and OPN) significantly influence economic growth. Unemployment has a detrimental impact on economic growth in this region. This indicates that, when unemployment increases, economic growth decreases. However, inflation and FDI makes a positive influence

on economic growth, while trade openness makes a negative effect on the economic growth of Southeast Asian countries.

Therefore, there is a limitation of Okun's law validity in Southeast Asia in terms of the relationship and the magnitude of the effect of one variable over the other

## 5. Conclusion and Recommendations

**Recommendations:** Globally, countries are ranked according to their economic growth, which shows how well they manage their natural and human resources. Therefore, Southeast Asian countries should develop more investment policies to improve the effectiveness and create opportunities for their workforce which leads to improving the economic growth of those nations.

Besides, human capital and Foreign Direct Investments also play a vital role in economic growth. cs. Therefore, governments and policymakers should create a favorable atmosphere that encourages foreign investors to new ventures that add more benefits to the hosting countries because it improves the country's productivity with more employment opportunities. Furthermore, FDI promotes exports and boost the economy while generating benefit via technical innovation (Stanatiou, 2018).

In contrast, global economic recession and depression make high inflation which adversely affects the economic conditions of the nations. Today, most of the nations in Southeast Asia are experiencing significant inflation. Therefore, policymakers should concentrate on strengthening their monetary and fiscal frameworks to tackle inflation. One of the remedies is to have a higher trade openness and improve their export which tends to make a country's currency more stable or less likely to have a currency crisis that controls inflation by boosting both the capability and desire to pay off external debt (IMF, 2002).

**Conclusion:** Every economy has struggled with unemployment because it is evident that unemployment has consequences for the economic condition. Hence, this study review how unemployment has affected the Southeast Asian economies. As mentioned by Okun's Law, Economic expansion inversely correlates with unemployment. Further, Okun contends that unemployment has a particular impact on economic growth. He said a 1% decline in unemployment translates into a 3% boost in output growth, and a 1% rise in unemployment makes a 2% decrease in the domestic output. However, this varies from country to country; hence it is hard to demonstrate which country has a line with Okun's Law and to what extent it is parallel to Okun's Law.

The results from this research demonstrate that Okun's law validity within Southeast Asian countries is limited due to the lack of a relationship between unemployment and economic growth. Further, the magnitude of one variable's effect on the other does not tally with Okun's law statistics. Further, there is no significant effect of economic growth on unemployment, but unemployment significantly influences economic growth, as Okun mentioned in his theory.

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# Social Cost-Benefit Analysis (SCBA) of Islamic Insurance (takaful) Drone-Assisted Disaster Victim Identification: Emotional Management

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**Abstract:** Islamic insurance (*takaful*) companies have continuously used the latest technology to serve their customers better. One of the potential technologies that *takaful* operators can consider is drones. Nonetheless, the adoption of drones has shown an imbalanced pattern between regions, with some countries displaying more commendable experiences than others. In the context of Malaysia, such adoption can be regarded as negligible, if not minimal. While drones have numerous positive effects, this study focuses on emotional management through the lens of social cost-benefit analysis (SCBA) based on disaster victim identification (DVI). DVI is the process of identifying corpses (often in large numbers) following a disaster, either natural or man-made disaster. This study provides preliminary findings that support the need for drones to be integrated into *takaful* operations, based on the SCBA method focusing on emotional management. The findings indicate that emotional management affects not only the family of the victim but also the first responders involved in the search and rescue (SAR) operation and their families. Hence, proper consideration must be given to using drones in *takaful* operations with the government disaster agency.

**Keywords**: D*rone; Islamic insurance; takaful; disaster; victim, insurance*

## 1. Introduction and Background

Disaster victim identification (DVI) refers to the rigorous process of recognizing dead bodies as a result of a disaster. While the responsibility of identifying the dead bodies is not part of insurance companies or *takaful* operators' mandate, drones are commonly used by insurance companies in advanced economies such as Japan, the United Kingdom, the United States of America and even China (Muhamat et al., 2022). Hence, there is uneven adoption of technologies between the Northern and Southern Hemisphere particularly in the context of *takaful* operators that are expected to champion the social cause due to the inherent religious tenets that guide the business operation. This paper is from a series of publications from our research grant that explores the potential of *takaful* operators to be part of the disaster management cycle or procedure to enhance the recovery aspect of the impacted disaster area.

Interestingly, drone-assisted DVI is one of the latest approaches that have been used in disaster management, especially during search and rescue (SAR) missions. Previous studies in this field demonstrated a significant research gap concerning *takaful* operators, against the landscape of Industrial Revolution (IR) 4.0. The crux of this study is to explore the social cost-benefit analysis (SCBA) specifically on emotional management during disasters, and the potential use of drone technology by *takaful* operators for DVI to address such concerns.

The paper is structured as follows: it begins with an introduction to the *takaful* sector, followed by a discussion of DVI and the standpoint of *takaful* operators. Furthermore, a detailed perspective on the DVI program is presented with a drone as the medium/apparatus in the process. The methodology section includes a social cost-benefit analysis (SCBA) in the context of DVI specifically on emotional management and finally, the conclusion.

## 2. Literature Review

This section discusses the contemporary and essential studies relevant to this paper's research.

**Disaster victim identification (DVI) and drone that is linked to *takaful* operators**

The *Takaful* industry has recorded a strong performance, USD 27.6 billion globally in 2021, and is expected to grow to USD 49.8 billion by 2027 (Imarch, 2022). However, there is a considerable variation in the penetration rate for insurance and *takaful* businesses in the Asia-Pacific, with life insurance or family *takaful* exhibiting a trend reduction. In contrast, general insurance and *takaful* businesses increased steadily (EY, 2020). In another global report, the Islamic Financial Services Board (IFSB) has informed that Iran, Saudi Arabia, Malaysia, the UAE, and Indonesia as the main contributors (91%) of the *takaful* industry from 2011 to 2018 (IFSB, 2020).

In the context of Malaysia, the Fitch Rating has forecasted solid growth for 2022 accompanied by improved penetration rates, business models and technology capabilities amid higher *takaful* awareness, digitalization innovation and government initiatives (Fitch, 2022).

In essence, the *takaful* sector is expanding, particularly during the post-pandemic Covid-19 recovery phase, and technology is one of the driving forces behind this increasing trend. During the pandemic, the need to accept the newest technology for the *takaful* sector is much greater. Such adaptation during the stressful period has led most *takaful* operators to use the latest system in their operations.

Drones are one of the technologies accessible for the insurance and *takaful* sectors; nevertheless, their acceptance has been inconsistent, with certain sections of the globe adopting them more than others, and *takaful* being one of the latter. Drones can be operated in various settings, including fertilization, search and rescue (SAR), intelligence, and other tasks.

Likewise, in the context of DVI, this technology has been employed for S&R to identify the disaster region or locate missing individuals. DVI is a way to identify disaster victims, which may involve a small or large number of victims and is critical to fulfilling legal and humanitarian conditions via a rigorous scientific and forensic process (Black & Hackman, 2009).

Such disasters or catastrophes may occur due to environmental, medical, automobile, industrial, or even terrorist factors (Brough et al., 2015). This technique has the potential to be used to an even broader degree, such as recognizing deceased corpses, albeit this application is presently inconsistent and lacking especially in developing countries (Daud et al., 2021).

If we can recall the 2018 earthquake in Palu, Indonesia, resulted in a tsunami that killed hundreds and rendered the disaster area inaccessible. When a massive disaster like this hits a country, disaster victim identification (DVI) is required.

Furthermore, the golden rule of forensics states that the first 48 hours after a disaster are critical for identifying victims, since this is before the remains decay and become hard to identify (Dillon, 2021). Even a country remotely affected by natural disasters like Malaysia was also affected during the tsunami that hit Acheh in 2004 which caused many fatalities or damage to human life or property. Man-made catastrophes, on the other hand, may also have comparable detrimental consequences.

*Takaful* as mentioned earlier is an Islamic-based protection mechanism. The participation of *takaful* operators in the framework of DVI is critical, especially for monetary recompense to policyholders who have been victims of the disaster. Muhamat et al. (2022) emphasize the importance of *takaful* in disaster management, especially the *takaful* operators are critical in the last phase of catastrophe management, the victim recovery phase. This is accomplished by compensation paid to impacted policyholders, enabling them to rebuild their lives, companies, and homes.

**Drone's potential linked to *Takaful***

However, their function may emerge sooner if *takaful* operators provide aid to the government's relief organizations or first responders in the case of a disaster. Any delay or failure to identify the victims would impact their policyholders. While *takaful* operators are obligated to compensate their policyholders, meeting

this requirement correctly implies that they should also engage in the disaster management process, with DVI being a significant area.

This possible endeavor will be explored from the standpoint of SCBA in this article. SCBA is a method for methodically weighing benefits and costs. It can be viewed as a forecasting exercise (Treasury of New Zealand, 2015). However, other aspects cannot be quantified in monetary terms, namely the psychological and well-being effects. These are the components that require careful consideration.

With that as a foundation, this research investigates the SCBA, focusing on emotional management as the premise of discussion for this initiative to be supported collaboratively by *takaful* operators.

## 3. Research Methodology

This project adopted a qualitative approach to appraising the objective laid down; to gather the SCBA analysis based on the potential adoption of drones by the *takaful* operators. The interviews with the key informants were conducted in several phases due to the lockdown period that the government had implemented to address the outbreak of the Covid-19 pandemic.

Some of the interviews were conducted online, and the rest were face-to-face with strict adherence to the SOP of the Ministry of Health. Likewise, the last data collection phase was executed in a simulation exercise. Therefore, the data used in this research is based on a simulation exercise in Melaka from November 9 to 12, 2021.

The first responder agency, Angkatan Pertahanan Awam Malaysia (APM) or Malaysia Civil Defence Force, Aerodyne (a renowned drone consultant), Ministry of Health Malaysia, Analisa Resources (M) Sendirian Berhad, National Institute of Forensic Medicine Malaysia, and Universiti Teknologi MARA institutes and faculties, including the Institute of Pathology, Laboratory, and Forensic Medicine (I-PPerforM), College of Engineering, and Faculty of Business and Management, all took part in the simulation.

## 4. Results & Discussion

Drones can be used mainly in four (4) stages of the disaster management lifecycle, which are:

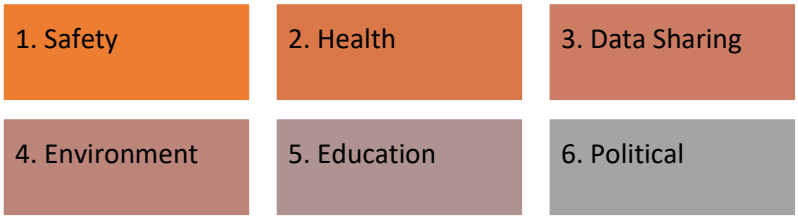
**Figure 1: Disaster Management Lifecycle**

Disaster victim identification (DVI) is one of the response processes in the disaster lifecycle. In normal practices in the industry, the rescuer will go to the site for the victim's identification through DNA and other necessary methods. But when technology is used, drones will be much more helpful in figuring out who the victims are.

The Cost Benefit Analysis (CBA) from the point of view of time was found in a previous study. It is proven that adopting drones could give advantages in the fast process of victim identification compared to going to disaster sites. It can be measured with a monetizable factor in which the benefit-cost ratio is around 1.5.

In line with that study, social cost-benefit analysis is done to identify other factors that can contribute to the adoption of drones in disaster victim identification. In total, six (6) main factors were identified in the SCBA involving:

**Figure 2: SCBA components of *takaful* operators' drone adoption**




The focus of this paper is on the health component; emotional management.

**Emotional Management**

Unmanned Aerial Vehicles (UAVs) or drones are increasingly recognized as potential devices that can reduce the impact of immense stress and trauma due to the conditions to which they are exposed, especially to the disaster management team, as well as the victims and their next of kin.

While drones have been mentioned as able to provide fast identification of the victims - hence the immediate release of information of the details to the family members and the authorities including the *takaful* operators and insurance companies for compensation.

Still, there are consequences for first responders and crisis management teams that have not been considered. For example, the usage of drones, which have been described as swift and dependable by many, contributes to improved decision-making for the crisis management team while also decreasing stress and pressure on them during the search and rescue (SAR) operation. The SAR operation is essential for relocating, recovering, and rescuing casualties, but it is extremely risky for them.

Providing and accessing adequate mental health care is crucial in cases of such trauma to minimize the risk of developing conditions such as post-traumatic stress disorder (PTSD), moral injury, or high emotional distress.

The adoption of drones will help in improving mental health not only among first responders but also among the family members involved. To assess mental health, a test named the Depression Anxiety Stress Scale (DASS) was developed. The indicators of DASS results are as follows:

**Table 1: Depression Anxiety Stress Scale (DASS)**

| **Score** | | | |
|---|---|---|---|
| | **Depression** | **Anxiety** | **Stress** |
| **Normal** | 0-5 | 0-4 | 0-7 |
| **Mild** | 6-7 | 5-6 | 8-9 |
| **Moderate** | 8-10 | 7-8 | 10-13 |
| **Severe** | 11-14 | 9-10 | 14-17 |
| **Extremely Severe** | 15+ | 11+ | 18+ |

Source: Psychology and Counseling Unit (UPsK)

It is important to highlight here that this study does not survey in-depth on the DASS and does not include a significant number of respondents. Nevertheless, during the interview, various questions were posed to the key informants (members of the crisis management team/first responders), summarizing their responses in Table 2.

**Table 2: Suggested Depression Level With or Without Drone**

| Without Drone (Human) | With Drone |
|---|---|
| Probability of DASS Score: Extremely Severe | Probability of DASS Score: Mild |

As per Table 2, the key informants who were part of the first responder team believed that using a drone would minimize the DASS on them.

In the context of victims, all the key informants from various backgrounds can be considered potential victims and family members. Thus, their feedback has been published as findings from this research project by Muhamat et. al (2021) and Muhamat & Ali Azizan (2022) as the key informants perceive a significant contribution to the potential to better fulfillment of the maqasid Shariah due to the impacts on religion, life, progeny, intellectual and property.

Specifically, for emotional management, due to the impact brought by drones, if being used by the *takaful* operators in their operations, the key informants reckoned it as essential during the disaster or calamity situation, the pressing need to know the whereabouts of the loved ones and his or her condition is so critical. Hence, DASS for them is better with the drone.

## 5. Conclusion & Recommendations

In a nutshell, this research provided critical information on the possibility of drone adoption, reinforced by the SCBA results about emotional management.

Having peace of mind during a stressful situation is essential to emotional management. Furthermore, this is the primary motivator for people to purchase the *takaful* policy. Emotional management encapsulates every critical component of a person, beyond the health requirements, as it also involves the security and well-being of the victim and the family members.

For instance, a mother's unstable mind due to stress from an accident or disaster involving her husband; who is still missing, might cause a physical and emotional disturbance that may be directed to her kids.

Such a situation is unhealthy because the mother might hit and abuse excessively by scolding her children due to stress (Muhamat & Ali Azizan, 2022), or worse, she might kill her kids and herself (Alexandri et. al, 2022). Many cases involved parents with unstable minds who ended up taking their kids' lives (Friedman & Resnick, 2007). The impact of the Covid-19 pandemic specifically with regards to mental health due to economically affected as well as medically sick due to the pandemic (Mamun, Bhuiyan & Manzar, 2020). A similar trend was recorded in Peru where homicide cases sharply increased (Calderon-Anyosa, Kaufman, 2021).

Nevertheless, other components of SCBA still need to be mentioned in this study and may be further investigated for future research. The comprehensive SCBA from the lens of *takaful* operators will provide a comprehensive assessment of this noble research project. It will facilitate further discussion and policy papers in this area.

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# To Recycle e-Waste or Not: Understanding Consumers' Intention from the Lens of Behavioral Theories

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**Abstract:** The study was conducted to explore and understand factors that determine consumers' intention to recycle e-waste from the lens of the Theory of Planned Behavior (TPB) and Behavioral Reasoning Theory (BRT). A cross-sectional survey was designed and data was collected from 339 respondents who used an extensive number of electronic devices. The findings suggest positive attitudes towards recycling; social norm and perceived behavioral control are significant to the intention to recycle e-waste. In addition, attitude is explained by two determinants; reasons for recycling and environmental value. Finally, environmental value is also significant in explaining reasons for and reasons against recycling. The study is important for theoretical and managerial implications in describing consumers' acceptance of e-waste recycling by considering the values that promote the act, and the risks that prohibit them from acting positively. Likewise, the findings would help in building an impactful environmental protection regulation for the sustainability agenda.

**Keywords**: *e-waste recycling, theory of planned behavior, behavioral reasoning theory, attitude and intention of recycling, factors of recycling acceptance*

## 1. Introduction and Background

One of the emerging concerns of the twenty-first century is activities linked to electronic waste (e-waste) (Li & Achal, 2020). e-Waste refers to damaged or unused electrical and electronic equipment that has the potential to be thrown away. In comparison to other unused items, e-waste is the fastest rising (George et al., 2019). e-Waste is projected to double in size by 2045 if current trends continue (Parajuly et al., 2019). The volume rise is attributed mainly to product availability and the rapid pace of technological innovation (Wang et al., 2019). Likewise, demands for electronic appliances are growing as consumers' purchasing power increases, and they are lured by the convenient features of the products (Lo et al., 2020).

Mismanagement of e-waste becomes a major pollution problem and causes dangers to global sustainability (Dhir et al., 2021). Untapping the problem will only set the e-waste issue to become a bigger concern. What alarms the environmentalists is the fact that electronic devices contain a large number of heavy metals in which their release into the environment will result in a significant increase in heavy metal concentrations in dust, sediments, plants, air, and soil (Fayaz, Abdoli, Baghdadi & Karbassi, 2022) that could harm human health.

Fortunately, recent development in waste management innovations has created opportunities to turn waste into gold. e-Waste is found to be very valuable and precious due to its metal components (Arya & Kumar, 2020). To curb e-waste problems and reduce the e-waste poll, recycling them has become one of the essential initiatives (Liang, 2021). Quite a number of projects have been implemented for inspiring environmental changes. For instance, the Royal Mint plant in South Wales processes UK-sourced circuit boards to retrieve precious metal to reuse in its coins, bars and other products (Royal Mint, 2021). Another example is the Tokyo 2020 Medal Project, which molded all medals from metal extracted from recycled consumer electronics. The project was supported by 1,300 educational institutions and 2,100 electronic retail stores across Japan (Tokyo 2020 the Medal).

However, while e-waste recycling is good for the environment and creates value for the earth, it was found consumers' reactions towards the initiative vary (Liang, 2021). In the contextual situation, reports from the Global e-Waste Monitor (2020) indicated consumers' reactions towards e-waste recycling in Malaysia are still low. It was further reported recycling activities were not keeping up with the e-waste amount. In addition, how consumers in Malaysia react and are willing to participate in e-waste recycling has not been fully studied

despite its emerging concern (Shittu, Williams & Shaw, 2021; Arain et al., 2020; Rodrigues, Boscov & Günther, 2020; Zhang et al., 2019). Some efforts were made in understanding the intention and its factors, such as disposal direction (Ho et al., 2013), convenience of infrastructure and services, information, incentives, reminder and the recycling infrastructure, perceived convenience and perceived policy effectiveness (Shaharudin, Said, Hotrawaisaya, Nik Abdul Rashid & Azman Perwira, 2020) and knowledge and attitude (Mahat, Hashim, Nayan, Saleh & Norkhaidi, 2019). Nevertheless, the findings have not addressed either the psychological motivations that will drive consumers to engage in e-waste recycling activities or the determinants that will shape the positive attitude toward accepting e-waste recycling. Understanding the attitude factors and the intention is important as each country has distinct values, norms, infrastructure availability and policy implementation that suit the cultural and societal context, and each consumer has a different interpretation of risks associated with e-waste recycling. Hence, it could be concluded that the limitations and the significance of e-waste impacts urge more efforts to be made to understand consumers' intentions and attitudes.

Therefore, the study was conducted to explore the key determinants of e-waste recycling intention by applying the psychological theories of the theory of planned behavior (TPB) and behavioral reasoning theory (BRT). While studies reported on the intention to recycle e-waste have commonly used the TPB, what factors determine the attitude was not exclusively investigated. As Clark et al., (2003) pointed out, a number of researchers have used environmental psychology to investigate internal (psychological) variables such as attitudes, norms or beliefs as underlying motivations for individual behavior. As a result, their policy recommendations typically include providing information, persuasion, or guilt instillation. On the other hand, consumers' lack of awareness about disposal choices, such as the location of appropriate facilities and concerns about personal data protection, is also important to be examined (Dhir et al., 2021). In addition, the study is also important to be conducted as the findings could help in designing strategies for reducing e-waste. Disposing of them in the right and safe manner is the responsibility of every single citizen.

The paper is organized into different sections. Section 2 reviews the theories; theory of planned behavior and behavioral reasoning theory, past related studies and develops the hypotheses. Section 3 explains the research methodology. Section 4 presents the analysis, the research findings and discusses the implications. Finally, section 5 provides the conclusions and recommendations for future research.

## 2. Literature Review

This section reviews the related literature on the circular economy and e-waste recycling as the initiative, the theory of planned behaviors, the behavioral reasoning theory and discusses past studies for hypothesis development.

### e-Waste Recycling Intention and the Theoretical Background

Studies on e-waste recycling intention were developed from numerous psychological theories. One of them is the value belief norm (VBN) theory which was first proposed by Stern et al., (1999). Generally, VBN theory is related to pro-environmental behaviors of activism, non-activist public-sphere, and behaviors in an organization. Mainly, studies applying the VBN theory reflect a causal chain that originates with the values, beliefs and awareness of consequences. Among the antecedents, the personal norm is the strongest determinant of pro-environmental behaviors (Gkargkavouzi et al., 2019; Vanderploeg & Lee, 2019; Li et al., 2018). Additionally, some scholars extended the VBN theory by measuring individuals' pro-environmental behaviors as green trust, habit, self-identity and subjective norm (Gkargkavouzi et al., 2019; Choi et al., 2015). In addition, based on valence theory, Dhir, Malodia, Awan, Sakashita & Kaur (2021) evaluated consumers' decision to recycle e-waste. They concluded intention to recycle e-waste is affected by the value compatibility of environmental concerns and the perceived benefits of engaging in this behavior.

### Theory of Planned Behavior

The theory explains the relationship between an individual's beliefs and actions (Ajzen, 1991). In this theory, three constructs are essential in determining behavioral intention. First is the attitude towards behavior, which is related to assessing one's behavior that is either favorable or unfavorable towards a subject. Second, is the subjective norm, which refers to the social pressure that an individual feels to adopt or vice versa on a

particular behavior. Finally, intensity refers to one's ability to control perceived behavior based on previous experience and anticipated challenges. Attitude is the process of assessing behavior. Subjective norm is the action seen as desirable, while perceived behavioral control is defined as being based on how easy or difficult to believe in doing something. In other words, attitude, subjective norm and perceived behavioral control drive the individual intention and behaviors towards decisions.

A study conducted by Echegaray & Hansstein (2017) used TPB to explain people's actions relating to electronic waste recycling. Attitudes and social norms were found the most predictive factors of behavioral intention. Additionally, it was discovered that awareness of the issue affected an individual's intention to recycle. To sum up, social awareness can be used to promote the recycling of electronic waste. Raising awareness of e-waste recycling may encourage individuals to take action and reduce the impact of electronic trash. It has been established that TPB is a framework that links to identifying factors influencing people's behavioral intentions. Table 1 depicts selected studies on TPB and its application in e-waste studies. It could be concluded attitude is mostly studied and its role is the most significant. Comparing subjective norm and perceived behavioral control, the former was studied more extensively.

**Table 1: e-Waste studies that use the Theory of Planned behaviors (TPB)**

| Authors | Attitude | Subjective norm | Perceived behavioral control |
|---|---|---|---|
| Tan et al., 2017 | ✓ | ✓ | |
| Sulaiman et al., 2019 | ✓ | ✓ | ✓ |
| Kumar, 2019 | | ✓ | ✓ |
| Afroz et al., 2020 | ✓ | | |
| Delcea et al., 2020 | ✓ | ✓ | |
| Ngah, 2021 | ✓ | | |
| Aboelmaged, 2021 | ✓ | | |
| Li et al., 2021 | ✓ | ✓ | ✓ |
| Zhang et al., 2021 | ✓ | ✓ | ✓ |

**Behavioural Reasoning Theory (BRT):** Behavioral reasoning theory (BRT) can be seen as an extension of Ajzen (1991) theory of planned behavior. This includes context as a significant influence on attitude and intention formation. In a word, BRT is a theoretical framework that enables scholars and practitioners to examine the relative influence of the reasons for innovation (Sahu et al., 2020; Westaby, 2005). In other words, it differs from other acceptance models or theories as BRT only considers the reason for engaging in any innovation (Sahu et al., 2020).

The theory further remarks reasons affect global motives and intentions. Theoretically, there are two significant sub-dimensions to reasons: 'reasons for' and 'reasons against' which are posited to influence a decision. The fact that BRT is a theory also allows investigating the relationship of the 'reason for' and 'a reason against' the intentions towards any innovation (Westaby, 2005). However, some studies have found rejecting innovations is not always the same as the reasons for accepting them; for example, recycling e-waste would benefit health. The value perception could be the reason for engaging in recycling, yet people may have been resistant to e-waste because of high expenses or inconvenienced reasons.

**Factors affecting e-waste recycling intention**

**Attitude:** Previous research indicates that a positive attitude is significantly associated with the willingness to engage in a given behavior (Tandon et al., 2020). Similarly, a positive attitude toward e-waste recycling is likely to be related to greater e-waste recycling intention. Hence, a positive attitude towards e-waste recycling is likely to be linked to increasing e-waste recycling intention (Dhir et al., 2021; Zhang et al., 2019). A study conducted by Claudy et al., (2015) concluded consumer value has a considerable impact on attitude. Therefore, the following hypothesis is offered:
**H1**: There is a significant relationship between attitude and e-waste recycling intention.

**Social Norm:** The concept of social norm refers to the individual's feeling of social pressure about whether or not to engage in a particular behavior (Azjen, 1991). In essence, it is how individuals perceive other people's

attitudes about a particular behavior. Likewise, it is an influence of a reference group or system on an individual's thoughts, opinions, emotions, and judgments, whereby it comes from a variety of groups, including family, friends, colleagues or social members with whom individuals are strongly associated. Moreover, the extent of literature on recycling behavior also emphasizes social pressure determines an individual's intention to recycle waste. Positive subjective norms can lead to positive behavior intention among consumers (Tong et al., 2018). Similarly, it was discovered subjective norm encourages the intention to recycle agricultural waste in China (Jiang et al., 2018), and encourages the behavior of recycling and reusing waste in developing countries (Khan et al., 2019). Thus, the following hypothesis is offered:
**H2:** There is a significant relationship between social norms and e-waste recycling intention.

**Perceived behavioral control:** Perceived behavioral control is concerned with people's perception of their ability to conduct specific behavior (Azjen, 1991). It is the perception of enacting a behavior, whether the possibility to act on certain behavior is easy or difficult to be done. This is because some behaviors are not within one's control. A prior study found that perceived behavioral control was significant to people's intention to develop pro-environmental behavior regarding food waste recycling (Russell et al., 2017). In addition, Coşkun & Özbük (2020) also found that perceived behavioral control is the strongest predictor of the intention to reduce food waste, while Kianpour et al., (2017) concluded behavioral control is a significant predictor of electronic devices' weekly household recycling intention (Kianpour et al., 2017). Thus, based on the discussion, the following hypothesis is offered:
**H3:** There is a significant relationship between perceived behavioral control and e-waste recycling intention.

**Factors affecting attitude toward e-waste recycling**
Concerning the particular behavior, it was observed that 'reasons for' acted as a stimulus in triggering positive attitudes among consumers. Existing literature has indicated 'reasons for' is a significant factor influencing consumer behavior in various situations (Sahu et al., 2020: Claudy et al., 2015). For example, 'reasons for' eating organic food was significantly related to consumer attitudes and intentions (Tandon et al., 2020). Thus, 'reasons for' e-waste recycling have a potential linkage to attitude and intentions to recycle e-waste. Therefore, the following hypothesis is offered:
**H4**: There is a significant relationship between reasons for and attitudes to recycling e-waste.

In explaining human behavior, 'reasons against' is seen as a controller that can generate negative insights toward engaging in a given act (Sahu et al., 2020). Scholars also proposed that rejecting is not always the same as the reason for adopting. Additionally, most consumers reflect the different risks based on the activity. Perceptions of risk are a substantial barrier to defining consumer behavior (Kaur et al., 2020). For example, the concerns of identity theft and misuse of confidential data could pose a negative risk barrier to the intention to recycle e-waste (Liu et al., 2019; Tan et al., 2018). Hence, based on the discussion, the following hypothesis is offered:
**H5**: There is a significant relationship between reasons against and attitudes to recycle e-waste.

Environmental concern refers to a person's awareness and readiness to resolve environmental issues (Paul et al., 2016) and significantly solve problems (Dunlap & Jones, 2002). Meanwhile, environmental value refers to individuals' fundamental attitudes toward their surroundings. Value is a critical factor in an individual's personal and professional decision-making. Prior research revealed that consumer value significantly influences attitude (Claudy et al., 2015). Furthermore, environmental values can significantly impact behavior indirectly through environmental attitudes. Thus, the following hypothesis is offered:
**H6**: There is a significant relationship between environmental value and attitude to recycle e-waste.
.

**Environmental value as a determinant of reasons for and reasons against e-waste recycling**
Environmental value refers to people's underlying attitudes toward their surroundings. The term has been applied interchangeably with other ideas such as environmental attitudes, ecological worldview and environmental concern (Dunlap et al., 2000). The element of value could influence individuals' decision-making in their life, whether it consists of professional life or personal. Research conducted by Wang et al., (2016) reported environmental awareness influenced Chinese residents' intention to recycle e-waste. In addition, Kushwah et al., (2019) concluded environmental concern has a positive impact on consumers' readiness to participate in e-waste recycling. Thus, the following hypothesis is offered:
**H7:** There is a significant relationship between environmental value and reasons for recycling e-waste.

Azjen and Fishbein (1975) in their discussion of expectancy-value theory, described people's views are about anticipating the outcome and the value of such outcomes that significantly affect the motivational process. While 'reason for' share a positive outcome, 'a reason against' assumes a negative association with the attitude (Tandon et al., 2020). Kushwah et al., (2019) suggested people with higher environmental value would place a greater concern on pro-environmental intention and vice-versa. Consumer value significantly impacted attitude (Claudy et al., 2015). However, prior research has empirically shown that 'reason against' is negatively linked with consumer attitudes and intentions. Therefore, the following hypothesis is offered:
**H8:** There is a significant relationship between environmental value and reasons against recycling e-waste.

## 3. Research Methodology

### Instrument Development

The instrument was developed by first reviewing the literature. To ensure the best possible item reliability and validity, we adopted existing construct items from past studies. The items and their sources are in Appendix 1. All items were measured on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree'). The respondents were also asked to provide their demographic profiles of gender, age, and work status. The variables 'reasons for' and 'reasons against' were measured as a higher-order model. The dimensions reasons are environmental benefits and personal benefits. On the other hand, reasons against were measured as risk barrier, value barrier, image barrier and usage barrier.

Before the data was collected, the instrument and the items were validated and pre-tested. A pre-test is a procedure that will require responses and feedback from a small set of respondents from the population. For face validity, the constructs and the items were checked and examined by three faculty members who were experts in the field. The procedure was performed as a strategy to ensure each item represents the meaning of the construct, to indicate the content of the research was related to the dimensions and variables, and to ensure no bias on the e-waste recycling initiative was presented. A pilot test was also conducted to assess the quality of the instrument, the degree of understanding of the statement, and the measure of the item's internal consistency score. Thirty undergraduate students participated in the pilot test. Ursachi et al., (2015) mentioned a general acceptance rule: Cronbach alpha of 0.6 – 0.7 indicates an acceptable level of reliability, and 0.8 or greater indicates an excellent level. The results of the internal consistency score show that all scores are within the acceptable values.

### Data collection: sample and procedures

In determining the sample size, various strategies could be adopted. One of them is to use the sample-to-item ratio (Gorsuch, 1983). Using this method, the recommended sample size would be 160. Next is to use the sample-to-variable ratio (Hair et al., 2017), and the recommended sample size would be 140. Another procedure is to use the power analysis calculation. The sample size is determined with the largest number of predictors. The inputs for the power analysis are power, effect size and significance level. We used G*Power for applying this procedure, and the recommended sample size was 119.

To collect the data, an online survey was designed using Google Forms and an invitation to participate in the study was sent through emails and WhatsApp applications. A total of 337 responses was received, and it meets the minimum number of a required sample size of 337 participants. The respondents consisted of 80 males (24%) and 257 (76%) females. The participants belonged to different age groups, with the largest percentage of 63% for 18 – 30 years and the remaining percentage for 31 years and above. For the educational background, 43% of the participants have earned a bachelor's degree. Fifty-eight percent of the participants were university students, and the remaining 42% were employed in various sectors.

## 4. Results

To examine the measurement and structural models, we followed the Anderson and Gerbing (1988) guideline, and we used SmartPLS version 3.3.2 for partial least square (PLS) modelling. The method is highly appropriate for theory building and hypothesis testing and also to predict the determinants (Hair et al., 2017). PLS modelling is an acceptable method that can accommodate a smaller sample size without a normality assumption (Chin et al., 2003).

**Measurement model**

The measurement items were tested for both convergent and discriminant validity. The results of the reliability convergent validity analyses are presented in Table 2. The convergent validity was assessed by the indicator loadings, composite reliability (CR) and average variance extracted (AVE). The loadings for all reflective items exceeded the recommended value of 0.600. The CR values exceeded the minimum value of 0.700, and the AVE exceeded 0.500 for all constructs (Hair et al., 2017). Thus, some evidence indicates an adequate convergent validity of the measurement model. For the 'reasons for' and 'reasons against' constructs, a higher-order calculation for assessing the CR and AVE was performed separately. The results also suggest for adequate measurement model. In addition, the results of all VIFs,

In addition, to address the issue of common method bias (also named common method variance), a collinearity test was conducted. According to Bagozzi and Yi (1991) and Podsakoff et al., (2003), common method bias is usually caused by a single measurement and data from the same source, and it can be ascribed to the measurement method, rather than the constructs. Based on the collinearity test, all VIFs are lower than 3.3. Hence, the model can be considered free of common method bias.

**Table 2: Reliability and Convergent Validity**

| Variable | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|---|
| Attitude | 0.940 | 0.961 | 0.893 |
| Environmental benefit | 0.911 | 0.944 | 0.849 |
| Environmental value | 0.787 | 0.858 | 0.601 |
| Image barrier | 0.718 | 0.876 | 0.780 |
| Intention | 0.881 | 0.927 | 0.808 |
| Perceived behavioral control | 0.927 | 0.945 | 0.774 |
| Personal benefits | 0.876 | 0.942 | 0.890 |
| Risk barrier | 0.868 | 0.938 | 0.884 |
| Subjective norm | 0.892 | 0.925 | 0.755 |
| Usage barrier | 0.889 | 0.948 | 0.900 |
| Value barrier | 0.867 | 0.938 | 0.883 |
| *Reasons for* | | 0.959 | 0.921 |
| *Reason against* | | 0.872 | 0.629 |

The assessment of the discriminant validity was conducted by using the heterotrait-monotrait (HTMT) ratio of correlations based on the recommendation from Henseler et al., (2015). Kline (2015) suggested HTMT values less than 0.85 support a good discriminant validity. However, based on Gold et al., (2001), HTMT values less than 0.900 are acceptable. The results of the HTMT for discriminant validity assessment demonstrated that the measurement items are valid and reliable. Therefore, they can be used for testing the hypotheses in the structural model.

**Structural model**

For the structural model, we run the analysis for examining the relationships. The structural model was tested by assessing the t-values, p-values, path coefficients, explained variance ($R^2$) and effect size ($f^2$). A bootstrapping procedure with 5,000 resamples, and a one-tailed test with a significance level of 0.05, was run to derive a valid standard error for the t-value calculation. In testing for the hypotheses, we tested for the effects of attitude, social norms and perceived behavioral control on e-waste recycling intention. We tested for the effects of environmental value, reasons for and reasons against attitude. Finally, we tested the effects of environmental value on reasons for and reasons against it. The results are presented in Table 3.

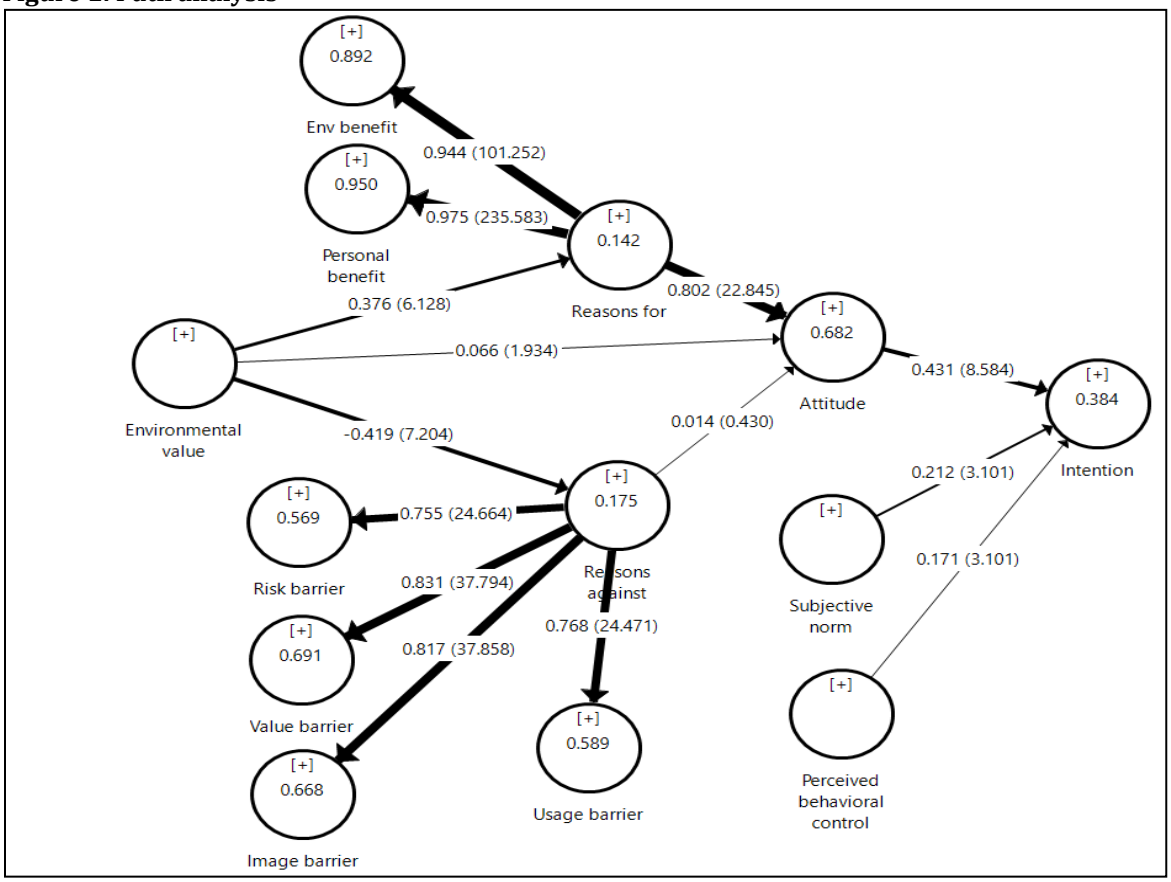
**Table 3: Hypothesis Testing**

| Hypothesis | Path Coefficient β | Standard Error | t-value | p-value | LLCI | ULCI | $f^2$ |
|---|---|---|---|---|---|---|---|
| Attitude → Intention | **0.431** | 0.052 | 8.367 | 0.000 | 0.345 | 0.511 | 0.281 |
| Environmental value →Attitude | 0.066 | 0.034 | 1.907 | 0.028 | 0.008 | 0.120 | 0.010 |
| Environmental value → Reason against | -0.419 | 0.059 | 7.039 | 0.000 | -0.502 | -0.322 | 0.213 |
| Environmental value → Reasons for | 0.376 | 0.062 | 6.120 | 0.000 | 0.266 | 0.470 | 0.165 |
| Perceived behavioral control → Intention | 0.171 | 0.056 | 3.047 | 0.001 | 0.089 | 0.268 | 0.027 |
| Reason against →Attitude | 0.014 | 0.034 | 0.430 | 0.334 | -0.038 | 0.066 | 0.001 |
| Reasons for → Attitude | **0.802** | 0.035 | 22.909 | 0.000 | 0.742 | 0.854 | 1.734 |
| Subjective norm → Intention | 0.212 | 0.069 | 3.076 | 0.001 | 0.105 | 0.317 | 0.040 |

$R^2$: Intention = 0.384, Attitude = 0.682, Reasons for = 0.142, Reasons against = 0.175
$Q^2$: Intention = 0.300, Attitude = 0.603, Reasons for = 0.112, Reasons against = 0.093

According to Fornell (1988), a $Q^2$ value above 0 indicates good predictive relevance. From the results, there is evidence that the $Q^2$ for intention, attitude, reasons for and reasons against are above 0. The results of the $Q^2$ variance for attitude is 60.3% and 30% for intention, hence they are indicative of good in-sample prediction accuracy. The results of the $R^2$ are presented in Table 3 and Figure 1. According to the rule of thumb, $R^2$ values between 0.02 and 0.12 is considered low, 0.13 to 0.25 are moderate and $R^2$ values above 0.26 are significant (Cohen, 1992). Following the suggestions, the reasons for and reasons against variances are considered to be moderate, while the intention and attitude variances are significant.

**Figure 1: Path analysis**



Looking at the hypotheses, all of them were supported, except for the relationship between reasons against and attitude ($\beta = 0.014$, $p > 0.05$). The strongest relationship is between reasons for and attitude ($\beta = 0.802$, $p < 0.001$), followed by attitude and intention ($\beta = 0.431$, $p < 0.001$), environmental value and reasons against ($\beta = -0.419$, $p < 0.001$), environmental value and reasons for ($\beta = 0.376$, $p < 0.001$), subjective norm and intention ($\beta = 0.212$, $p < 0.05$), perceived behavioral control and intention ($\beta = 0.171$, $p < 0.05$) and environmental value and attitude ($\beta = 0.066$, $p < 0.05$). The path model analysis is illustrated in Figure 1.

**Discussion of Key Findings**

The increased amount of unmanaged e-waste creates environmental issues. The study aims to address the environmental impacts by focusing on consumers' psychological behaviors and motivations based on the theory of planned behavior (TPB) and behavioral reasoning theory (BRT). Based on the findings, three key findings are discussed. The first is on the predictors of intention. Second is on the key determinants of attitude which is significant for building motivational strategies. Third is the role that environmental value plays in shaping the perception of reasons for recycling or reasons against recycling.

In this study, attitude, social norm and perceived behavioral control predict consumers' intention to recycle e-waste. Among the three determinants, attitude is the strongest factor. The findings are consistent with past research (Dhir et al., 2021; Zhang et al., 2019). Attitude is a very important factor that will shape one's movement through the intention. A positive attitude brings optimism and would bring constructive changes. Hence, to curb the e-waste problems, changing the attitude is very important. Next to attitude is the social norms and the findings are consistent with studies by Tong et al., (2018), Jiang et al., (2018) and Khan et al., (2019). Subjective norm suggests an individual's thoughts, opinions, emotions, and judgments could be influenced by others. In the theory of planned behavior, 'others' have always been measured as family and friends. However, as information technology evolves, communications between people to people and among people have evolved and enlarged. Hence, digital openness has also become one of how individuals could be influenced (McClure & Seock, 2020). In this study, social norms referred to both people around the subjects, and also programs and campaigns. It is not necessarily referring to friends and family members. Therefore, to increase the intention, taking a positive influence is a significant step, and social media is a significant influence in shaping one's decision (De Fano, Schena & Russo, 2022; Lewandowsky, Cook, Fay & Gignac, 2019). Finally, perceived behavioral control plays a role in determining consumers' intention toward e-waste recycling. It could be concluded that one's perceived availability to control and act depends largely on his perception of whether it would be easy or difficult. Likewise, the findings are consistent studies on the environment and e-waste (Zhang et al., 2021; Kianpour et al., 2017; Russell et al., 2017). Perceived behavioral control could serve as a proxy for actual control and contribute to the prediction of behavior (Azjen, 1971).

Next, in predicting the attitude towards e-waste recycling, the results affirmed reasons for and environmental value are the significant factors. Concerning a particular behavior, it was observed that reasons have acted as a stimulus in triggering a positive attitude among the consumers. Thus, reasons for e-waste recycling seem linked to a positive attitude and intentions towards e-waste recycling. Likewise, environmental value plays a significant role in changing to a positive attitude. How consumers value the environment could be reflected in how they act and behave. Examples of their actions related to the environment are signing an environment protection petition, donating money for environmental causes and putting a boycott against companies that they feel are harming the environment. This group of environmental supporters is essential for the sustainability agenda, and their voices could make a change in influencing more people to take part in circular economy activities.

However, even though the results of examining the relationship between reasons against and attitude are not supported, the findings indicate an important note. As the reasons against are measured as risks, consumers feel these risks would hinder their attitude. Even though environmental protection has gained significant global relevance today, the basic concepts of waste disposal are always overlooked. Perceptions of risk act as a substantial barrier in defining consumer behavior (Kaur et al., 2020). For example, the risk barrier is significantly negative towards the use of mobile payment systems and the issues of electronic equipment disposal. Also, the issues of theft of personal information and confidential data arose when consumers intended to recycle e-waste (Liu et al., 2019; Tan et al., 2018).

Finally, the study found a significant relationship between environment value and reasons for, and between environment value and reasons against. Consumers who are already acting on some environmental-related activities would perceive for positive benefits of e-waste recycling. For instance, they feel e-waste recycling is able to reduce the devices' health hazards, reduce accidental damage, protect the environment from toxic chemicals and cut down the greenhouse emissions.

**Theoretical and Managerial Contributions**

The study contributes to several theoretical implications. Understanding the intention to recycle e-waste is important, but having to determine the motivational factors that are significant in shaping a positive attitude is equally important. Thus, injecting Westaby's (2005) beliefs and values, reasons for the behavior and reasons against the behavior add to the comprehensive motivational requirements. Furthermore, the findings establish a recent contribution from a waste management perspective since they address the gaps of previous limitations in looking for consumers' attitudes and intentions. Finally, the findings contribute as a source of reference in identifying other factors that will motivate the behavior or identifying dimensions and other measures of environmental value. Finally, as e-waste recycling in Malaysia has not received substantial acceptance among consumers, the findings will shed light on academic's views with potential identification of strategies to promote the behavior. Moreover, in view of the fact that little attention has been devoted to the role of environmental value in e-waste sustainability management, this study also contributes to the development of waste management literature.

Furthermore, the study is significant to managerial contributions where consumer awareness and preference during the disposal of e-waste are crucial factors in determining the future success of e-waste management. This evidence can lead to nationwide awareness in raising household e-waste recycling activities by teaching people how to recycle, reuse and dispose of e-waste. In brief, people will learn to behave more responsibly toward the environment.

## 5. Conclusion and Recommendations

Electrical and equipment devices have turned out to be essential in our everyday lives. E-waste has rapidly become a source of domestic waste. This is primarily due to shorter lifecycle products, frequent technological advancement, and shorter product life spans that comprise the significant reason for e-waste recycling. This study contributes to theoretical implications. First, it contributes to the theory-building in the area of e-waste and circular economy. Attitude, social norms and perceived behavioral control of the theory of planned behavior were found to be significant predictors to intention. Likewise, reasons for, reasons against and values from the behavioral reasoning theory was tested as the factors of intention. Examining how environmental value is important for the decision either to accept or to reject the idea of e-waste recycling is also another theoretical contribution of the study.

In addition, the study also contributes to the practical implications for policymakers, decision-makers and communities. The findings provide some reasonable suggestions on how to change the perception of e-waste and how to promote 0it for a greater cause. Based on the findings, it could be said utilizing social media and influencers is one of the strategies and people are easily drawn towards certain acts when the idols do so. In addition, how consumers could participate in e-waste recycling should be made easier and simpler. This is to encourage them to understand recycling e-waste is within their control. Furthermore, more awareness of the values of e-waste and circular economy should be created for all, regardless of the consumers' profiles and age. The environment is for all; hence the awareness is not only for the people but also for the collectors, producers, logistics providers and local agencies. Unquestionably, recycling is the key factor that needs to be considered to reduce e-waste. Tokyo 2020 Medal Project has proven to be a success in making waste to wealth a reality. The e-waste components contain precious metals such as gold, copper, palladium and silver, with high recycling value. Educating society across all ages about e-recycling, reusing, and the best appropriate methods for disposing of electronic and electric devices is key.

Finally, there are some limitations of the present study. First, the study did not consider the variations of the e-waste based on certain criteria such as types, size, models and others. The variation could help in making some comparisons to the acceptable behavior. In addition, the study did not consider the level of e-waste

recycling awareness. Some people are completely aware, while others may be ignorant of its importance. Hence, by assessing the difference, more activities to influence them could be customized for greater concern. In addition, the variance of intention is less than 40 percent. Therefore, future research could consider looking at other variables other than individual characteristics. The study also did not rule out the effects of demographic and cultural variables. For this reason, it unlocks the opportunity for future research for further exploration. Besides that, the upcoming research may also consider qualitative methods to obtain more knowledge and findings related to e-waste in various contexts. Pertaining to the findings of this study, it can be suggested that future research can include potential moderating or control variables. The element of country, culture and perceptions or categories of electronic waste could be explored.

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**Appendix 1: Item Measurement**

| Measure | Source | Item |
|---|---|---|
| Attitude | Dhir et al., (2021); Echegaray & Hansstein (2017); Wang et al. (2019) | ATT1: E-waste recycling is good for the environment<br>ATT2: E-waste recycling is bene*fi*cial for the environment<br>ATT3: E-waste recycling will make the living environment better. |
| Subjective Norm | Wang et al., (2019) | SN1: There are many people around me who choose e-waste recycling<br>SN2: Many people recommend me to use e-waste recycling<br>SN3: People around me support me to participate in e-waste recycling<br>SN4: There are many programs and campaigns about e-waste recycling |
| Perceived Behavioral Control | Wang et al., (2019) | PBC1: It would be easy for me to send appliances to e-waste recycling center<br>PBC2: I could locate the e-waste recycling center around my home<br>PBC3: I know how to use the e-waste recycling facility<br>PBC4: I could complete the e-waste recycling even if there was no one around me what to do<br>PBC5: I could complete the e-waste recycling even if there was no reference to refer to. |
| Reasons for (*Environmental benefits and personal benefits*) | Dhir et al., (2021) *Environmental benefits* | EB1: Using proper e-waste recycling protects the environment from toxic chemicals<br>EB2: Using e-waste recycling reduces the risk of polluting the environment<br>EB3: Using e-waste recycling cuts down the emission of greenhouse gases |
| | Dhir et al., (2021) *Personal benefits* | PB1: Using e-waste recycling reduces the health hazards of electronic wastes<br>PB2: Using e-waste reduces the chances of accidental damage at home |
| Reasons against | Dhir et al., (2021) | RB1: I fear that after the transfer of my electronic device for |

| Measure | Source | Item |
|---|---|---|
| *(Risk barrier, value barrier, image barrier and usage barrier)* | *Risk barrier* | recycling, the stored information may be misused<br>RB2: I fear that my electronic device may be misused by the collection center |
| | Dhir et al., (2021)<br>*Value barrier* | VB1: I feel that the traffic expenses of e-waste recycling are high<br>VB2: I feel that the handling charges of e-waste recycling are high |
| | Dhir et al., (2021)<br>*Image barrier* | IB1: In my opinion, e-waste recycling is often too complicated to be useful<br>IB2: I have an image that e-waste recycling is difficult to adopt |
| | Dhir et al., (2021)<br>*Usage barrier* | UB1: In my opinion, it is not easy to find information on e-waste recycling<br>UB2: In my opinion, it is not easy to find an e-waste collection center |
| Environmental Value | Dhir et al., (2021) | EC1: I follow developments related to the environment<br>EC2: I have signed a petition in support of protecting the environment.<br>EC3: I have donated money to an environmental group (e.g. NGO or global organization)<br>EC4: I have boycotted or avoided buying the products of a company because I felt that the company was harming the environment |
| Intention | Wang et al., (2019) | INT1: In the future, I will prefer to recycle e-waste.<br>INT2: I will use the e-waste recycling platform for future electronic waste disposal<br>INT3: Whenever possible, I would intend to recycle e-waste |

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# Solid Waste Management in Malaysia: An overview

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**Abstract:** Malaysia is heavily dependent on landfilling as a method of waste disposal, and as a result, severe space constraints, health issues, and environmental issues will eventually affect the country. This essay aims to give a general overview of solid waste recycling in Malaysia at the level that affects a community or country the most, the family. In Malaysia, households are the main producers of municipal solid waste, with recyclable materials making up between 70 and 80 percent of the total waste found in landfills. To improve solid waste management from a recycling perspective, it is important to consider Malaysia's current household solid waste recycling policy and program status. Wastes are still dumped in open areas of land without any attempt at recovery or recycling, despite the high potential and opportunities for doing so. Malaysia's rate of 5% illustrates the rarity of this practice when compared to recycling rates in neighboring nations. The government is committed to greatly enhancing solid waste management services for all citizens, particularly waste minimization. Since wastes, separation, and recycling make up a sizable portion of the major changes in the current policy implementation, it is a good thing that the emphasis on recycling as a sustainable waste management strategy has undergone a paradigm shift. The question of whether the 2020 goals can be met is still up in the air, but there is a chance for a successful implementation of sustainable solid waste management, especially in recycling. These issues and challenges in recycling practice were highlighted in this context, particularly from the aspects of information availability and other loopholes within solid waste management policies and, related recycling programs within the community.

**Keywords**: *Solid Waste Management, Sustainability, Malaysia*

## 1. Solid Waste Management: The History

The control of waste generation, storage, collection, transfer, and disposal of solid wastes (SW) in accordance with best practices for public health, economics, finance, engineering, administration, law, and the environment is known as solid waste management (SWM). One of the top three environmental problems that municipalities face worldwide is the generation of solid waste. It is typically inversely proportional to the degree of urbanization and income, with economies with higher incomes and greater levels of urbanization producing higher per capita levels of solid waste.

Any solid waste may be disposed of, burned, deposited, or decomposed under the Malaysia Solid Waste and Public Cleansing Management Act 2007 (Act 672) (Nagapan et al., 2012). Landfill dumps, however, are still frequently used in Malaysia to manage solid wastes because they are inexpensive and easy to use, as opposed to incinerators, which are more expensive and operate with specialized technical knowledge. The waste problem is out of control and is not going away, as evidenced by landfill dumps. Since the majority of landfills are approaching or have already reached their capacity limits, disposing of solid waste in landfills is becoming more challenging. Building new landfill sites is also getting more and more challenging because of a lack of available land, rising land prices, and increased demand brought on by population growth (Latifah et al., 2009).

Municipal solid waste makes up 64% of Malaysia's total waste, with industrial waste making up 25%, commercial waste making up 8%, and construction waste making up 3% (EU- SWMC, 2009). In landfills, recyclable materials make up about 80% of municipal solid wastes (MHLG, 2006), and household waste contributes the most to this category of wastes, with recyclable materials making up no more than 70% to 80% of the total solid waste composition (Sumiani et al., 2009). One of the major sources of municipal solid waste in Malaysia, along with institutional and commercial waste, is the residential sector (Tariq and Mostafizur, 2007). The roughly 20 categories of municipal solid waste, which can be classified as organic or inorganic, include food waste, paper (mixed), cardboard, plastics (rigid, film, and foam), textile, wood waste, metals (ferrous or non-ferrous), diapers, newsprint, high grade and fine paper, fruit waste, green waste,

batteries, construction waste, and glass (Amin & Go, 2012). Without any attempt to recover or recycle the waste, it is simply dumped in a field, regardless of its composition or type (Amin & Go, 2012).
A paradigm shift from traditional waste collection and disposal is represented by the emphasis on recycling as a strategy for sustainable waste management (Bolaane, 2006). Due to its potential to lower disposal and waste transport costs and increase the lifespan of landfill sites, recycling has gained widespread acceptance as a sustainable method of solid waste management (Folz, 1991; Muttamara et al., 1994; Suttibak and Nitivattananon, 2008). Since it is one of the most economically and ecologically sound approaches to waste management (Omran et al., 2009), the idea of turning materials that would otherwise be discarded into valuable resources with financial, environmental, and social returns (US EPA, 2012) has attracted increasing attention as a means of protecting the environment.

For this reason, Malaysia's Ministry of Housing and Local Government started a national recycling campaign in 1993. However, recycling has not yet become a common practice in Malaysia despite significant efforts. Over 100 million tonnes of solid waste are dumped or buried each year when they could be recycled. For the collection and disposal of its urban waste, Malaysia spent RM37.4 million (8.11645 million Euros) in 1990, which amounted to 877 million pounds or 546 kg per person per year. The government decided to restart the recycling campaign in 2001. This time, more money was allocated to public relations and instruction. Leading recycling campaigns and the collection of recyclable materials were a number of non-governmental and community organizations. The results, however, have remained largely unchanged seven years after the relaunch (Abdelnaser et al., 2006 a, b). However, only 5% of waste is recycled, leaving the question, "Why were recycling campaigns unsuccessful?" unanswered.

Concessionaires, local governments, and their contractors only collected about 75% of the solid waste produced in 1998 (UNDP, 2008). As the population grows overall, living standards rise, and people's lifestyles change, so will the amount of waste produced by residential and commercial facilities (Hassan et al., 2001). According to the World Bank (1999), urban residents produce two to three times as much solid waste as their rural counterparts. The rate of waste production in urban areas is currently around 760,000 tonnes per day, but by 2025, it is predicted to soar to 1.8 million tonnes per day. (1999, World Bank).

## 2. Solid Waste Management and Disposal in Malaysia

According to Latifah et al. (2009), solid waste is typically divided into three major categories, each of which is controlled by a different government. The Ministry of Housing and Local Government (MHLG) is in charge of managing municipal solid waste; the DOE is in charge of managing hazardous or scheduled waste; and the Ministry of Health (MOH) is in charge of managing clinical waste. In essence, the National Solid Waste Management Department (NSWMD) of Malaysia develops and recommends solid waste management and public cleansing policies, plans, and strategies, establishes standards, specifications, and codes of practice, and grants licenses and approval in accordance with the Act 672. While doing so, the Solid Waste Management and Public Cleansing Corporation (PPSPPA) carries out the proposed policies, plans, and strategies of NSWMD, monitors adherence to its standards, specifications, and code of conduct, and carries out, enforces, and recommends changes to its solid waste management and public cleansing laws.

Because wastes must undergo pricey and time-consuming physical, chemical, and biological treatment and segregation, the landfill method is the least preferred method of waste disposal (Grodzinska-Jurczak, 2001). According to Tchobanoglous et al. (1993), landfills are physical facilities used for the final disposal of unrecovered wastes. They are used for the disposal of residual solid wastes in the earth's surface solids. The majority of landfill sites in Malaysia, however, are open dumping grounds with overloaded capacity, posing serious environmental and social risks (Yunus and Kadir, 2003; Latifah et al., 2009). Landfilling is also the most popular method of disposing of solid waste in Malaysia. The majority (95%) of waste that is collected is sent to landfills for disposal, with a very small percentage undergoing intermediate processing; the remainder is either sent to small incineration plants for treatment, diverted to recyclers or re-processors, or illegally dumped (NSP, 2005). According to UNDP (2008), Malaysia's solid waste collection is primarily restricted to urban and township areas, with adjacent rural areas receiving only sporadic collection. Because there are no solid waste collection services in these areas, residents must rely heavily on burials close to their

homes and are largely independent. This explains the widespread use of open dumping and small dumpsites as well as illegal dumping.

Anaerobic landfill, anaerobic sanitary landfill with daily cover, improved anaerobic sanitary landfill with buried leachate collection pipes, semi-aerobic landfill with natural ventilation and leachate collection facilities, and aerobic landfill with forced aeration are the five categories into which the decomposition processes in a landfill are divided. Level 0, open dumping; Level 1, controlled tipping; Level 2, sanitary landfill with a bund (embankment and daily soil covering); Level 3, sanitary landfill with a leachate recirculation system; and Level 4, sanitary landfill with a leachate treatment system (Latifah et al., 2009). However, a second classification system is used for operational purposes. In Malaysia, landfill sites are accessed and categorized using the second classification system (Idris et al., 2004). The majority of these sites are nearly full, and 50% of them have a remaining lifespan of less than five years, according to the resources available; an MHLG survey conducted in 2002 found that of the 112 disposal landfill sites in use, 43 percent were open dumps, and only 6.3 percent were classified as Level 4 landfills (NSP, 2005). Recycling in Malaysia is still in its infancy, and these landfills are in poor condition (Latifah et al., 2009).

In the current Malaysian Plan, the government outlined actions to increase the effectiveness of solid waste management, which will lower greenhouse gas emissions, including the recycling of non-organic waste and the construction of material recovery facilities and thermal treatment plants (Lim, 2019). At the most recent United Nations Summit on Climate Change in Copenhagen, Denmark, Malaysia pledged to reduce greenhouse gas emissions by 40% of the nation's GDP by 2020 compared to 2005 levels (Lim, 2019). The use of an incinerator is being considered as one of the disposal options because Malaysia cannot rely solely on landfills. Despite being the second most popular method for disposing of solid waste after landfilling, incineration is also one of the most expensive ways to manage solid waste because of its high capital and operating costs (World Bank, 1999). To get rid of hazardous waste, Malaysians developed incineration (Latifah et al., 2009). Recycling alternatives to composting seems to offer a more environmentally friendly way to dispose of waste because recyclable materials make up the majority of the waste disposed of. Existing smaller incinerators don't seem to have any positive effects, and some of them aren't even operational when they're finished because of the mounting financial burden this technology's operating costs cause.

By 2025, Malaysia wanted to recycle 40% of all solid waste, but the country's current recycling rate is only 31.5%. Malaysia's recycling rate is less than half as high as that of other developed nations, which is more than 60%. The majority of studies emphasize an overall picture of the state of solid waste management, despite the need to draw attention to other issues like recycling solid waste. Despite the fact that sustainability in solid waste generation at the source is achieved by implementing the 3Rs, which are reuse, reduce, and recycle in ascending priority order, the term "recycle" should not be taken lightly.

## 3. Challenges of the Recycling Program

It is thought that the main barriers to participation are knowledge of the existence of a recycling program and the knowledge necessary to adhere to the program's rules and regulations. Salhofer and Isaac (2002) provided evidence of the importance of PR in the recycling strategy. They thought public relations could be utilized to inform and motivate people to take part in recycling campaigns. According to Salhofer and Isaac (2002), public relations projects must be meticulously and professionally planned, and they must also include an analysis of the target audience and media selection. Public relations activities must target specific audiences to produce promising results. Government support and encouragement for recycling are frequently widespread, but public participation in recycling is generally low. Why is there a disparity like this? Numerous explanations have been discovered by researchers.

In their thorough meta-analysis of 67 empirical studies on recycling, Hornik et al. (1995) found a number of factors that might affect recycling behavior. The two basic types of variables were identified as incentives for social behavior and facilitators (or barriers to social behavior). They might be internal to the person or outside. Hormuth et al.'s (1993) analysis of flat dwellers' recycling practices identified two interrelated strategies for making daily recycling easier. One involved placing recycling bins in convenient spots, and the other involved integrating recycling into the regular behavior stream of cooking and cleaning up after meals.

Similar thinking was put forth by Zimmerman (1989), albeit from a different theoretical standpoint. Zimmerman (1989) asserted that individuals must learn how to set up their environment so that it supports desired behaviors in his analysis of effective self-regulation. To find out whether manageability affects desired behavior, he used an open-ended survey to find out how participants organized their recyclables. Social influence was defined by Vining and Ebreo (1990) as the worry about how one's friends and family may view his or her recycling behavior, including the presence or absence of support. This social pressure might be enough to keep recycling practices going. DeYoung (1989) found that the importance of feeling good about recycling was underestimated. Recycling is a practice that can demand a lot of work from the individual as it requires sorting, preparation, and storage of household waste (Boldero, 1995). As a result, choosing to recycle is probably going to be difficult, and a number of things might be taken into account. Convenience is one of the factors that researchers are looking at, though. Nyamwange (1996) asserts that making recycling more convenient can be a strong motivator. Furthermore, numerous studies that sought to pinpoint particular traits associated with recycling participation have conducted extensive research on the motivational factors that underlie recycling attitudes and behaviors.

The significance of comprehending the environmental influences on consumer behavior and figuring out the factors that predicted such behavior was emphasized by Bratt (1999). The study found no correlation between behavior and the social norm, which is made up of the consistent behavioral patterns of the vast majority of people around the individual. Peer pressure was found to be a significant predictor or motivator of recycling behavior in the findings of Oskamp et al. (1991), which was unexpected. This shows that subjects tended to behave more morally when around other people, especially when their peers engaged in recycling. Some of the reasons why some communities develop strong recycling habits include social influences, altruism, and regulatory factors (Vining and Ebrero, 1990; Ewing, 2001). However, the main drawbacks are the effort (Oskamp et al., 1991), space (Vining and Ebrero, 1990; Boldero, 1995), and cost (Ewing, 2001).

One way to lessen inconvenience and facilitate recycling is to recycle at the curb. According to Boldero (1995), contextual elements like the amount of work required, inconvenience, storage space, and accessibility to recycling programs are likely to have an impact on recycling behavior. A measure incorporating situational variables was incorporated into the model because of the significance of these variables in Boldero's (1995) research. The importance of public awareness in determining participation rates was emphasized by Thomas (2001). The success factors, which are their consistency and effectiveness rather than the quantity of participating homeowners, are appropriately highlighted. The importance of local government awareness and promotion campaigns was emphasized by Evison and Read (2001); campaigns that are poorly planned and executed will have low participation rates. In the United Kingdom, even though a very high percentage of householders (over 60 percent) claimed to recycle, evidence suggested that this self-reported behavior was exaggerated, with the actual proportion being much lower. This was stated in a MORI report from 2002. What's more concerning is that a sizable minority (10–15%) never recycles under any circumstances. A predictive model for recycling participation and material capture rates has been created by Tucker et al. (2018). They mention the relatively low recycling rates. However, there are a number of low-cost tactics available, such as carefully planned information campaigns for practical collection systems, for achieving and maintaining high participation and capture rates. They correctly point out that high informational and operational costs frequently accompany recycling programs, and they emphasize the need for a variety of activities to support such expensive programs to ensure cost-effectiveness. According to Parfitt (2001), a number of factors are to blame for the rise in municipal waste. Demographic factors, increased consumer spending, changes in consumer behavior, and adjustments to waste management practices are a few of these. According to Garcés et al. (2002), a person's recycling behavior was influenced by their level of environmental consciousness and their understanding of the effects of urban waste on the environment. McDonald and Oates (2003) looked into the barriers to curbside collection and produced useful recommendations regarding the need for a thorough audit of the target area before collection scheme development.

The importance of socioeconomic factors and their impact on recycling rates are emphasized by Emery et al. (2003). The authors show that precise data on household purchasing patterns and waste composition are crucial before creating efficient local strategies. Williams and Kelly's 2003 investigation into the problems with recycling green waste for MSW collection. Absence from this waste stream is a complicated, multifaceted

issue that necessitates extensive, ongoing research. People must be made aware of the why, what, and where of recycling. People with an external locus of control or skepticism (Rotter, 1954) might think that participating in recycling wouldn't make a difference. These people might need extra encouragement to recycle. People must therefore be aware of the benefits recycling has for the environment as well as its motivations. Having the right opportunities, resources, and information to recycle, as well as not being discouraged by the physical challenges of recycling (such as time, space, and inconvenience), are thought to have the greatest impact on recycling behavior, according to Tonglet et al. (2004). Increased public understanding and participation in recycling services are necessary for awareness-raising campaigns to be effective (Read, 1998; 1999). In their study, Garcés et al. (2002) found that when a recycling program is perceived to be supported by sound environmental policies and to be organized and controlled by good management, it has a positive impact on individual recycling behavior. According to the study, one major barrier for people who wanted to lessen their environmental impact but weren't willing to comply with government initiatives by going above and beyond was the amount of effort needed to participate in a program.

Therefore, it is the responsibility of the government to carry out efficient programs that consider both the needs of individuals and the environment. As a side note, Guerin et al. (2001) also looked at how people reacted after assessing how well the government handled environmental issues. People were more likely to adopt environmentally friendly habits if they thought their government was making an honest effort to protect the environment. If people think recycling is a significant issue, perhaps because they are aware of the government's proactive actions, they will devote their time and energy to a recycling program (Guerin et al., 2001). Polish officials from Jaslo City determined that a similar approach would be effective there. The findings, however, do not support the earlier hypotheses (Grodzinska-Jurczak et al., 2006; that household motivation is a function of socioeconomic factors). According to researchers, areas, where residents are well-educated, financially secure, and have satisfied their basic needs, are those where recycling participation rates are highest (Tikka et al., 1999).

Perry and Williams (2006) highlighted the significance of comprehending ethnic minorities' recycling profiles and promoting their participation in recycling programs in recent research. According to their conclusions, this can be achieved by offering written information in ethnic minority languages and by holding presentations and focus groups at religious or cultural institutions in those languages. Bolaane (2006) identifies potential obstacles to advancing people-centered recycling approaches and offers many solutions to overcome them. His research included key informant interviews as well as household member interviews. It was based on a case study of Gaborone, Botswana. The study found that although Gaborone's municipal officials are aware of the potential advantages of recycling, they don't seem to support waste management reforms like municipally run recycling programs. Williams (2005) contends that the central government should create tools to help local governments evaluate and choose their strategic waste management options and create implementation plans. Local governments should be required to produce municipal waste management strategies through a two-stage process that focuses on operational issues and is based on the strategies and goals already developed and published by the central government. Imam et al. (2008) conducted recent research that examined Abuja City residents' mentalities in great detail. They found that Abuja residents have a bad opinion of waste disposal. Transporting garbage to bins is frequently seen as something that only children should be responsible for, and people who deal with garbage are frequently stereotyped as filthy, downtrodden, and inferior. In Abuja, both the public and private sectors have worked to raise public awareness of the problems with solid waste management. Televised debates on waste management have also taken place. It is also well known that improper waste disposal has negative effects. However, the majority of people still do not understand that everyone has a crucial role to play in improving environmental quality and that it is not just the government's responsibility.

## 4. Conclusion

Malaysia faces a serious problem with solid waste management because the nation produces a lot of waste each day. Approximately 38 thousand tonnes of waste were produced daily in Malaysia in 2020, according to the Ministry of Environment and Water. Numerous challenges are presented by Malaysia's solid waste management as it stands right now. The absence of adequate waste management infrastructure, such as

landfills and waste treatment facilities, is one of the major problems. This has led to a large number of illegal dumpsites, which may cause environmental pollution and present health risks for the communities nearby. The lack of public education and awareness regarding waste management is another barrier. Many Malaysians are still ignorant of the value of waste minimization, recycling, and appropriate waste disposal techniques. Low recycling rates and contamination levels in the recycling stream are the results of this.

In response to these problems, the Malaysian government has implemented several measures to enhance solid waste management throughout the nation. Among them is the National Strategic Plan for Solid Waste Management 2019–2030, which seeks to lower waste generation, boost recycling rates, and enhance waste management facilities. The Extended Producer Responsibility (EPR) policy, which mandates that importers and manufacturers be in charge of the entire product lifecycle, including waste management, is currently being put into practice. Enforcing the 2007 Solid Waste and Public Cleansing Management Act, which defines penalties for violations and governs waste management practices? Promoting public education and awareness campaigns on waste management, including the 3R (reduce, reuse, recycle) concept and appropriate waste segregation is the final step.
Despite the fact that solid waste management in Malaysia continues to face difficulties, the government's initiatives as well as greater public awareness and education could help the situation in the years to come.

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# Determinants of Sustainable Development among Malaysian Small and Medium Enterprises: A New Conceptual Framework

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**Abstract:** Sustainable development is an emerging paradigm designed to strike the balance between the ecological health of the planet and human development in a manner that ensures that both meet the needs of the present without compromising the future. However, little is known about the determinants of sustainable development among Small and Medium Enterprises (SMEs) in Malaysia. As such, the present study fills up the gaps by examining the relationship between integrated management systems, technology and innovation capability, sustainability orientation, green corporate image, government support and sustainable development. This research applies a quantitative survey method using a self-administrated survey questionnaire to collect data from SMEs in Malaysia. Data from this survey will be analyzed using PLS-SEM to examine the associative relationship between determinants of sustainable development and sustainable development. This study will contribute to the body of knowledge by documenting factors that lead to sustainable development, namely integrated management systems, technology and innovation capability, sustainability orientation, green corporate image and government support. It also will benefit both enterprises and the government in building competitive, resilient, and sustainable enterprises in the domestic and international markets.

**Keywords**: *Green Corporate Image, Government support, Integrated Management Systems, Sustainability Orientation, Sustainable Development, Technology and Innovation Capability.*

## 1. Introduction and Background

Throughout the period since the release of the Brundtland Report by the World Commission on Environment and Development (WCED, 1987), the sustainable development concept has been gaining continually more interest from a majority of research disciplines in the recent decade. The world saw an increasing focus on business opportunities with the green agenda where traditional business was to encouraged to transform their business to reflect their concern for environmental and social issue (Mazutis and Sweet, 2022). The commitment of social entrepreneurs to social goals can lead them to exploit limited resources and act productively within institutional constraints (Dyck et al., 2019). Despite institutional failures surrounding them, many enterprises attempt to implement strategies that promote sustainable development. Hence, sustainable entrepreneurship can be interpreted as a spin-off concept from sustainable development. Sustainable entrepreneurs are those companies that contribute to sustainable development by sustainably doing business (Lazano et al., 2015). Sustainable entrepreneurship has been widely debated lately (Zeng, 2017). Despite that, there is a lack of thought of the sum and substance of this phenomenon and the future of sustainable entrepreneurship in theory and practice (Muñoz & Cohen, 2018; Terán-Yépez et al., 2020).

As such, sustainable entrepreneurship emerges. As an important domain within the entrepreneurship study at present (Munoz and Cohen, 2018; Hall et al., 2010) and there is growing recognition that fundamental transformation is needed to reduce detrimental environmental and societal impacts created by our currently unsustainable business practices (Hall et al., 2010). In this context, sustainable entrepreneurship is increasingly recognized as a significant conduit for bringing about a transformation to sustainable products and processes, with numerous high-profile thinkers advocating sustainable entrepreneurship as a panacea for many social and environmental concerns (Hall et al., 2010). Besides, Shepherd et al. (2011) argued that in today's world, the question of how businesses can become a vehicle toward more sustainable development has become more relevant than ever. As a way to solve the problems, crucial to a more sustainable economy is the successful implementation of sustainable practices through entrepreneurial activities (Patzelt & Shepherd, 2011). According to Gimenez et al. (2012), a company needs to operate responsibly and sagacious, look after employee health and safety, and quality of work-life of the external community. In turn, Patzelt and Shepherd (2011) stated the need to explore the role of entrepreneurial action.

As a mechanism for sustaining nature and ecosystems. In this way, sustainable entrepreneurship aims to promote positive environmental and social change0 and establish a platform presenting new opportunities for businesses, decision-making, and new products or services from the very beginning to the end, rather than pursuing economic profits as the primary objective (Zeng, 2017). Another expansion of this trend was that there were calls for targets on social and environmental practices to be determined at a multi-national or national level and a regional level (Apostolopoulos et al., 2018). Although the promise sustainable entrepreneurship holds for fostering sustainable development, there remains considerable uncertainty regarding the nature of sustainable entrepreneurship's role in the area. In addition, the determinants of sustainable development among small and medium enterprises in emerging economies are understudies (Zeng, 2017). The academic discourse on sustainable development within the mainstream sustainable entrepreneurship literature has to date been sparse. While entrepreneurs have long been recognized as a vehicle for exploiting emerging opportunities associated with societal needs, little understanding of how entrepreneurs will discover and develop those opportunities beyond the pull of existing markets. Thus, the case for sustainable entrepreneurship as a panacea for transitioning towards a more sustainable society is alluring.

There remain significant gaps in our knowledge of whether and how this process will unfold (Zeng, 2017). Besides, the relationship between sustainable entrepreneurship and sustainable development is often more prescriptive than descriptive and, perhaps, overly optimistic. Hence, it remains an open question as to what entrepreneurs have the potential for creating sustainable ventures, and if sustainable-oriented entrepreneurs differ from traditional entrepreneurs. Research is also needed to explore the role of public policy and how it may positively influence the incidence of sustainable entrepreneurship (Hall et al., 2010). Small and Medium-Sized Enterprises (SMEs) have attracted research in various fields of study (Mazutis & Sweet, 2022). Because of their predominance, SMEs' significant role in preserving the environment is self-evidence (Fonseca et al., 2020). Prashar and Sunder (2020) pointed out that research in operation management literature on sustainability considerations towards the social issue and environment and social dimensions were less explored. Despite the wealth of literature available in the field, there is a lack of a theoretical framework explaining sustainable development in SMEs (Sarango-Lalangui et al., 2018). As such, further study needs to be conducted to better explain the phenomena of sustainable development within the context of small businesses.

## 2. Literature Review

Sustainable Development requires a fundamental shift in consciousness as well as action. It calls for a fresh vision, a new dream, and new approaches for shaping evolving new realities. As early as Zhou Dynasty (110BC-771), realized that the mountains, forests, and rivers should be rationally used according to the laws of nature rather than overexploiting them (Shi et al., 2019). Thus, it is a development paradigm as well as the concept that calls for improving living standards without jeopardizing the earth's ecosystems or causing environmental challenges such as deforestation and water and air pollution that can result in problems such as climate change and extinction of species (Benaim et al., 2008; Browning & Rigolon, 2019). Its significance has been growing since 1972, when "sustainable development" was first coined at the United Nations on the Human Environment, beginning the concept of sustainable development. Later, in 1987, the World Commission on Environment and Development drafted a report on human development, "Our Common Future," which the first time systematically stated the definition of sustainable development.

The definition emerging from the report, "Sustainable development is a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987), emphasizes the dynamic aspect of sustainability. At its core is the notion that all-natural systems have limits and that human well-being requires living within those limits. Issues such as population, food, spices, genetic resources, energy, human habitation, social justice, and human development within the framework of social equity and equitable distribution and resource utilization were highlighted in the "our common future" reports (WCED, 1987). The ensuing decades saw fundamental challenges to sustainable development and sustainable growth at all levels of systems, from individual to global. Sustainable development came as an idea for the past more than 130 years ago (George, 1879). It evolved and gain significant popularity and emergence by increasing interest from the academic scholar.

Especially on operation management, which recognized sustainable development (WCED, 1987) as a critical and inter-disciplinary field of research (Gunasekaran & Spalanzani, 2012; Prashar & Sunder M, 2020). Unsustainable business practices have had a negative impact both socially and environmentally due to the misuse of natural resources and the non-conservation of the environment (Ben Youssef et al., 2018). Small and Medium-Sized Enterprises have attracted research interest since the early 1980s from researchers in management (Yap et al., 1992), organization studies (Paniccia, 1998), and many other research domains (Yap et al., 1992). SMEs represent about 90 percent of enterprises globally and employ 50-60 percent of the world's population, which means that many countries' business sector is mostly composed of SMEs (Dey et al., 2018). Because of their predominance, SMEs' significant role in preserving the environment is self-evidence (Fonseca et al., 2020). Pullman et al. (2009) pointed out that research in operation management literature on sustainability considerations towards the social issue and environment and social dimensions were less explored.

Behnam and Cagliano (2017) argued that very few papers considered all dimensions of sustainability simultaneously (economic, environmental, and social). Furthermore, a few of these reviews were specific to SMEs. At present, SMEs have considered the aspects of social implication and environmental protection in strategy formulation to improve economic welfare (Gast et al., 2017; Prashar & Sunder, 2020). While economic sustainability in SMEs is vital for their survival, the social and environmental dimensions and economic dimensions improve their overall performance by creating a new form of competitive advantage (Schwab et al., 2019). Hence it is very crucial to explore sustainable development in SMEs to gain a better understanding of the economic, social, and environmental impact of their operations to ensure the well-being of future generations (Prashar et al., 2020). The main message concerning sustainable development concepts is geared toward the economy, the environment, and society. Specifically, they relate, among others, to the conservation of ecosystems and biodiversity, production systems, population control, human resource management, conservation of progressive culture, and people's participation (Molinario et al., 2020).

**Dimensions of Sustainable Development**

**VUCA Approach**: The VUCA concept was first introduced by the U.S. military after the end of the Cold War to describe the conditions of a world ever more challenging to predict and rely on, shaped by Volatility, Uncertainty, Complexity, and Ambiguity (Shambach, 2004). Since its first appearance in the 1990s, the concept was quickly embraced by other fields such as strategic decision-making, risk management, and situational problem-solving. Business and management science adopted the VUCA concept after the financial crisis in 2008–2009 when societies, companies, and organizations all over the world suddenly found themselves faced with similar conditions in their social and economic environments and model (Bennett & Lemoine, 2014). Current research on the VUCA concept focuses on its consequences for sustainable leadership and strategic development and the challenges of adapting managers' and decision-makers mindsets to these new conditions. Even though the principles have been addressed individually, the VUCA concept has less studied its way into environmental science or conservation practice (Schick et al., 2016). A conservation site is defined to be subjected to "VUCA" conditions if the system expresses the following symptoms:

- A change toward increasing dynamics and speed of change forces (Volatility).
- A high degree of uncertainty within the main drivers of the system (Uncertainty).
- A high number of interlinkages within the system and with modes of higher orders (Complexity).
- Multiple interpretations of current and future conditions (Ambiguity).

In many cases, these global and national challenges are unprecedented with the rapidity and frequency of change in the modern era, becoming increasingly difficult to forecast and gauge. Many commentators note that we live in a time of VUCA, i.e., in a time where volatility, uncertainty, complexity, and ambiguity abound, and where such a state of affairs is becoming more, rather than less, commonplace (Bennett & Lemoine, 2014). As Bennett and Lemoine (2014) identified, VUCA is a worldview that describes four situations. The situation is volatile. There is a rate of change itself, uncertain where there is a lack of clarity about the present and future outcomes, complicated where there are multiple and competing decision factors, and ambiguous. There may be a multiplicity of meanings and significance. Economic, social, and environmental factors deeply rooted in Sustainable Development principles are integral components of organizational sustainability.

Through experiential learning experiences and dialogues during the Caribbean Canada Emerging Leaders' Dialogue (CCELD) 2019, they considered the extent to which small, medium, and large enterprises in the country are sustainable in the context of volatility, uncertainty, complexity and ambiguity (VUCA).

**Sustainable Development Theories**

**Resources-Based View Theory:** Utilizing the resources-based view, Barney (1996) defined sustainable development SMEs in terms of resources within the internal and external factors that determine SMEs' sustainable development. Accordingly, sustainable development can be viewed as mobilizing individual and interdependent resource stocks that enable and contribute to sustainability activities within its natural context. The resource-based view, which had been developed within the field of strategic management, focuses on sustainable and unique costly-to-copy attributes of the firm as the sources of economic rents. For example, the firm's fundamental drivers and sustainable competitive advantage are required for sustainable development and superior financial performance (Teece, 2016). A firm's capabilities in obtaining and maintaining profitable market positions depend on its capacity to gain and defend advantageous positions concerning the firm (Conner, 1991). Barney (1996) posited that a firm's success in the market not only depends on environmental factors but also the firm's functions and influence on the environment. He suggested that sustainable development's critical resources should be valuable, rare, imperfectly imitable, and not substitutable. Besides, Grant (1991) indicated that resources must capture durability, transparency, transferability, and replicability.

**Institutional Theory:** Institutional Theory is an alternative theoretical lens to previous research that has focused on Corporate Social Responsibility (CSR) and environmental management (Bai & Sarkis, 2010). The strength of Institutional Theory is that it explains why certain practices are chosen without an apparent economic return (Berrone et al., 2010). Sustainable development is an essential agenda in the modern business world (Amaeshi et al., 2008). Institutional Theory describes three forms of drivers that create isomorphism in organizational strategies, structures, and processes (Green Corporate Image). These drivers are coercive, normative, and mimetic (DiMaggio and Powell, 1983). Coercive occurs from influences exerted by those in powerful positions. Coercive pressures are crucial to driving environmental management and hence sustainability (Kilbourne et al., 2002). Normative drivers ensure organizations conform to be perceived as partaking in legitimate actions (Sarkis et al., 2011). Ball and Craig (2010) found that normative pressures drive enterprises to be more environmentally aware and argue that institutional research is needed to understand new social rules (e.g., ethical values and ecological thinking) and organizational responses to environmental issues. Therefore, normative drivers exert influence because of a social obligation to comply, rooted in the social necessity or what an organization or individual should be doing (March and Olsen, 1989). Mimetic isomorphic drivers occur when enterprises imitate successful competitors' actions in the industry and attempt to replicate the path to success and legitimacy (Sarkis et al., 2011).

**Ecological Modernization Theory:** This concept was first developed in theoretical terms in the early 1980s (Weber and Weber, 2020). Variously used to refer to the significant change internationally in policy discourse concerning the environment whereby the consistent overexploitation of Western industrial societies' environment is no longer accepted as routine (Cohen, 1998). In a wide-ranging review, Mol and Sonnenfeld (2000) identified three stages in the maturation of ecological modernization theory. The first was characterized by a heavy emphasis on the role of technological innovation, a critical attitude towards the role of the state, and bias towards market solutions (Hajer, 1995). From the late 1980s to the mid-1990s, the second took a more moderate view of the roles of technological innovation, the state, and the market and emphasized institutional and cultural dynamics (Hajer, 1995). The Brundtland Report (WCED, 1987) embedded the new thinking in broader principles, which recognized that environmental safeguarding in the longer term requires concerted socio-economic and cultural change internationally; and Agenda 21 (UNCED, 1992) codified processes by which the growth might be achieved. In the third and current stage (Lash et al., 1996), the debate has broadened to include consumption and global processes in the international arena. Social movements modify their functions so that reform ideologies take precedence over confrontation with the state, and intergenerational solidarity towards environmental protection is assumed. The food industry also produces a great deal of solid waste, mostly in packaging materials, by-products, and domestic waste, thus placing an additional burden on waste management (Rahim & Raman, 2015).

**Determinants of Sustainable Development**

**Integrated Management Systems:** Integrated management systems (IMS) can be a path for inducing sustainability (Anholon et al., 2018) mainly because manufacturing companies have undergone significant changes in the last few decades. As IMS can be shaped according to an organization's needs, they are capable of including different management system standards. Therefore, there are still debates about IMS. Before dwelling on the content of IMS, it is necessary to explain the concept of integration. Integration refers to "completion" and "aggregation" (Cambridge, 2020). However, the term integration should not be confused with "combination" and "compliance" in terms of management system standards (MSSs). Compliance refers to parallel MSSs prepared for the same discipline despite showing significant differences in terms of structure and content (Zeng et al., 2017). Concerning the term combination, it is the creation of a new system by adding different management systems to each other. The Malaysian Department of the Environment (DOE, 2010) released environmental performance reports showed that small and medium enterprises in the food and beverage industry were the leading contributor to water pollution and that the sector only complied with the minimum required level of relevant environmental regulations, which is in contrast to other industries (Rahim & Raman, 2015). Meanwhile, this particular industry uses a tremendous amount of energy, which results in the generation and emission of a vast amount of carbon dioxide (Karakaya & Özilgen, 2011). Consequently, there is interest among Malaysian food companies in responding to environmental impacts to reap some benefits by implementing environmental management systems, preferably ISO 14001 EMS (Musa & Chinniah, 2016).

**Technology and Innovation Capability:** Van Kleef and Roome (2007) defined innovation as the process of discovery and development that generates new products, production processes, organizations, technology, and institutional and systemic arrangements. This definition includes employing ideas, knowledge, and technology in a manner that enables firms to improve performance significantly. Onsel et al. (2008) indicated that innovation is not necessarily related to problem-solving but is instead typically related to improving competitiveness and economic success, and it is frequently spurred by technology. The previous literature distinguished the different types of innovation as technology, process, product and service, management, operations, and organization (McFadzean et al., 2005). For a firm, a competitive advantage not only is dependent on research and development but also is enhanced by potential technology (Chang and Chen, 2019).

In reality, most firms cannot have up-to-date technology developed in-house because of the increasingly complex nature of technology and short product life cycles. Suppose a firm wants to remain competitive in the market. In that case, it must quickly integrate, adapt, and upgrade the diversity of its external and internal information storage, retrieval, and analytical tools that relate to necessary work activities in addition to business and management functions with external technologies and on-time product launches (Chang and Chen, 2019). Therefore, searching for the internal factors that encourage technological innovation capabilities might augment the firm's understanding of innovative processes (Kafetzopoulos & Psomas, 2015). In terms of technology activities, vital networking and social capabilities benefit technology innovation because of the collaboration among actors in a network, as design can be achieved by implementing additional capabilities from outside sources (Becker & Dietz, 2004).

**Sustainability Orientation:** Firms' sustainability orientation (SO) is widely understood as a strategic resource, leading to competitive advantage and superior firm performance. While recent empirical evidence suggests a moderate and positive relationship between SO and financial performance on a firm level, it understood the influence of SO on new product development (NPD) success (Claudy et al., 2016). The result of sustainable products and services is still one of the least understood sustainability management areas, providing a clear mandate for further research (De Medeiros et al., 2014). In operational efficiencies, higher quality products and more excellent customer value ultimately lead to superior organizational performance (Hart, 1995). Sustainability orientation has defined the level of concern about individuals' environmental protection and social responsibility and consists of items that measure the underlying attitudes and personal traits on ecological protection and social responsibility (Kuckertz & Wagner, 2010). It reflects its convictions and beliefs on sustainable entrepreneurship. Its relationship with opportunity recognition and entrepreneurship intention is still questioned. Sustainability orientation can help to understand the

entrepreneurial purpose, to some extent focusing on sustainable development (Wagner, 2012) even though sustainability orientation and its positive impact on entrepreneurial intention tend to disappear with business experience.

**Green Corporate Image:** The green corporate image is reckoned to be the driving factor in the current business setups. Stakeholders' green perception of the firm encourages the growth of businesses. The organization moves from established companies to running businesses with sustainable agenda that creates value for their brand. Too and Bajracharya (2013) state in their research that the number of consumers preferring to purchase from companies that care about sustainability is growing. This statement is further strengthened by Namkung and Jang (2013) in their study by stating customers are more likely to choose a green restaurant that supports more green experiences and involvement. Although most leading brands have moved towards developing and introducing eco-friendly products in the current business era, it still faces a significant challenge to overcome consumer skepticism about their green operations and green attributes (Kumar & Christodoulopoulou, 2014). These are seen as greenwashing, where many organizations claim to be green when they are not practicing it.

**Government Support:** Some dimensions of sustainable development need more support and attention from the government and its political leaders. Hence an integrated approach is imperative (Hasna 2007). Without an integrated approach, governments may direct their focus only on some dimensions (i.e., political and economic) and neglect others. Humankind's impact on the ecology resulted in waste accumulation, pollution, "squeezing" of natural resources (water, marine life, timber, etc.), the so-called greenhouse effect, and climate change. This condition makes it clear that present levels of output and the impact on resources and the environment are unsustainable. Yet, it seems as if the global community is committed to an economic system that multiplies consumption levels (Van der Waldt, 2015). These make the role of the government as a catalyst for change even more indispensable. Moreover, it should be understood that the government's role in society, and in general, has expanded dramatically over the past century. In comparison to pre-20th century functions, governments have taken on new and vast roles that typically comprise a modern state (Brown 1991). Recognizing that SMEs, especially private firms, is the critical engine for economic growth, the government has set up supporting measures and issued various incentives. Although these policies cover all the different aspects of support for SMEs, difficulties in their implementation still exist because of unclear and unrealistic requirements (Le, 2010).

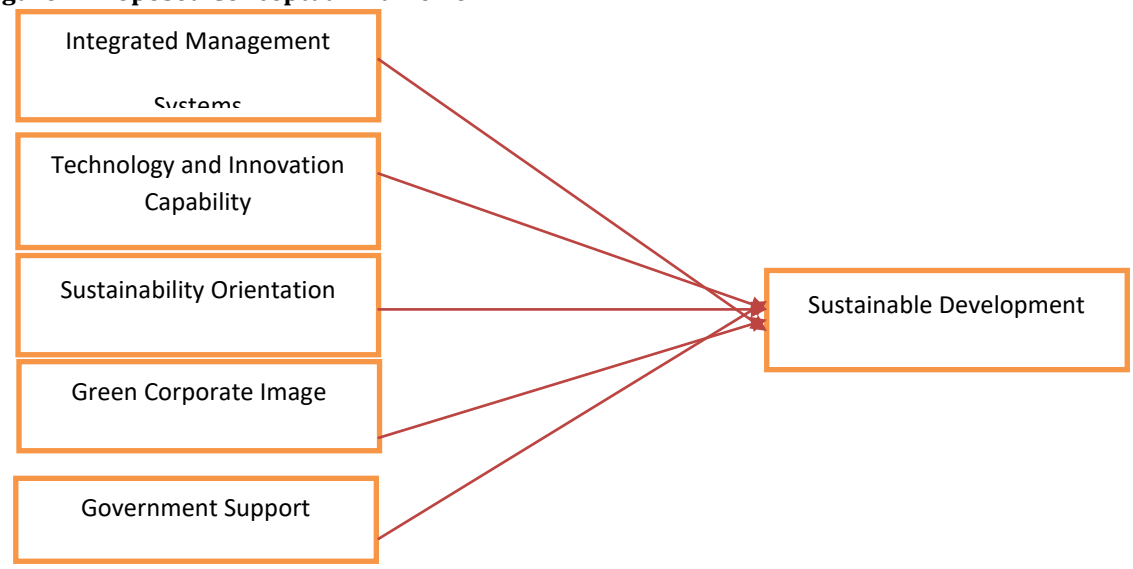
## 3. Proposed Conceptual Framework

Based on the above literature review, the Proposed Conceptual Framework of this study is developed. The framework is built around the concept of sustainable development that consists of sustainable development properties (VUCA Approach). Other building blocks of the framework are organizational and environmental characteristics. The SMEs under study features are reportable by the SMEs owner, Chief Executive Officer, or general manager. Notably, the proposed conceptual framework proposes that there is a relationship between the determinants of sustainable development (organizational and environmental characteristics) and sustainable development, which are expected to be positive. For example, the relationships between the determinants of sustainable development and sustainable development constructs are hypothesized to be positively associated. From this hypothesis, specific hypotheses for individual constructs then follow. To illustrate, integrated management systems are positively related to sustainable development. The framework advances SMEs' sustainable development research by clarifying the newly emerging field of sustainable entrepreneurship and its theoretical foundation within sustainable development research.

Sustainable entrepreneurship placed more importance on entrepreneurship and entrepreneurs (and their characteristics), broadly considered the critical variables in SMEs' sustainable development research. The proposed research framework is expected to provide several contributions to the literature. It addresses the development of an integrated and multidisciplinary approach to understanding the sustainable development of SMEs in Malaysia. Sustainable development cannot be fully explained by one theory and is better explained with an integrated approach (Yepez et al., 2020; Munoz and Cohen, 2018). Thus, this framework integrates several theories related to sustainable development discussed in this chapter, namely the resource-based view, ecological modernization theory and game theory. Besides, it also focuses on the multidisciplinary field

of study, sustainable entrepreneurship, strategic management, information systems, economic and statistics, management, and organization studies to better understand, fully explain, and document the sustainable development of SMEs in Malaysia. This framework also considers environmental factors in terms of government support that may impact the sustainable development of SMEs (Hall et al., 2010). Thus, this research is based on the Proposed Conceptual Framework presented in Figure 1 below.

**Figure1: Proposed Conceptual Framework**




**Hypotheses Development:** Several hypotheses are developed based on the literature review and related theories. These hypotheses focus on the influence of integrated management systems, technology and innovation capability, sustainability orientation, green corporate image and government support on sustainable development. Details of the specific research propositions are presented as follows:

**The Effects of Integrated Management Systems on Sustainable Development:** Integrated management systems provide organizations with a management philosophy that enables processes to be successfully managed and achieve desired results. When executives and other employees internalize the emerging management philosophy, it has a positive impact on sustainable development and provides many benefits to the organization (Anholon et al., 2018). Performed literature research indicates that integrated management systems have a constructive effect on management, employees, production, environment, market, occupational health, and safety processes. Integrated management systems focus on companies' medium- and long-term goals rather than the improvement in short-term indicators and form a corporate culture to this end (Gomes et al., 2006). As such the present study purpose:
**H1:** Integrated management systems relate positively with sustainable development.

**The Effects of Technology and Innovation Capability on Sustainable Development:** In the literature, innovation is considered an important element of firm success (Delgado-Verde et al., 2011). Harper and Becker (2004) indicated that innovation resulted in significant change, preferably an improvement in the real product, process, or service that exceeds the impact of previous achievements; these authors further indicated that innovation supported sustainable business management. Firms encourage innovation to achieve production and marketing goals, improve product or service quality, lower their operational costs, increase their market share, attain production flexibility, and enhance the management process (Walker et al., 2011). The above discussion signifies the importance of technology and innovation capability for sustainable development and leads to the following proposition:
**H2:** Technology and innovation capability relate positively to sustainable development.

**The Effects of Sustainability Orientation on Sustainable Development**: Sustainability orientation (SO) refers to the belief in integrating environmental and societal considerations in business operations (Kuckertz

& Wagner, 2010). It demonstrates the readiness of the organization to implement sustainability-related initiatives (Prasad, 2015). Entrepreneur's sustainability orientation is defined as the entrepreneur embracing goals or objectives that 'focus on preserving nature, life support, and community. It is perceived opportunity to bring into existence future products, processes, and services for gain. The benefit is to include economic and non-economic gains to individuals, the economy, and society (Patzelt & Shepherd, 2011). More elaborately, Klewitz & Hansen (2011) illustrated that sustainability orientation comprises a generation of intelligence about creating opportunities, proactiveness, and managing risks. It was related to present and future economic, social, and environmental progression, the diffusion of that acumen across departments, and the organization's self-renewal (Klewitz & Hansen, 2011). Therefore, it can be expected that sustainable development will be influenced by sustainability orientation. This leads to the following proposition:
**H3:** Sustainability orientation relate positively to sustainable development.

**The Effects of Green Corporate Image on Sustainable Development**: The corporate image definition is seen as what the stakeholders perceive the organization as a business (Amores-Salvadó et al., 2014). Corporate image is perceived as the feature of an organization in the eye of its stakeholders. It is the desired general impression of the organization in the minds of its stakeholders. Organizations spend their vital resources i.e., money, time, and people, to build a strong corporate image (Poon Teng Fatt et al., 2000). Studies have shown that companies tend to secure a position in the industry through this image and create a competitive edge for themselves (Too & Bajracharya, 2015). Several types of research have focused on the green corporate image (GCI) across various industries. Bansal and DesJardine (2014) indicated a diverse GCI effect on several internal and external organizational factors such as employee work-life, top management support and commitment and organizational sustainable development. Therefore, it can be argued that:
**H4:** Green corporate image relates positively with sustainable development.

**The Effects of Government Support on Sustainable Development**: Recognizing the critical role of Small and Medium-Sized Enterprises (SMEs) in the nation's economic activities, the Government of Malaysia has introduced several assistance programs. Incentives are called government-support programs (GSPs), consisting of financial and credit assistance, marketing, market research, technical and training assistance, extension and advisory services, and infrastructure support. The GSPs aimed at preparing sustainable growth for SMEs. However, the contribution of GSPs toward business growth in SME firms is still questionable. GSPs are lacking and not delivering enough towards developing and strengthening local SMEs (Hasna, 2007). Thus, it is expected that government support will impact sustainable development. This leads to the following proposition:
**H5:** Government support relates positively to sustainable development.

## 4. Research Methodology

This research applies a quantitative survey methodology using self-administered survey questionnaires to collect data from a sample of sustainable development SMEs in Malaysia. According to Amaratunga et al. (2002), quantitative methods help researchers establish statistical evidence on the strengths of relationships between exogenous and endogenous constructs. They also argued that the statistical results provide directions of relationships when combined with theory and literature. Furthermore, Cavana (2001) suggested that quantitative methods can be utilized to verify the hypotheses and provide strong reliability and validity. The study's target populations are the sustainable development SMEs in Malaysia. This research explores sustainable development SMEs involving manufacturing, service and agriculture focusing on established firms, traditional, low-technology, and high-technology industries consistent with the literature's recommendation for greater diversity in the industry scope (Zahra et al., 1999) in the emerging economies. The aim is to assess whether theoretical perspectives developed in mature market contexts are valid in emerging economies and obtain clear sustainable development patterns and outcomes. The key informants in this survey are the owners or the highest-ranking officers of Malaysian SMEs. They are believed to be the most knowledgeable about their firms' characteristics, management style, operations, and firms' performance (Roth and O'Donnell, 1996). Data collected from this survey will be analyzed using partial least squares structural equation modeling (PLS-SEM) to examine associative relationships between integrated management systems, technology and innovation capability, sustainability orientation, green corporate image, and government support and sustainable development.

## 5. Conclusion

Sustainability is an increasingly important issue for many people, especially in the business world. For business owners, leaders, and administrators, sustainable business practices are becoming imperatives that lead to the sustainable competitive advantage of a firm. Making businesses more sustainable starts with being aware of the issue at hand and understanding just how important it is to make changes both for the business and the planet. A sustainable business adheres to the triple bottom line which is profits, people, and the planet. A sustainable business earns profits by being socially responsible and protecting the use of the planet's resources. Sustainable development practices take an initial investment, but, over time, it will save money by prioritizing sustainability which can improve operational efficiency and cut costs. The entrepreneur should be aware of the complexities of sustainable development and the necessity of performing regular evaluations of factors related to sustainable development. Significant factors include integrated management systems, technology and innovation capability, sustainability orientation, green corporate images and government support. Small and medium enterprises are often recognized as the most important contributors to gross domestic product and employment. Therefore, the federal government should offer tax credits, rebates and savings for going green which can develop sustainable competitive small and medium enterprises in the domestic and international markets.

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# Impact of Social Media Marketing Activities on Online Purchase Intention for the Cosmetic Industry in Malaysia

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**Abstract:** In the digital era, marketing trends have undergone a significant transformation. A brand-new marketing channel that businesses are using to reach out to customers is social media. In this study, the effect of social media marketing methods on customers' desire to buy cosmetics is investigated. Entertainment, engagement, trendiness, personalization, and eWOM are the five social media marketing strategy dimensions that were examined in the study. Data were obtained using the convenience sample approach, and 260 valid questionnaires were gathered. Data analysis using the SEM-PLS method. The findings show that each of the five social media marketing strategy elements had a statistically significant impact on consumers' intention to make a purchase. Users' participation in online cosmetics purchases was found to be strongly influenced by entertainment.

**Keywords**: *Social Media Marketing Strategies, Purchase Intention, Cosmetic Industry*

## 1. Introduction and Background

Social media is a useful device for businesses with commercial interests and it helps improve the business operation (Gautam & Sharma, 2017; Rapp et al., 2013). Consumers also use social media to inform their purchasing decisions (Hutter et al., 2013). As more consumers are utilizing social media and businesses are incorporating it into their strategies, social media not only makes it easier for customers to interact with businesses, but it also gives customers a place to connect and engage with one another (Hall-Phillips et al., 2016). Thus, social media has become a popular medium for businesses to support their operations, including ways to improve relationships with their clients, advertise their goods or services, enhance their public image, and so on.

The usage of social media as a customer-centered communication channel and as an alternative to corporate marketing communication plans (Hutter et al., 2013). With this social media is increasingly viewed by modern companies as a method to perform promotional activities that efficiently reach targeted consumers for e-commerce. Social media marketing is the practice of using internet platforms like Facebook, Instagram and Twitter to advertise products or events to potential customers (Jamil et al. 2022). Social media marketing activity is an easy and quick way for the organization to communicate with consumers (Seo & Park, 2018) and a cost-efficient way to interact with customers (Kim & Ko, 2012).

Social media has emerged as one of the most often used marketing techniques by businesses (Umair et al, 2020) as it involves two-way interactive, low-cost, wide social networking and is convenient to reach customers (Irfan et al, 2017). Choedon et al. (2020) estimate that the value of social media marketing in the world surpasses USD billion. Social media marketing is a useful marketing strategy as it helps businesses to straightforwardly connect with their consumers, create brand awareness, and eventually sell more goods. Social media has been a popular marketing platform for the cosmetic industry in Malaysia to promote their product. According to a report in 2020, 57% of fashion and beauty businesses use social media influencers (SMIs) as a component of their marketing strategy and influencers rather than beauty brands themselves created the most popular beauty videos on YouTube (Starngage, 2020).

Therefore, this study investigates the impact of social media marketing (SMM) activities on customers' purchasing intentions (PI) in the Malaysian cosmetics sector. The SMM activities' entertainment, engagement, trendiness, customization, and word-of-mouth components make up the study's SMM dimensions. This study provides some theoretical and practical applications, particularly in the expanding online cosmetic e-

commerce. Consequently, it is anticipated that this research would deepen understanding of the particular online e-commerce sector. The foundation of the literature review will be further discussed in the next section.

## 2. Literature Review

### Social Media Marketing Activities

SMM is a new component of corporate marketing strategy that focuses on promoting goods, services, information, and ideas via online social media (Dahnil et al, 2014). Social media marketing activities were categorized by Kim and Ko (2010) into five categories: entertainment, trendiness, personalization, and electronic word of mouth. SMMA is defined as "a subcategory of online marketing/digital marketing that supports traditional promotion approaches" (Yadav & Rahman, 2018, p. 3884). SMMA is seen as a relational and promotional communication tool that supports the adoption of organizational marketing strategies by providing more interaction through online connections between businesses and customers (Ibrahim et al., 2020). By producing relevant and useful information for consumers, businesses may be able to predict their customers' future purchase patterns efficiently (Kim & Ko, 2012), increase the popularity of brand postings, bring in new customers, increase brand awareness, increase revenues, and encourage customer loyalty (Moslehpour et al., 2021). Studies have indicated that social media marketing efforts have a considerable impact on consumers' intentions to buy (Yadav & Rahman, 2017; Choedon & Lee, 2020).

### Entertainment

User participation in social media and the creation of user-generated content is greatly influenced by entertainment. Entertainment on social media is a crucial component that promotes positive emotions, encourages engagement, and enhances the intention to use it regularly (Kang, 2005). Hudson and Hudson (2006) assert that marketers should combine entertainment material with marketing content to establish a strong emotional tie between their business and their audience. Users will communicate their positive feelings to other group members who can then utilize that information to influence their purchasing decisions when they are feeling joyful, content, or satisfied (Dobele et al., 2007). Cheung et al.'s (2020) investigation of consumer behavior on social media brand sites revealed a significant positive association between entertainment and consuming behavior.

### Interaction

From the social media aspect, interaction refers to the process of discussion and communication between users, as well as between users and businesses, in which information is shared and ideas are traded. Social media interaction happens when users can easily converse and swap information and opinions with other members of the online community (Kim & Ko, 2010). Maoyan et al. (2014) claim that social media marketing interactions can be in terms of between clients or clients and businesses, but also allow businesses to promptly answer queries from customers. Cheung et al. (2020) found a positive significant relationship between interaction and consuming behavior on social media brand pages.

Trendiness

Trendiness is an element of social media marketing activities that provides clients with recent and updated information about the products (Godey et al., 2016). Many consumers attain information on various social media platforms because they think social media is a more trustworthy and convenient medium than company-sponsored communication through traditional promotional channels. Cheung et al. (2020) found an insignificant relationship between trendiness and consuming behavior on social media brand pages.

### Customization

Customization is the degree to which information or services are adjusted to satisfy the desires of the customer (Schmenner, 1986). Customization evades the issue of information overload and improves the effectiveness of decision-making (Tam & Ho, 2006). In Customization, social media platforms not only posted information but also need to offer users a space where they can get the information they need and openly express their opinions (Kim and Ko, 2010). Martin and Todorov (2010) contend that businesses may use social media customization as a method to promote their uniqueness and boost brand preference and loyalty.

Cheung et al. (2020) found an insignificant relationship between customization and consuming behavior on social media brand pages.

**eWOM**

Researchers have emphasized the need of understanding how consumers connect to one another in the digital world and how this might change the relationships (Borgatti et al., 2009; Sokolova and Kefi, 2020). According to Elseidi & El-Baz (2016) and Hussain et al. (2017), eWOM has grown to be a crucial factor in consumers' decision-making. Online customer reviews are one of the key elements that determine a brand's performance, and social media has regularly had a favorable and negative impact on the reputation of brands (Taylor, 2018). eWOM is important attitudes comprehend customers' behavioral intentions (Gvili &Levy, 2016). Khan (2019) found a positive significant relationship between eWOM and purchase intention.

Based on the literature discussed above the proposed hypotheses are as follows:
H1: Entertainment has a positive relationship with online purchase intention for cosmetic products.
H2: Interaction has a positive relationship with online purchase intention for cosmetic products.
H3: Trendiness has a positive relationship with online purchase intention for cosmetic products.
H4: Customization has a positive relationship with online purchase intention for cosmetic products.
H5: eWOM has a positive relationship with online purchase intention for cosmetic products.

## 3. Research Methodology

This study is cross-sectional quantitative research through the self-administered online questionnaire. The convenience sampling method was applied in the data collection process conducted in Klang Valley, Malaysia. There were 300 questionnaires gathered in all, and 260 of them could be used (respondent rate: 86.67%). Using GPower version 3.1.9.7, the minimal sample size necessary was determined (Faul, Erdfelder, Lang & Buchner, 2007). As suggested by Cohen (1992), with a power of 0.95 and an effect size of 0.15, a 138 sample size is required with 5 predictors.

The measurement items in the questionnaire were designed by adapting from previous studies. All measurement items of the constructs in the study were measured with a 5-Point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. Question items of the study to measure social media marketing strategies of entertainment, interaction, trendiness, customization and EMOW constructs were adapted from Laksamana (2018), Macharia & Cheng (2019) and Sharma et al. (2020). Items measuring online purchase intention were adapted from Toor et al. (2017). The WebPower online tool was to examine the multivariate normality with Mardia's multivariate skewness and kurtosis. The analysis results indicated the data were multivariate non-normality.

The analysis of the research model and structural equation modeling-partial least square (PLS-SEM) method was applied (Hair et al., 2017). The analysis was conducted using Smart PLS software version 3.8 (Ringle et al., 2015). The PLS-SEM analysis comprises measurement and structural models.

## 4. Results

### Demographic Analysis

The study's respondents' demographic analysis is shown in Table 1. The majority of responses were female at 81.3% and male at 18.7%. In terms of race, 68.7% were Malay, 20.7% were Chinese, 5.7% Indian and others were 5.0%. Furthermore, the percentage of respondents between the age of 20-29 was 33.0%. The highest was 30-39 with 37.7%, followed by 40-49 with 26.7 % and lastly 50-59 with 2.7%. Most of the participant's Nationalities were Malaysian 99.7% and others 0.3%. The highest monthly income was from RM3,001-RM4,000 with a percentage of 38.3%, followed by RM4,001-RM5,000 with 25.3%. Below RM2,000 and above RM5,000 had the same number of respondents with 13.3%. Lastly was RM2,001-RM3,000 with 9.7%.

**Table 1: Demographic Characteristics Analysis**

| Demographic Characteristics | Frequency | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 56 | 18.7 |
| Female | 244 | 81.3 |
| **Race** | | |
| Malay | 206 | 68.7 |
| Chinese | 62 | 20.7 |
| Indian | 17 | 5.7 |
| Others | 15 | 5.0 |
| **Age** | | |
| 20–29 years old | 99 | 33.0 |
| 30–39 years old | 113 | 37.7 |
| 40–49 years old | 80 | 26.7 |
| 50–59 years old | 8 | 2.7 |
| **Monthly Income** | | |
| Below RM2,000 | 40 | 13.3 |
| RM2,001-RM3,000 | 29 | 9.7 |
| RM3,001-RM4,000 | 115 | 38.3 |
| RM4,001-RM5,000 | 76 | 25.3 |
| Above RM5,000 | 40 | 13.3 |

**Measurement Model**

The measurement model's analysis findings assess the model's validity and validity. The convergent validity was measured using factor loadings, average variance extracted (AVE), and composite reliability (CR). As shown in Table 2, items loadings were greater than 0.5, AVE values surpassed 0.5 and the CR values more than 0.7. This indicates the convergent validity of the model was supported. There are 7 items dropped due to low factor loadings.

**Table 2: Measurement Model**

| Variable | Items | Loading | CR | AVE |
|---|---|---|---|---|
| Entertainment | ENT1 | 0.784 | 0.897 | 0.636 |
| | ENT2 | 0.774 | | |
| | ENT3 | 0.795 | | |
| | ENT4 | 0.827 | | |
| | ENT5 | 0.807 | | |
| Interaction | INT1 | 0.82 | 0.882 | 0.651 |
| | INT2 | 0.806 | | |
| | INT4 | 0.821 | | |
| | INT5 | 0.780 | | |
| Trendiness | TREN1 | 0.72 | 0.85 | 0.586 |
| | TREN2 | 0.705 | | |
| | TREN3 | 0.813 | | |
| | TREN4 | 0.818 | | |
| Customization | CUS1 | 0.705 | 0.893 | 0.582 |
| | CUS2 | 0.772 | | |
| | CUS3 | 0.804 | | |

| | | | | |
|---|---|---|---|---|
| | CUS4 | 0.767 | | |
| | CUS5 | 0.759 | | |
| | CUS6 | 0.766 | | |
| E-WOM | EWOM3 | 0.71 | 0.847 | 0.581 |
| | EWOM6 | 0.79 | | |
| | EWOM7 | 0.748 | | |
| | EWOM8 | 0.797 | | |
| Online Purchase Intention | PI3 | 0.736 | 0.914 | 0.639 |
| | PI4 | 0.837 | | |
| | PI5 | 0.844 | | |
| | PI6 | 0.84 | | |
| | PI7 | 0.782 | | |
| | PI9 | 0.75 | | |

The validity measurement was assessed using Heterotrait-Monotrait Ratio (HTMT) as presented in Table 3. The values of the HTMT criterion for all variables were less than 0.9, indicating that the model was discriminantly valid.

**Table 3: HTMT Criterion**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. CUSTOMIZATION | | | | | | |
| 2. ENTERTAINMENT | 0.716 | | | | | |
| 3. EWOM | 0.823 | 0.844 | | | | |
| 4. INTERACTION | 0.822 | 0.792 | 0.802 | | | |
| 5. ONLINE PURCHASE INTENTION | 0.539 | 0.852 | 0.710 | 0.655 | | |
| 6. TREADINESS | 0.783 | 0.899 | 0.825 | 0.783 | 0.736 | |

**Structural Model**

A bootstrapping approach was used to evaluate the structural model with a resample of 5000 (Hair et al., 2017). The structural model assessment comprises the $R^2$, path coefficient, t-value, p-value, confidence interval and effect size. Table 4 displays the analysis results of the hypothesis testing.

**Table 4: Hypotheses Results**

| Hypotheses | Std Beta | Std Error | t-value | p-value | BCI LL | BCI UL | $f^2$ | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| H1: Entertainment -> Online purchase intention | 0.506 | 0.092 | 5.470 | 0.000 | 0.365 | 0.654 | 0.209 | 0.591 |
| H2: Interaction -> Online purchase intention | 0.111 | 0.073 | 1.457 | 0.073 | -0.012 | 0.232 | 0.013 | |
| H3: Trendiness -> Online purchase intention | 0.218 | 0.067 | 3.338 | 0.000 | 0.104 | 0.314 | 0.043 | |
| H4: Customization -> Online purchase intention | -0.136 | 0.091 | 1.481 | 0.070 | -0.291 | 0.027 | 0.019 | |
| H5: EWOM -> Online purchase intention | 0.122 | 0.072 | 1.689 | 0.046 | 0.019 | 0.202 | 0.015 | |

The analysis results reveal that entertainment ($H1: \beta = 0.506, t = 5.470,\ p < 0.01$), trendiness ($H3: \beta = 0.218, t = 3.2338,\ p < 0.01$) and eWOM ($H5: \beta = 0.122, t = 1.689,\ p < 0.05$) have a statistically significant

positive effect on online purchase intention. While interaction ($H1: \beta = 0.111, t = 1.457,\ p > 0.05$) and customization ($H1: \beta = -0.136, t = 1.481,\ p > 0.05$) were found statistically insignificant impact on the online purchase. The results are consistent with Cheung et al. (2020) findings.

The effect size of entertainment on online purchase intention is large while interaction, trendiness, customization and eWOM have low effect size on online purchase intention. The $R^2$ value of 59.1% indicated that 59.1% of the variation in online purchase intention was explained by social media strategies (e.g. entertainment, interaction, trendiness, customization and eWOM).

The predictive relevance of the model was assessed through the blindfolding procedure. The $Q^2$ value ($Q^2$= 0.366) of the model is greater than 0, suggesting the predictive power of the model is sufficient.

## 5. Conclusion and Implications

This study examines the influence of social media marketing strategies of the cosmetic industry on consumers' online purchase intention. The findings showed that social media marketing activities of entertainment, trendiness and eWOM had a statistically significant impact on online purchase intention while interaction and customization were found to have an insignificant on online purchase intention in the cosmetic industry. Entertainment was the strong influencer factor for users to participate in online purchasing through social media and online platforms consistent with Muntinga et al. (2011) findings. Through entertainment, businesses may gain from their clients' favorable attitudes, which raise customer satisfaction (Luo, 2002) which can lead to higher intention to purchase. Findings also support the significance of trendiness on online purchase intention. As trendiness indicates the ability of social media to disseminate trendy information of knowledge, surveillance, pre-purchase information, and inspiration (Muntinga et al., 2011). These may motivate consumers to be aware and understand more about a specific product thus increasing consumers' online purchase intention.

This research adds to the body of knowledge by illuminating how social media marketing activities relate to customers' online purchase intentions in the cosmetic industry. To improve consumers' desire to buy cosmetics, the study's findings suggest that businesses should actively engage both regular consumers and well-known consumers on social media. Marketing communication aims to increase consumer knowledge of a product and induce purchase intention. Social media marketing is a suitable tool for attracting cosmetic customers given the growing interest in local cosmetics on the national market. Social media marketing initiatives serve as a crucial channel for marketing communication.

Interaction between businesses and customers is significant to stimulate online purchase intention. Customization was found to have a negative impact on online purchase intention. This indicates that if individuals' requirements were not satisfied by personalized service or information offered by social media platforms, businesses could decrease consumers' intention to purchase online.

Findings indicate the significance of eWOM on online purchase intention. This implies that messages or reviews comment posted on social media or e-commerce platforms concerned the consumers which may affect their actions and intention of purchasing. Thus, the value of the brand or product can indeed be communicated to consumers by social media platforms through peer-to-peer contact (Bilgin, 2018)

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# Conceptualizing Muslim Consumer Religiosity: Challenges and Recommendations for Future Research

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**Abstract:** Recent trends focused on religion as an essential aspect of culture that affects Muslim consumer *behavior*, especially religiosity. Nonetheless, *conceptualizing* religiosity for Muslims shows the complexity of the concept that transcends culture and fields of study. Therefore, researchers face challenges in understanding religiosity and its role in predicting consumer *behavior*. This paper sheds some light on the topic by highlighting these challenges to provide insight for future research agendas.

**Keywords**: *Religiosity, Muslim consumer religiosity, Muslim consumer behavior.*

## 1. Introduction and Background

Religion has an impact on how people live their lives, encouraging or discouraging people from choosing certain behaviors (Delener, 1994; Wilkes et al., 1986; Bailey & Sood, 1993). Consumer behavior that serves as the core of values in deciding consumption prescription and is formed at a young age is essential. (Sheikh & Thomas, 1994; Berkman 1997). Thus, religion is an important cultural aspect worthy of more investigation. The two essential constructs of religion are religious affiliation and religiosity [6]. Religious affiliation is denominational membership or religious identification of the individual. While religiosity is an individual's level of commitment to a religious group (Delener, 1994; McDaniel & Burnett, 1990). Of late, much research emphasizes the importance of religiosity, especially concerning consumer purchase behavior (Kaur et al., 2022; Rizkitysha and Hananto, 2022; Widyanto and Sitohang, 2022; Khan et al., 2021; Nurhayati and Hendar, 2020). Despite the emphasis, advancing religiosity in understanding Muslim consumers requires researchers to address two main concerns. First is the unclear construct measurement of religiosity in researching Muslim consumers (Salam et al., 2019; Ul-Haq et al., 2019; Abou-Youssef et al., 2011; Khraim, 2010). Secondly is the inadequacy of the current framework in incorporating religiosity as part of the construct in predicting consumer behavior (Amin et al., 2014; Amin 2017, Junaidi, 2021). Thus, the unclear constructs have led to a setback in developing a more compatible framework due to dependency on existing theoretical standpoints.

## 2. Adoption and Frameworks on Religiosity

Even though there are numerous alternatives for measuring Muslim religiosity, more general assessments stemming from a Judeo-Christian worldview have dominated the construct measurement utilized for Muslim customers. Popular adoptions included well-established religiosity metrics (Allport & Ross, 1967; Glock, 1972; Wilkes et al., 1986; Worthington et al., 2003). These measurements were altered and fitted to a unidimensional religiosity scale (Iranmanesh et al., 2020; Dekhil et al., 2017; Kusumawardhini et al., 2016; Mansori et al., 2020; Mokhlis, 2006). Some researchers also use a crude measure of religiosity (Abdolvand & Azima 2015; Ahmed et al., 2013; Moschis & Ong, 2011). In addition, considerable researches use generic metrics of Muslim origin (Alam et al., 2011; Abd Rahman et al., 2015; Awan et al., 2015). These unidimensional metrics appear insufficient to capture the complexities of religiosity (Abou-Youssef et al., 2011; Khraim, 2010). The majority of prior studies introduced religiosity into the preexisting theoretical framework. Typically, these frameworks use the Theory of Reasoned Action and the Theory of Planned Behavior as their underlying hypotheses.

A few researchers asserted that these hypotheses accurately describe Muslim customer desire to purchase Halal products (Lada et al., 2009; Alam & Sayuti, 2011; Mukhtar & Butt, 2012). In certain instances, religion is added to the original determinants of these theories, thereby emphasizing the existing theoretical premise (Acas & Loanzon, 2020; Yakin & Rahmani, 2018; Alam et al., 2012). The majority of the study had either suggested religiosity as a moderating element or as an additional factor to these theories' existing determinants. Current research indicates that the Theory of Islamic Consumer Behaviour (TICB) provides a

partial solution to the incompatibility of TRA and TPB in studying Muslim consumers (Amin et al., 2014, Amin, 2017). While being relatively infant, its compatibility with incorporating religion into a new framework is highly probable. Several researchers have clearly positioned religiosity as the independent variable (Amin, 2017; Junaidi, 2021). Nonetheless, utilizing the prevalent metrics of religiosity, such investigations fell short. Thus, further development of Muslim consumer religiosity within a more suitable framework is warranted.

## 3. Alternative religiosity measure for Muslims

Current research on measuring the religiosity of Muslims has flourished. As a result, increasing demand necessitated an alternative to mainstream religion. Although psychology research has offered a substantial number of these religiosity measures, their application in consumer research has been limited (Salam et al., 2019). In addition, such metrics require modifications to accommodate consumer research environments. To ensure item validity, items should be updated and carefully selected according to the subject of study (Abou-Youssef et al., 2011; Albelaikhi, 1997). To date, only a handful of researchers have revealed such modifications in study design (Usman et al., 2017). In contrast, consumer research experts utilize single-dimensional generic measurements of Muslim background (Alam et al., 2011; Abd Rahman et al, 2015; Awan et al., 2015). These may fall short of capturing the Islamic conception of a religion (Shukor and Jamal, 2013; Abou-Youssef et al., 2011; Khraim, 2010). Hence demonstrates that few efforts have been made to adjust religiosity to other fields, particularly consumer research (Salam et al., 2019; Ul-Haq et al., 2019). Hence, prior studies employed a variety of religiosity measures adapted from diverse religiosity instruments. These one-dimensional measures evaluated the influence of religiosity on a variety of dependent variables (Rehman & Shabbir, 2010; Alam et al., 2011; Alam et al., 2012; Awan et al., 2015; Abd Rahman et al., 2015). These efforts may lead to erroneous conclusions by demonstrating these links. Therefore, using a coarse measure of religiosity could limit its multidimensional measurement and impact.

## 4. Challenges

Recent trends indicate that scholars have proposed numerous new and enhanced religiosity assessments. There have been at least 28 religiosity assessments for Muslims in recent years. Despite the fact that such measurements were proposed, their use in Muslim consumer research has been restricted. In addition, there are two significant flaws of these metrics that have been thoroughly discussed in other study fields (Berry, 2005; King, & Crowther, 2004). These hazards pertain to the study's measurements and design. These metrics face conceptual and operational obstacles in their construct measurements. Concerning the study design, the obstacles will be a suitable study design that displays the relationships within a particular framework.

**Conceptual:** First, the constraints posed by construct measurement from both conceptual and operational viewpoints. Most experts concur that the essence of religiosity is a very abstract phenomenon or construct from a theoretical standpoint. Hence, it has been difficult to develop a theoretically and consistently coherent definition of religiosity. Various authors characterized religion differently from the typical standpoint. Manap et al. (2013) describe it from an Islamic standpoint that is unique from earlier definitions. Thus, the content validity of the conceptions of Muslim religiosity that are not part of the mainstream Western canon is called into question (Ul-Haq et al., 2019). In the literature, the complexity of religiosity as a concept has been extensively discussed (Berry, 2005; King & Crowther, 2004). Perhaps unresolved, inconsistencies in the definitions had been one of the primary criticisms. To comprehend the concept, others proposed an Islamic model of religiosity (Manap et al., 2013). This model provides guidelines for evaluating and developing Islamic-based measures.

The concept proposes that religiosity measures should emphasize the observable aspects of human behavior. Thus, such a concept requires both theoretical and practical virtue. In addition, some argued that spirituality is an inseparable component of religiosity (Rehman and Shabbir, 2010). Although others have acknowledged that it is possible to develop such religiosity, Allah is the sole judge of one's spirituality (Tiliouine & Belgoumidi, 2009). To date, there is no consensus regarding the number of such dimensions from both conventional and Islamic vantage points (Mokhlis, 2006). Despite the many proposed dimensions, the most important is an empirical question that remains unanswered (Ul-Haq et al., 2019).

Thus, Islam provides guidelines for religious observation by humans. These rules emphasize the manifestation of beliefs and practices, which is unquestionably multidimensional.

**Operational:** First, the constraints posed by construct measurement from both conceptual and operational viewpoints. Most experts concur that the essence of religiosity is a very abstract phenomenon or construct from a theoretical standpoint. Extending the concept of religiosity's shortcomings, its operationalization remains equally difficult. Lately, numerous constructions have been proposed to gauge the religiosity of Muslims. These concepts are frequently multidimensional elements of the Muslim faith, commitment, and allegiance, etc. Researchers have articulated the difficulties of such operationalization and identified a number of potential bipolar aspects (Berry, 2005). The author proposes defining the key characteristics of diverse operationalizations of religiosity. Substance vs. function, theocentrism versus non-theocentrism, and universalism versus particularism are bipolar aspects. It is difficult to find an equilibrium between the substantive and functional dimensions of religiosity. The substantive measures approach to religiosity, which focuses on traits like belief, relationship to the divine, and vision of self, others, and the world, may push the limits of scientific theory and theology (Berry, 2005).

While functional techniques frequently emphasize behavior and response, they tend to dissolve definitional boundaries if they are not related to substantive ideas. Consequently, it may result in construct validity concerns, and academics admit that it is one of the most challenging obstacles in constructing religiosity assessment instruments (Ul-Haq et al., 2019). Inconsistencies in measuring both substantive and functional measurements, as well as between Islamic beliefs and practices, represent a challenge to the current operationalization's methodological approach. The development of conceptions for beliefs and behaviors must take the context of the phenomena into account. These elements must adhere to the belief system, and functional items must be closely associated with substantive belief (Berry, 2005). Others have claimed that a questionnaire can be used to characterize religion by inquiring about the respondents' religious affiliations or preferences (Abou-Youssef et al., 2011). The authors recommend psychological associational methods. Research incorporating religiosity needs to focus on crafting items reflecting consumption or consumer behavior.

Items should be related to the manifestation of religious beliefs and practices towards consumption. This technique would be better in asking about the level of religiosity of Muslims in consumers. It is rather appropriate and able to avoid the misleading and imprecise response of the respondents about their level of religiosity. Besides, measuring the belief dimension is often substantive and leads to a lack of variance and results in the loss of many items (Albelakihi, 1997). Moreover, this concept applies to all Muslims, as every Muslim is expected to have this fundamental idea. The operationalization of existing frameworks displays Islamic religious pillars. Any measurement centered on this construct is guaranteed to have zero variance. Modifying the query using this method may therefore provide a solution to such a construct. Others exhibited a commendable development of devotion stemming from earlier instruments (Usman et al., 2017; Tiliouine & Belgoumidi, 2009). Religious belief items quantify the manifestation of one's religious belief in the framework of Islamic banking. However, functional measures (e.g., I pray five times per day, I typically fast during Ramadan) frequently cause respondents to respond with greater bias.

When data is collected via face-to-face interaction, the likelihood of such an occurrence is increased. Due to the fact that the worry about private and confidential information would occasionally be misleading and imprecise (Abou-Youssef et al., 2011). Due to social desirability, manipulation could occur (Abou-Youssef et al., 2011; Albelaikhi, 1997). The bipolar dimension of universalism against particularism follows. The majority of prior research on Muslim consumers employed universal religiosity measures (Allport and Ross, 1967; Worthington et al., 2003; Wilkes et al., 1986). These measures advocate operationalization to the greatest number of individuals possible, frequently crossing culture and religion. In contrast, particularism frequently offers measurements that capture a particular expression that a group, such as Muslims, values. Hence, the implementation of universal policies must contain substantive and functional components that are adapted to a particular religion, such as Islam. The measuring of Islamic or Muslim religiosity is universal only within the Muslim community. In this view, universalism only transcends cultural lenses, not faiths.

Given the likelihood of such a situation, some research has underlined the importance of social and religious context in preventing operationalization issues (Abou-Youssef, 2011; Khraim, 2010). Researchers must address demographic obstacles such as gender variations, sensitivity, and offensiveness of objects from Muslim populations' political and cultural landscapes (Albelaikhi, 1997). In addition, the problem of item validity in religiosity measurements must be considered. Measures of religiosity must address issues of representativeness, relevance, item clarity, and interpretability (Ul-Haq et al., 2019; Abou-Youssef et al., 2011). To minimize cultural insensitivity, researchers must comprehend the target audience and recruit the most suitable participants (Ul-Haq et al., 2019). To operationalize such religiosity assessments, a certain degree of particularism is necessary.

**Study Design:** Lastly, the constraints posed by a suitable study design reveal the connection between religiosity and consumer behavior. In consumer research, few studies have simultaneously produced a religiosity instrument or measurement and demonstrated its relationship to a specific variable of interest (i.e., intention, attitude, etc.). Since studies not particularly designed to measure or detect the influence of religiosity are unlikely to find distinctive variance provided by these components, they are poor sources of continuing evidence for research (Miller & Thoresen; 2003). Even though the vast majority of religiosity measures are multidimensional, its operationalization in the vast majority of consumer research is one-dimensional. In consumer research pertaining to Muslim customers, thus, evidence of the multidimensional influence of religiosity has been rare. Seldom had other mechanisms been introduced into the majority of the subject's research, which was dominated by existing theoretical frameworks. It frequently evaluates the effect of religiosity on attitude or intent. Hence, it has ignored the mediating impact of variables like brand preferences.

In addition, despite the development of SEM, which permits many variables in numerous connections and the construction of complicated models, existing studies continue to employ first-generation statistical techniques to investigate such complex interactions. Thus, researchers frequently disregarded suitable study designs that included Muslim religiosity and other dependent variables. The prior research lacks some elements of study design that include the lacks (1) multidimensional religiosity measures, (2) an understanding of the effect of a mediator like brand preferences, and (3) new theoretical perspectives. It underlines the potential for TICB and TOHADEMAP to serve as the basis for incorporating brand-related elements into its role evaluations. Exploring the more intricate relationship between Muslim consumer behavior and Islam cannot be overlooked. With the development of statistical approaches such as AMOS and Smart PLS, this is not only possible but also highly probable. Explanation of the relationship between religiosity and consumer behavior would ultimately disclose a number of intricate relationships and mechanisms.

## 5. Conclusion and Recommendations

This research emphasizes the significance of conceptualizing religiosity as a key variable in consumer behavior models. It is crucial to address the deficiencies of the current metrics and scales. This report suggests that future research be conducted to build a multidimensional religiosity for Muslim customers. Using a suitable study design that corresponds to the need for a better framework incorporating such variables in consumer research is required. Thus, this report proposes that future research concentrate on several research agendas. The majority of studies incorporated instruments from other fields of study and reported no or minimal modifications, particularly in consumer research. It necessitates modifications to subjective and functional metrics that may offer a degree of specificity in relation to Muslim consumers. Prior works recognize religiosity as a multifaceted and abstract variable. It is multidimensional as opposed to unidimensional. Thus, future research will concentrate on enhancing existing instruments to better serve Muslim consumers. Aside from this, the conceptual framework for comprehending the role of religiosity required refining. Future studies must highlight the compatibility and sufficiency of these frameworks. Recent research on Muslim consumers suggests that new theories and alternative mechanisms may be necessary to comprehend Muslim consumers. Thus, the addition of significant mediating variables could explain such Muslim customer behavior. It will enhance theoretical knowledge, practical tactics, and approaches to Muslim consumers. In addition, this work suggests the use of advanced statistical approaches pertinent to instrument design.

It allows for the selection of appropriate SEM techniques for CFA, including CB-SEM and PLS-SEM. PLS-SEM appears superior for constructing a new baby measuring model. CB-SEM yielded lower construct reliability and validity scores than PLS-SEM, despite the fact that the sample sizes were comparable. PLS-SEM and CB-SEM have distinct statistical assumptions. It is ideal for maintaining a larger number of predictors (items) with better construct reliability and validity values, which are essential for constructing a measurement model that is a good fit. In addition, this report calls for additional research to build topic- and field-specific measurements. There is no "one-size-fits-all" measure of religiosity, and it should not focus on belief but on a broad spectrum of activities that span all subjective and functional aspects of life. It must also address the three fundamental ties between man and God (HabluminnAllah), between man and man (Habluminannas), and between man and the rest of creation (Habluminala'lam).

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# The Effects of Health, Labor and Capital towards Labor Productivity in Manufacturing Industries

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**Abstract:** The manufacturing industry is the focus of this study, in which the proportion of its contribution to economic growth is experiencing a decreasing trend recently. Does it involve factors such as the input of capital, health, or workers that give significant impacts on labor productivity in the Malaysian manufacturing industry? This paper discovered the relationship between capital, health, and workers that consist of foreign and local labour with the labour productivity in the Malaysian manufacturing industry from 1986 to 2020. The Cobb-Douglas production function was used to derive the model specification in this study. The results showed that all variables are significant, in which the capital and health have a positive relationship, whilst the factor of labour including local and foreign labor has a negative relationship with labour productivity. These findings may provide some insights into the improvement of manufacturing industries' performance in Malaysia. It would be useful in determining which input factors significantly affected the productivity of manufacturing labour.

**Keywords:** *Capital, workers, health, labor productivity, manufacturing industries.*

## 1. Introduction and Background

Malaysia is an expanding country in which the transformation of its domestic economy is ongoing, from an agrarian to a manufacturing country ever since the 1970s. To date, the manufacturing sector has become a major contributor to the national economic growth. Its contributions towards the country's exports, gross domestic product (GDP), and job recruitment at different levels of expertise cannot be denied (Azer, Hamzah, Aishah, & Abdullah, 2018). In 2021, manufacturing sectors in Malaysia accounted for 23.9% of gross domestic product (GDP) followed by agriculture (7.1%), and mining (6.7%) (Department of Statistics Malaysia, 2022). Moreover, the manufacturing industry plays a crucial part in advancing employment which essentially provided job opportunities for unskilled and semi-skilled workers it also can comprehensively decrease unemployment and minimise poverty (Khan et al., 2014). The manufacturing industry of Malaysia plays an essential part in boosting the economy to develop value, wealth, and job opportunities that finally encourage GDP growth and advancement of the socio-economic sector in this country. In addition, it promotes the utilisation of home-grown products that can increase recruitment in the downstream industry. The manufacturing sector also contributed to job recruitment. For instance, there were 2.5 million employees (16.60% of the total employed workforce) in the manufacturing sector in 2021. Table 1 shows the increasing trend in employment provided by the manufacturing sector. These increments signified the fundamental contribution of the manufacturing industry towards the growth of socio-economic in Malaysia through the enhancement of incomes and job recruitments that can reduce joblessness. Moreover, table 1 also shows that the involvement of non-native employees in Malaysia's manufacturing industry has increased since 1985 and was still high in the year 2021 (Department of Statistics Malaysia, 2022).

**Table 1: Employment in Manufacturing Sector and Foreign Workers in Manufacturing Sector, 1986-2021 ('000)**

| YEAR | EMPLOYMENT | FOREIGN WORKERS |
|---|---|---|
| **1986** | 874 | 16.2 |
| **1996** | 1912.10 | 264.8 |
| **2006** | 2,082.80 | 224 |
| **2016** | 2,390.70 | 506.2 |
| **2020** | 2,498 | 391.5 |
| **2021** | 2,501.4 | 378.8 |

**Source:** Department of Statistics Malaysia, 2022.

Moreover, with the employment opportunities contributed by this industry, the health of the labor force has become a crucial element towards productivity and the capability of the workers to adapt to technological progress. Meanwhile, life expectancy is commonly associated with the health of the workforce, their productivity and their ability to adapt to technological progress (Madsen, 2012). Life expectancy is frequently adopted as an indicator to assess the population's health status (OECD 2023). In Malaysia, life expectancy at birth has constantly increased towards 75.9 years in 2020 compared to 72.2 years in the year 2000 (World Development Indicator, 2022). One of the common indicators to augment productivity is health (Siddique et al., 2020). A worker that is in a good condition can be competent as he or she possesses physical and mental capabilities which then contributed to high productivity. Investing in health will ensure that the employees are healthy, thus helping them to combat chronic diseases. The countries that experienced poor health conditions will find it hard to achieve sustained development (Soriano and Garrido 2016). There is a significant relationship between productivity and health (Bloom et al., 2001) in which the workers' productivity is a fundamental aspect of economic growth.

For instance, productive organizations generated more income and recruitment, whilst experienced employees are more productive, earn more, and have a better living standard than unskilled workers (Arabi and Abdalla, 2013). In terms of the economy, health is regarded as the engine of advancement and a capital of creative assets (Barro, 1996). The investment in health and education will give a country a profitable return (Mushkin, 1962). Bloom and Canning (2000) and Grossman (2017) stated that healthy workers are more productive as they can acquire knowledge more efficiently. Even though the contributions of the manufacturing sector in Malaysia towards advancing exports, generating economic growth, and providing job recruitment have been acknowledged, the ongoing direction of liberalization, globalization, and accelerated institutional, organizational, along with technological alteration have created overwhelming barriers and challenges for the development of this sector (Nikolić, Jovanović, Nikolić, Mihajlović, & Schulte, 2019; Rahman, Yaacob, & Radzi, 2016; Saleh & Ndubisi, 2006). Furthermore, some researchers believed that the manufacturing industry in Malaysia is experiencing major challenges and issues that could reduce its productivity such as the ability to explore new markets and improve productivity, efficiency, and quality (Hooi & Leong, 2017; SMIDEC, 2002; National SME Development Council, 2010).

Other ongoing issues faced by manufacturing players in Malaysia are the increased costs of raw materials; high start-up costs; insufficient supply of workforce and high labor costs; lack of incentives and grants from the government; limited capabilities to go up against foreign makers; accelerated global competition; and lack of information and knowledge. In addition, the manufacturing industry is also devastated by disintegration, overhead costs, hazards, time overrun, and extravagance (da Silva, Marins, Tamura, & Dias, 2017; Nallusamy, Kumar, Yadav, Prasad, & Suman, 2018). Besides, the accelerated advancement of industrialization also sped ups waste production, pollution and environmental deterioration in Malaysia and other expanding countries (Carvalho et al., 2018; Ghazilla et al., 2015). This scenario can be seen in the decreasing trend of GDP growth in the manufacturing sector and its contribution to GDP in Malaysia. In the year 2000, the manufacturing sector's growth was at 19.1% which contributed 32.3% of Malaysia's Gross Domestic Product (GDP) compared to the year 2021 in which the growth was 9.5% and contributed approximately 23.9% to the national GDP. As depicted in Table 2, the GDP of manufacturing in Malaysia has declined from 2000 to 2021 (Department of Statistics Malaysia, 2022).

**Table 2: GDP Growth and Share of GDP in the Manufacturing Sector, 2000-2021 (%)**

| | **Annual Growth (%)** | | **Share of GDP (%)** | |
|---|---|---|---|---|
| **Years** | **2000** | **2021** | **2000** | **2021** |
| **Manufacturing** | **19.1%** | **9.5** | **32.3%** | **23.9%** |

**Source:** Department of Statistics Malaysia, 2022.

Moreover, the manufacturing industry is suffering from several issues that needed to be addressed and resolved (Singh, Singh, & Sharma, 2018). Researchers have suggested several critical strategies that can be adopted towards achieving sustainable production in the context of social, economic, and environment (Mukhedkar, 2020). The improvement in productivity, quality, and novelty is crucial in creating a sustainable manufacturing industry in Malaysia, which is not only successful in implementing complex manufacturing projects domestically but able to participate in major projects at the international level as well. Hence, it is

crucial to take a holistic approach by reviewing the challenges to promote the productivity and efficiency of the Malaysian manufacturing industry. Recognising this matter, the main objective of this research is to study the relationship between the factor of labour, capital, and health on labour productivity in the manufacturing industry of Malaysia.

To determine whether these factors of labour, capital, or health give more significant impacts towards labour productivity in the Malaysian manufacturing industry. In addition, we departed this study from the previous research by proposing a relationship effect of health on labour productivity in the manufacturing industry. There was only a few research conducted previously to determine the relationship of health factors that influenced productivity in the industry. This study also aims to fill in the gaps in the existing literature in theoretical and practical manners. The novelty of this study is it estimates the effects of the capital intensity, employees that consist of local and foreign workers, as well as the health of manufacturing labour's productivity. The findings of this study should complement the previous literature with a discussion on the aspect of the relationship and the causality between workers and health. It can be concluded that information on the impacts of health on labour productivity especially in manufacturing industries in the variables of interest of this study is almost non-existent, especially in the Malaysian context.

## 2. Literature Review

Numerous studies have been done previously to determine the effects of factors that contributed to productivity in the manufacturing sector. Among the determinants that will be focused on in this study are the contribution of capital investment in manufacturing, health, and workers which consist of native and non-native workforce. The immigration of foreign workers will either give positive or negative impacts on the labor productivity of the receiving countries. Some studies have been conducted on the positive impacts of the foreign workforce on labour productivity in the manufacturing sector. For instance, a study carried out by Thangavelu (2016) that discovered non-native employees could affect productivity in the manufacturing sector, but the impacts were insignificant compared to the native workers. There was a decrease in the capital-to-labour ratios presented along with the increasing number of foreign workers available. Whilst another study conducted by Noor et al. (2011) found that foreign labours have significantly impacted labour productivity, but did not substitute or complement the local workforce and their productivity.

However, a study done by Kangasniemi et al. (2012) found that the migrants were more productive than locals in the UK, but on the other hand, Spain native's workforce is more productive than their new migrants, due to the different policies of immigration. Meanwhile, a study carried out by Jordaan (2018) has concluded that foreign workers have created positive productivity effects on the manufacturing sector. Some researchers studied the relationship between local and non-native employees to determine whether the connection are substituting or complimenting one another. A study by Friedberg & Hunt (2018) found that the earnings and job opportunities for the local population did not cause an increment in the immigration labours. In addition, a study by O'Connor & Graham (2019) revealed that immigration did not statistically affect a native's well-being across all scenarios. Moreover, a study by Sulaiman, Ismail & Saukani (2017) found that the number of non-native workers and the number of technological agreements did not affect the Total Factor Productivity (TFP). Furthermore, the study by Brunello, Lodigian, & Rocco (2020) discovered the current increase in low-skilled.

Immigrants in Italy has prevented the conversion of economic arrangement to be more productive and increased wages. Whilst a study by Ismail & Yuliyusman (2014) validated that there was an adverse impact of immigrants on productivity. The interrelated other factors that affected the labour productivity of the manufacturing sector were also studied. Some of the factors are in the form of capital investment and only a few studies have discussed the health factor, especially in the manufacturing industry. Another factor of production productivity in the manufacturing industry is capital. It is frequently associated with the ratio of total assets or fixed assets to labour inputs which further defined a company's efficacy in utilising its resources to generate materials or services (Chang & Singh, 1999; Sen & Farzin, 2000). The instrument and equipment were commonly described as the capital in production. Equipment and technology play crucial roles in the enhancement of construction activities towards automation, which significantly affected manufacturing productivity and project performance. The impacts of technology, automation and

modernization towards improving productivity were investigated to determine and assess.

The effects of management tools in improving productivity (Baker, Kumar, & Singh, 2019; Singh, Singh, & Sharma, 2018). Moreover, a study done by (Dhillon, 2006) revealed that investment in fixed assets and capital expenditure did significantly affect labour productivity. Furthermore, the connection between human health and labour productivity has been investigated. Siddique et al. (2018) discovered the existence of a significant relationship between life expectancy and economic growth, considering that a negative relationship existed between newborn fatality and economic growth in 76 middle-income countries from 1991 to 2016. The findings showed that economic growth can be enhanced through education. The study also concluded that in the upper- and middle-income countries, education, newborn fatality, and life expectancy have greater impacts compared to the lower- and middle-income countries. Biyase & Malesa (2019) also found that life expectancy has a positive effect on economic growth in 10 South African countries from 1985 to 2017. Ullah et al. (2019) studied the effects of health on labour productivity in Pakistan from 1980 to 2010. The results indicated that the advancement in health will increase productivity. Chaabouni et al. (2016) also examined the two-way causality between health expenditures and economic growth.

For a panel of 51 countries from 1995 to 2013, by utilising the dynamic simultaneous equation models whilst Zortuk & Ceken (2015) have identified that spending on health care is one of the fundamental expenses in the European Union from 1995 to 2011. In relation to that, it is possible to mention the input factors of productivity such as investment of capital, labour, and health are associated with the production. This signified that productivity portrays the quality level of production factors' characteristics. In this context, production can be observed consequently of the process, in terms of services or products, whilst input factors comprised any humans and physical resources adopted in the process. All in all, the impacts of labour and other inputs factors towards labour productivity can be positive, negative or have no connection, but the relationship is mainly having negative impacts, specifically for the factor of labour. Thus, it can be assumed that the impact factor of labour towards labour productivity in the manufacturing industry is more towards the negative relationship. The purpose of this study is to enlighten the project management teams in the manufacturing industry on the perspectives of labour, health, and capital investment and determine which factors contributed to low labour productivity. This will help the project teams in the manufacturing industry to identify early signs of issues due to low productivity and adopt corrective measures in time to bring the project back on track.

## 3. Methodology and Analysis Approach

This study adopted the Solow growth model by carrying out the primary Cobb-Douglas production function in the Solow framework model (Noor et al., 2011). The basic equation of the function is as follows:

$$Y_{t} = AK_{t}^{\alpha} L_{t}^{\beta} Mat_{t}^{\theta} \quad (1)$$

Derived from the Cobb-Douglas production function, the value-added variable in the equation was divided by the total number of labours to convert it into a labour productivity equation (Noor et al., 2011). In this equation, labour consists of two categories which are local labour and foreign labour. Then, health was added to the equation and the entire variables were then transformed into a logarithm. The estimated equation is as follows:

$$\ln y_t = A + \beta_1 \ln capital_t \ \beta_2 \ln workers_t + \beta_3 \ln health_t + \in_t \quad (2)$$

Referring to the equation above, where t =1, …, T, refers to the time.
Meanwhile,
1n y = logarithm of labour productivity (value added /total number of workers),
ln capital = logarithm of capital in terms of fixed assets,
ln workers = logarithm of the total number of labour which consist of local labour and foreign labour,
ln health = logarithm of life expectancy at birth.

**Table 3: Measurement of Data Explanatory Variables and Proxies**

| Variable | Proxy | Unit | Past Studies |
|---|---|---|---|
| Labour Productivity | Gross Domestic Product or value added / Total Number of Labour | Gross Domestic Product (GDP) in hundred thousand Ringgit Malaysia ('000 RM), Total Number of Labour in hundred thousand ('000, Person working) consist of Local Labour and Foreign Labour | (Trpeski & Cvetanoska, 2018) |
| Capital | Value of Fixed Assets | Fixed Assets in hundred thousand Ringgit Malaysia ('000 RM) | Noor et al., (2011), Jordaan (2018) |
| Workers | Total Number of Local Labour and Total Number of Foreign Labours | Total number of Local Labour in hundred thousand ('000, Person working) | Noor et al., (2011) |
| Health | Life Expectancy | The average period that a person may expect to live | Siddique et al. (2018) |

Equation (2) was tested by employing Ordinary Least Square (OLS) method. Before commencing further analysis, the existence of a time series problem in the data must be validated. The Unit Root Test which consists of the Philips Perron (PP) unit root test was used to test the data. Data for this study were obtained from the survey conducted by the Department of Statistics of Malaysia. All data were collected annually and then converted into logarithms. The analysis period is from 1986 to 2020 and the Ordinary Least Squares (OLS) method for data estimation was used to analyse the data.

## 4. Results and Discussion

In this study, descriptive statistics were used to measure the basic conduct of the data. Table 4 indicated that on average, the labour productivity in Malaysia is ($\bar{x}$ = 3.8540, s = 0.7104), with the capital ($\bar{x}$ = 11.7364, s = 0.8773) has the highest value among the sets of independent variables, followed by workers ($\bar{x}$ = 7.5165, s = 0.3065), and health ( $\bar{x}$ = 4.2943, s = 0.0232) . Jarque-Bera analysis signified that all variables were normally distributed. Thus, Ordinary Least Square (OLS) is appropriate to be used in this study.

**Table 4: Descriptive Statistics**

| Analysis | Labor Productivity | Capital | Workers | Health |
|---|---|---|---|---|
| **Mean** | 3.8540 | 11.7364 | 7.5165 | 4.2943 |
| **Standard Deviation** | 0.7104 | 0.8773 | 0.3065 | 0.0232 |
| **Minimum** | 2.6390 | 9.9703 | 6.7452 | 4.2530 |
| **Maximum** | 4.8202 | 12.8265 | 7.8678 | 4.3299 |
| **Jarque-Bera** | 2.4968 | 4.6649 | 12.0274 | 2.5451 |
| **Probability** | 0.2869 | 0.0970 | 0.0024 | 0.2801 |

Then, the Philips Perron (PP) Unit Root test was performed on the four variables to identify whether the variables are stationary or non-stationary. The results revealed that all variables for PP with drift in the unit root test were stationary at the first difference, I (1). Moreover, with drift and trend in the PP unit root test, all variables were stationary at first difference.

**Table 5: Result of Philips Perron Unit Root Test**

| Variables | Philips Perron (PP) Unit Root test | | | |
|---|---|---|---|---|
| | Intercept | | Trend & Intercept | |
| | Level | 1st Difference | Level | 1st Difference |
| Ln labor productivity | -1.2204 | -5.4655*** | -1.6513 | -5.6348*** |
| | (0.6545) | (0.0001) | (0.7513) | (0.0003) |
| capital | -2.2746 | -3.2131** | -1.2331 | -3.9842** |
| | (0.1854) | (0.0278) | (0.8877) | (0.0189) |
| Ln workers | -3.3617 | -4.2191*** | -2.1344 | -4.8652** |
| | (0.0194) | (0.0022) | (0.5096) | (0.0021) |
| Ln health | -1.4145 | -2.8591* | -1.8623 | -3.0698 |
| | (0.5640) | (0.0608) | (0.6523) | (0.1295) |

After that, Ordinary Least Square (OLS) was applied to regress the equation in (2). The result was shown in Table 6 below. It can be concluded that all variables have a significant relationship. The result showed that capital has a positive relationship with labour productivity in the manufacturing industry. It indicated that the increase in capital by 1% will increase labour productivity by 0.51%. This is consistent with Durdyev & Mbachu (2018) who stated that by overcoming the shortage of tools and equipment, the biggest gain in labour productivity can be achieved. Additionally, workers consist of two categories which are local labour and foreign labour has a significant and negative relationship with labour productivity in the manufacturing industry. It showed that an increase of 1% in the workers will decrease labour productivity by 0.59%. This is consistent with Ismail (2015) who found out that unskilled and semi-skilled foreign workers have a negative contribution towards labour productivity. Moreover, health has the highest significant relationship with labour productivity. The result showed that health has a positive relationship with the significance of labour productivity in the manufacturing industry. It indicated that the increase in health by 1% will increase labour productivity by 18.45%. This is consistent with the findings from Ullah et al. (2019) who studied the impacts of health on labour productivity in Pakistan from 1980 to 2010. The outcomes of the study showed that health improvement could increase productivity. Table 6 summarised the results of the ordinary least square regression analysis:

$\ln y_t$ = -76.9315 + 0.5140 $\ln capital_t$ - 0.5966 $\ln workers_t$ + 18.4512 $\ln health_t + \in_t$ (3),

**Table 6: Result of the Ordinary Least Square Regression**

| Variables | Coefficient | | p-value |
|---|---|---|---|
| C | -76.9315 | | 0.0000 |
| Ln capital | 0.5140*** | | 0.0005 |
| Ln workers | -0.5966*** | | 0.0243 |
| Ln health | 18.4512*** | | 0.0000 |
| R-squared | | 0.9751 | |
| Adjusted R-squared | | 0.9728 | |
| F-statistic | | 419.3952 | |
| Durbin-Watson statistics | | 0.5205 | |

Thus, it can be concluded that the manufacturing sector in Malaysia is experiencing lower labour intensive as the result showed that any increases in labour usage will not affect labour productivity. In addition, this sector is moving towards the capital accelerated landscape as any increases in capital utilisation will boost labour productivity. Furthermore, health was also known as a crucial factor contributing to the increase in labour productivity. $R^2$ Indicated that the productivity output of the manufacturing is represented by 97.5% of the discussed variables in the model. The diagnostic test then was carried out such as the normality test and also the heteroscedasticity test for the model. The purpose of these tests is to indicate the model is valid to use. The normality test is done by using the Jarque-Bera test. The result of Jarque-Bera on the Estimated Regression Coefficient shows that the error term normally distributed due to the coefficient is not statistically significant at the 5% level. The result is shown in Table 7.

**Table 7: Result of Jarque Bera on the Model**

| **Jarque-Bera** | **1.4635** |
|---|---|
| Probability | 0.4813 |

The Heteroskedasticity test then was carried out. This study applied Breusch Pagan Godfrey to test Heteroskedasticity whether it exists or not in this model. The result of Heteroskedasticity on the Estimated Regression Coefficient shows that there is no Heteroskedasticity in the model due to the coefficient is not statistically significant at the 5% level. The result is shown in Table 8:

**Table 8: Result of Heteroskedasticity on the Model**

| **F-statistics** | **1.9774** | **Prob. F (3,32)** | **0.1372** |
|---|---|---|---|
| Obs * R-squared | 5.6301 | Prob. Chi-Square (3) | 0.1311 |
| Scaled explained SS | 6.1420 | Prob. Chi-Square (3) | 0.1049 |

Hence, in this model, the error term of the model is normality distributed and there is also no heteroskedasticity in the model. The causal relationship between workers and health in (3) was obtained by running the Granger causality test to determine the causal relationship between workers and health. The relationship is shown in Table 9 below:

**Table 9: Result of Granger Causality Test**

| **Null hypothesis** | **Observation** | **F-statistic** |
|---|---|---|
| Workers do not Granger cause Health | 27 | 2.6510 (0.0923) |
| Health does not Granger cause Workers | 27 | 17.6905 0002) |

From Table 9, the findings revealed that there was causality between health and workers, but none was found between workers and health. The null hypothesis which stated that health does not Granger cause employees was rejected, while the null hypothesis which stated that employees do not Granger cause health was accepted based on the results obtained. This indicated that health did have a significant effect towards workers. Thus, it can be concluded that health is fundamental for workers in the manufacturing sector to preserve their productivity. This outcome matched the study conducted by Ullah et al. (2019) who investigated the effects of health on labour productivity in Pakistan from 1980 to 2010. The findings showed that the advancement in health could raise productivity.

## 5. Conclusion and Recommendations

Fundamentally, this research aims to determine the factors that affected the labour productivity of the manufacturing industry in Malaysia. The factor variables in this study comprise the capital, health, and workers, which include the foreign and local workforces. Annual data samples from 1986 to 2020 were used in this study. The theory adopted to analyse the relationship between the factor's variables and labour productivity in Malaysia is the Cob-Douglass theory and the Philip Perron Test were applied as a unit root test of this study. The estimation results indicated that capital and health have contributed positive effects on labour productivity. Contrarily, workers consisting of local and foreign labours showed a negative relationship towards labour productivity in Malaysia's manufacturing industry. Based on the findings, the factor of labour on local and foreign workers has a negative relationship with the labour productivity in the manufacturing sector, whilst other factor inputs have a positive relationship. The negative relationship of factor labour might be due to the lack of investment in terms of human capital that led to the low rate of labour productivity. Moreover, Ibrahim et al. (2010) suggested that to tackle the issues of administrative shortage, inexperienced workers, and technical problems, the manufacturing industry of Malaysia should increase training for professionals and employees to enhance their capabilities, competencies, and operational performances at the local and international levels.

Hence, it is also suggested that the government should strengthen the capability of local and foreign workers by increasing industrial training. It can be achieved through collaboration with experts from the industry and training institutes (Varaprasad, 2022). Employers could also motivate their local and foreign workers by

providing interesting incentives, such as offering bonuses and allowances as rewards for any achievements in the workplace to enhance their productivity (Nikiforakis, Oechssler & Shah, 2019; Mohd Fateh et al., 2022). It is also recommended that employers should provide workers with incentives and allowances for workers' healthcare so that they can be healthier, thus increasing their productivity as well (Ullah et al., 2019). The employers could also provide a conducive and safe working environment to attract more local workers to work in this sector (Verghese, Viswanathan, & Ramalingam, 2018). Therefore, with all these initiatives, the workers would be more motivated, productive, and attracted to work in the manufacturing sector. Mohd Fateh et al. (2022) added that the living quarters provided by the employers should meet the requirement for local legislation and international best practise, such as minimum allocation of space for every worker, provision of sanitary, laundry, and cooking apparatus as well as a sufficient supply of clean water. In addition, future research should include other factors that could affect labour productivity in the manufacturing sector to enhance understanding of the other factors in the context of labour productivity.

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# Factors Influencing Ethical Behavioral Intention among Takaful Agents

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**Abstract:** Despite the fact that contemporary insurance contracts are simple to read, this does not imply that they are simple to comprehend. Most people rely on trust when purchasing insurance. They trust the insurance agent to recommend and obtain appropriate coverage. Takaful agents act as consumers' representatives in managing their takaful plan participation procedures, while also providing consumers with transparent and clear information about takaful plans. This study is mainly focused on identifying the factors influencing ethical behavioral intention among takaful agents. Therefore, this study examines the relationship between attitude, subjective norms and perceived behavioral control on ethical behavioral intention among insurance agents by adopting the Theory of Planned Behaviour (TPB). A total of 100 questionnaires were collected from 100 Takaful agents from the Family agency and General Agency. To evaluate the raw data, the paper used the non-probability sampling technique and analyzed it by conducting reliability analysis, correlation analysis, and regression analysis. The results of this study indicated that there was a significant relationship between attitude and subjective norms toward ethical behavioral intention as the predictors. Hence, these findings assist the practitioners, particularly takaful providers in strategizing their efforts in terms of training aspects for their respective takaful agents.

**Keywords**: *Ethical Behavioral Intention; Insurance; Takaful; Agents.*

## 1. Introduction and Background

Takaful in Malaysia has been increasingly important in managing risks and achieving economic development, particularly in the banking industry. Because of the ethical system nature that can be offered to all communities, independent of faith, the Takaful business has become successful (Eldaia, Hanefah, Marzuki, & Shatnawi, 2020). As the demand for this service grows yearly, the number of Takaful operators has recently exploded in Malaysia's financial sector. Insurance has always been a separate function and discipline. Family takaful and life insurance are two important components of the Malaysian financial market. When compared to the same period last year, the general insurance industry saw a 10.3% increase in gross direct premiums to RM 9.8 billion in the first six months of 2022. However, underwriting profit fell by 21.2% to RM 810 million, owing primarily to losses in the Motor and Medical and Health Insurance lines of business (PIAM, 2022). This phenomenon has brought healthy competition among the Takaful operators in producing a variety of attractive products offered to customers. According to Munani, Tuan Yusof, Hosnih, Bruce, Muhyidin and Cheong (2015), following the advancement of technology, the Malaysian government aims to increase the penetration rate among the people as one of the strategies to continue moving forward economically and socially. Therefore, the most significant major distribution route for takaful products to consumers is a takaful salesperson (Wan Mohd Zawawi, Salleh & Md Fadzil, 2022). As a result, the role of Takaful agents appears to be important in marketing activities, particularly in promoting insurance products.

As the industry is currently run through an agency system (Wakala model). Takaful agents, according to The Islamic Financial Services (2013), are the takaful firms' representatives who solicit ideas for takaful certificates, offer or participate in negotiating takaful certificates, and handle the issue, renewal, and continuation of takaful certificates on their behalf (Abdullah et al., 2020). In this situation, the Takaful business relies on its agency structure as the primary medium for marketing and promoting Takaful goods. It is crucial for Takaful agents to use Islamic marketing that complies with Shariah law when interacting with the public. However, most of them frequently implement strategies where the management places a premium on commission or profit alone, particularly in the traditional insurance sector (Ahmad Samsuri & Jamal, 2015). This study contributes to gauging the knowledge of the determinants of behavioral ethics in the context of takaful products. Other than that, interested parties such as industry practitioners, takaful educators and policymakers can embark on certain policies to implement in ensuring behavioral ethical conducts are being implemented especially for those who engage in the intermediary's role in the industry.

Thus, this paper aims to highlight the relationship between attitude, subjective norms and perceived behavioral control on ethical behavioral intention among insurance agents by adopting the Theory of Planned Behaviour (TPB). For this purpose, several aspects will be explained in the next sections and lastly, the summary section.

## 2. Literature Review

**Ethical Behavioral Intention**: Ethics is defined as the "*rules or principles that define right and wrong conduct*". Both corporate entities and individuals frequently apply the principles while making decisions. In today's corporate and commercial world, as well as in academic and professional circles, business ethics is a topic that is heavily contested and discussed (Grigoropoulosi, 2019). The standards of behavior of certain business people, rather than necessarily the standards of business as a whole, have been defined as business ethics (Henry, 2003). According to the previous study done by Hoffman, Howe and Hardigree, (1991), nine ethical issues were identified in their study which are misrepresenting, twisting, rebating, down selling, equivalent, non-licensed agents, letter, lowball and false information. Marcum and Robin (2003) concur and described those ethical challenges among insurance agents in four areas, (1) settlement of claims, (2) involving other part-time jobs without intimating the superior, (3) agents who had bad experiences tend to decline the facilitating payments. Past scholars have examined the behavior of takaful agents which includes Howe, Hoffman and Hardigree (1994) and Abdullah (2018).

In the context of Takaful, the agents: (1) should have a clear intention and sincerely attend to the clients. This can be done by disclosing information to the customers about the products and recommending necessary products that suit their needs. Agents also should be responsible and honest in their duties, and intelligent, wise and patient in dealing with the clients (Che Mohd Salleh, Irwani Abdullah, Razali, & Wok, 2012). (2) Agents also should know the Takaful concept, (3) They also must explain clearly the concept of Tabarru' which is different from the conventional (Mohd Akram, 2012). And (4) agents also require for having the intention to get a blessing from Allah S.W.T in performing their duties (Aiman, 2009: 118). (5) The agents are also responsibly safeguarding the welfare of society as a whole. Realizing this need, this study proposed the need to discuss the ethical behavior of Takaful agents in the aspect of individual approaches, adopted from the Theory of Planned Behavior (1975). Hence, it assumed that people form behavior intention based on attitude, subjective norms and perceived behavior control that were originally adapted from the Theory of Planned Behavior (1975).

**Attitude**: The degree to which a person perceives a behavior based on a favorable or unfavorable judgment of the behavior is known as their attitude (Ajzen, Brown, & Carvajal, 2004). Attitude towards the behavior is a person's evaluation of the behavior overall. According to the Theory of Planned Behaviour (TPB), behavioral intention was indicated through attitudes. Several factors that influence ethical behavioral intention were found by (Leonard, Cronan, & Kreie, 2004), whereby the attitude toward the professional, legal, and organizational climate. Also includes the attitude towards personal values and situations. A prior study done by Cheng, Lam, and Hsu (2005) found that attitude influences ethical intention. Haron, Ismail and Abdul Razak (2011) and Ferdous and Polonsky (2013) concur and stated that attitude is one of the factors that influenced a salesperson's ethical intention and behavior. In the insurance industry, false or misleading representations of products or services in promoting the products were highlighted as the main concern (Cooper & Frank, 1991). Besides, pressure on sales by managers also influenced ethical intention among insurance agents. Previous studies found that managers tend to punish those top performance agents leniently as they tend to favor sale production rather than ethical behavior (Kurland, 1995; Bellizzi & Hasty, 2003). As a result, it is hypothesized that:
**H1:** There is a relationship between attitude and ethical behavioral intention.

**Subjective Norms**: Subjective norms are defined as any social influence that may determine if the individual performs or does not perform the behavior (Ajzen et al., 2004). People tend to believe that others are important, and they want to comply with their wishes requested by them. Cooper & Frank (1991) mentioned that significant others like friends and family members, also superior, company management and personal moral valuation can influence ethical intention among insurance agents. Subjective norms based on the Theory of Planned Behavior (Icek Ajzen et al., 2002) are the belief in normative expectations of others and the

motivation to comply with these expectations. Peers may have influenced unethical behavior in two ways which are through differential association or norms (Schein, 1984).

In this context of the study, Takaful agents are surrounded by multiple groups of individuals during their duties. Friends, peers, family and subordinates are groups of people that can influence the decision and conduct performed by insurance agents. These groups of individuals will influence the ethical intention of the agents as they may indicate approval or disapproval towards the conduct performed by the agents. The approval of this individual is critically important to decide whether she or he should engage or not in that behavior. A survey conducted on managers by Zey-Ferrell, Weaver, & Ferrell (1979) and Zey-Ferrell & Ferrell (1982) found that the perception of their peers' actions was a better predictor of unethical behavior compared to their own beliefs and values, or those top management. As mentioned in the previous research, the involvement of management can cause individuals to feel pressure to comply with the requests of management for the success of the organization (Jones, 2014). The pressure on the sale target by the managers caused the agents to act with unethical behavior (Bellizzi & Hasty, 2003). As a result, it is hypothesized that:
**H2:** There is a relationship between subjective norms and ethical behavioral intention.

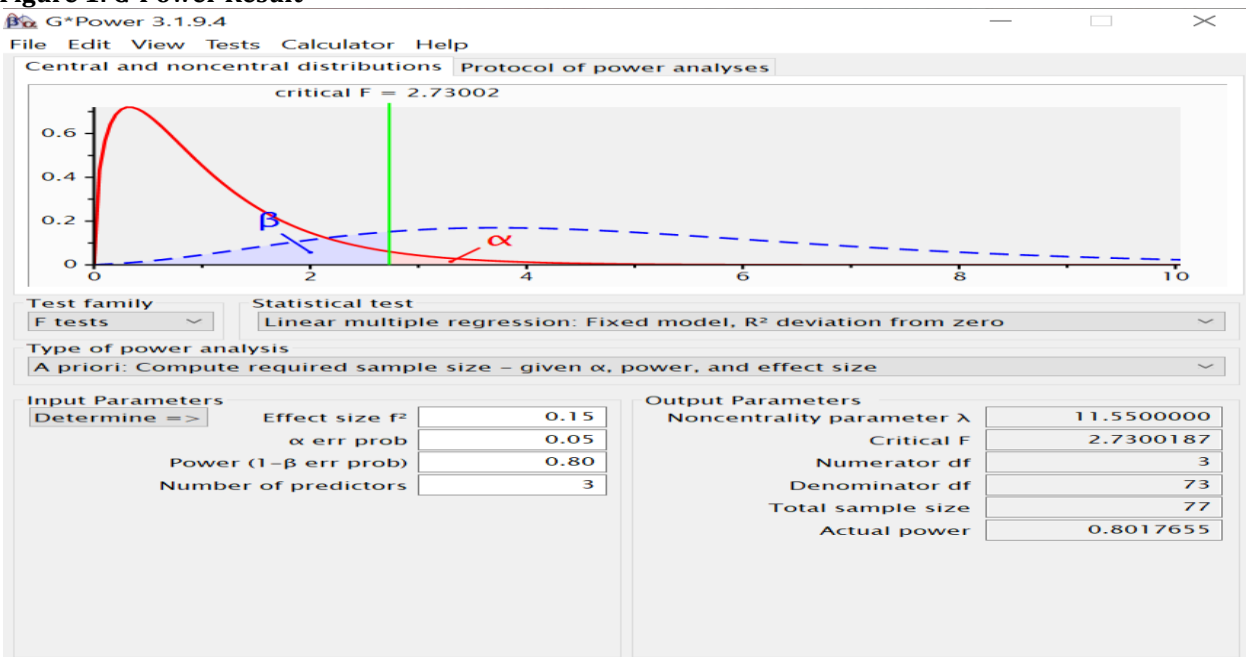
**Perceived Behavioral Control (PBC):** Perceived behavioral control refer to the level of confidence within an individual about their ability to perform the behavior based on how easy or difficult they perceive its performance as it relates to hindrances or facilitators (Ajzen et al., 2004). The validity of the Theory of Planned Behavior in the aspect of perceived behavioral control can influence unethical behavioral intentions also can be found in the previous studies (Cheng et al., 2005). Actions under Theory Reason Action (TRA) are totally under volitional control and Theory Planned Behavior (TPB) by Ajzen (2002) was created with an additional variable which is perceived behavioral control as an extension for TRA. This theory explained that people tend to get involved in a particular behavior when they have control over it and the chance of converting that intention into the behavior can be seen clearly. Two components are needed under perceived behavioral control which are resources and opportunities, according to (Icek Ajzen, 1991b).

Taylor & Todd (1995) also added that the availability of money and time to perform certain behavior can contribute to a high degree of perceived behavioral control. However, stressed that individuals tend to lose interest in the organization due to the greater price offered. The self-interest that should be displayed in the organization slowly decreases as greater rewards are offered. In the context of this study, the Takaful agents may not be able to disclose the information regarding the policy as they feel intimate and worried that the clients may not be able to understand. Hence, they tend to sell the policy without disclosing important information and intentionally commit unethical behavior. The Takaful agents are responsible to understand customers' needs and assist them with the right choice of Takaful products and not offer unnecessary coverage (Ahmad Mazlan Zulkifli, et al., 2015). As a result, it is hypothesized that:
**H3:** There is a relationship between perceived behavioral control and ethical behavioral intention.

## 3. Research Methodology

A survey design was used to achieve the research objectives. This study employed the convenience sampling method, also known as the non-probability sampling strategy and used the researcher's discretion. A similar group of respondents is chosen using this sampling strategy. The respondents in this study are the Takaful agents in Selangor as it captures the most populated states in Malaysia (*Current Population Estimates, Malaysia, 2021*). A total of 100 questionnaires were gathered, exceeding the probability sampling technique's minimal sample size requirement of 30 participants, showing suitability for analysis using descriptive statistics. Further, in this survey, the G-power sampling size determinant was used to determine the sample size. This study's model incorporated three main variables. The minimum sample size required was 77 when utilizing G-power software with an effect size of 0.15, alpha of 0.05, and power of 0.8. Hence, G-Power Test also confirmed that the minimum total sample size needed is 77 and the 100 questionnaires collected exceed this number. Ethical behavioral intention was employed as the dependent variable in this study, whereas attitudes, subjective norms and perceived behavioral control were the independent variables. All instruments were adapted from previous research, adapted from Haron et al. (2011) and King and Powell (2007).

**Figure 1: G-Power Result**




## 4. Results

This section presents an analysis done which includes descriptive analysis, reliability analysis, correlation analysis and regression analysis. First, a set of results relating to the profile of respondents' experiences towards intentional ethical behavior among Takaful agents is presented. In this study, male agents participated more to answer this questionnaire compared to female agents. This is consistent with the Department of Statistics Malaysian (2017-2018) official portal mentioned that the sex ratio in Malaysia is 107 males per 100 females. As for marital status, single status has the highest number of frequencies with 54 respondents (54%) and followed by married status with 40 respondents (40%) whereas 6 out of 100 respondents answered divorced as their marital status which is the least compared to single and married status. In the frequency table above, the highest number of respondents is from the 18-25 years old group which consists of 36 respondents (36%) out of a total of 100 respondents. According to the news "Today World" published on March 2018, young Malaysian adults preferred to sell insurance products because the earning income for one year is more than their previous or current job, stated by (Cup, Read, Visuals, & Spotlight, 2018). The second highest frequency is 26 (26%) respondents who are in the range of age between 26 to 33 years. The difference between these two ranges of age was only 10 respondents. There are 17 (17%) out of 100 respondents aged between 34-41 years old. 21 (21%) of agents who participated in this survey are aged 42 or above.

Based on the table below, there are five categories of level of education divided by the researcher in this study. The highest level is Doctoral Degree, and the lowest level of education is SPM/STPM. The researcher ranges the level of education starting from SPM/STPM has 25 (25%) respondents. The highest frequency is bachelor's degree with 35 (35%) respondents and followed by diploma as the second highest with a total of 30 (30%) respondents. In this study, the number of doctoral degrees is very low when only one respondent who answered this questionnaire has the highest level of education. There is a big difference in the total number of respondents between those who answered doctoral degree and others' choice. The number of years being an agent indicated the level of experience possessed by them in handling clients. To the figure above, agents with less than 5 years of working experience dominated with the highest frequency which is 58 respondents (58%). There are 32 (32%) respondents being an agent between 5 to 10 years which is the second highest in terms of the number of respondents. It was followed by 9 (9%) out of 100 respondents with 11-20 years being an agent. Only one person recorded as an agent with more than 20 years being an agent in this study. Researchers found out that most of the respondents participated in answering.

This questionnaire consists of those who have been an agent for less than 5 years. As for the range of yearly income from below RM50, 000 there are 43 (43%) respondents, RM51, 000-RM100, 000 and RM101, 000-RM150, 000 got 22 (22%) respondents respectively. The lowest number of respondents is those who received a yearly income of more than RM150,000. There are 13 (13%) respondents who got a yearly income of more than RM150,000. Those with a yearly income below RM50,000 have the highest frequency number compared to the others. This is consistent with a finding by Yearly Income Statistic for Family Takaful Agency, channel administration department reported that 3565 total Takaful agents obtained yearly income below 100, 000 in 2017. For 5 years in a row, starting from 2013 to 2017, agents with a yearly income of less than 100, 000 are dominated with the highest frequency compared to those with a yearly income of more than 150, 000.

**Profile of Respondents:** Table 1 displays a summary of the characteristics of the total sample of Takaful Agents who participated in the study.

**Table 1: Demographic and Geographic Information Pertaining to Takaful Agent**

| VARIABLE | FREQUENCY | PERCENTAGE |
|---|---|---|
| **GENDER** | | |
| Males | 52 | 52% |
| Females | 48 | 48% |
| **Total** | **100** | **100%** |
| **Marital Status** | | |
| Single | 54 | 54.0 |
| Married | 40 | 40.0 |
| Divorced | 6 | 6.0 |
| **Age (years)** | | |
| 18-25 | 36 | 36.0 |
| 26-33 | 26 | 26.0 |
| 34-41 | 17 | 17.0 |
| 42 and above | 21 | 21.0 |
| **Level of Education** | | |
| SPM/STPM | 25 | 25.0 |
| Diploma | 30 | 30.0 |
| Bachelor Degree | 35 | 35.0 |
| Bachelor Master | 9 | 9.0 |
| Doctoral Degree | 1 | 1.0 |
| **Years of Being an Agent** | | |
| < 5 years | 58 | 58.0 |
| 5-10 years | 32 | 32.0 |
| 11-20 years | 9 | 9.0 |
| >20 years | | |
| **Yearly Income (RM)** | | |
| <50,000 | 43 | 43.0 |
| 51,000-100,000 | 22 | 22.0 |
| 101,000-150,000 | 22 | 22.0 |
| >151,000 | 13 | 13.0 |
| **Marital Status** | | |
| Single | 54 | 54.0 |
| Married | 40 | 40.0 |
| Divorced | 6 | 6.0 |
| **Age (years)** | | |
| 18-25 | 36 | 36.0 |
| 26-33 | 26 | 26.0 |
| 34-41 | 17 | 17.0 |
| 42 and above | 21 | 21.0 |

**Descriptive Statistics:** According to the result in Table 2, it shows that subjective norms have the highest mean score compared to the other variables which are 3.98. Meanwhile, perceived behavioral control indicated the lowest mean score with 3.66 among others. All the variables have quite similar mean values which are around 3.50 and above. It shows that the respondents have mixed opinions for each variable, however, the responses were leaning more towards an agreement which is why the mean is near 4. Most of the respondents nearly agreed that subjective norms are the dominant factor that influences their ethical behavioral intention. Responses obtained show that social influences such as family, friends and supervisors can influence them to decide whether to perform or not that behavior. Perceived behavioral control shows the least mean score indicating that agents are not likely agreed that perceived behavioral control is the main factor that may influence their ethical behavioral intention. The result of standard deviation shows subjective norms have the highest score with 0.80 compared to other variables. Meanwhile, the lowest standard deviation score indicated by perceived behavioral control with 0.53. All the variables for this study have standard deviation values less than 1, which means that they are more in agreement with one another.

**Table 2: Descriptive Statistics**

| Variable | Mean | Std. Dev. |
|---|---|---|
| Ethical Behavioral Intention | 3.9886 | 0.61911 |
| Attitude | 3.8130 | 0.65004 |
| Subjective Norms | 3.8544 | 0.80274 |
| Perceived Behavioral Control | 3.6670 | 0.53881 |

**Reliability Analysis:** Reliability in this study refers to the existence of both consistency and stability factors in the research. The reliability can be determined by Cronbach's Alpha test. The closer Cronbach's Alpha to the value of t, the highest the interval consistency reliability will be. As presented in Table 3, subjective norms had high Cronbach's Alpha scores (0.926) which can be interpreted as the items in the variables having excellent internal consistency. The items for attitude also portrayed a relatively high internal consistency with a score of 0.823. However, the items in ethical behavioral intention and perceived behavioral control were considered good with a score of 0.737 and 0.705 respectively.

**Table 3: Reliability Analysis**

| Variable | No of Item | Item Deleted | Alpha |
|---|---|---|---|
| Ethical Behavioral Intention | 7 | - | 0.737 |
| Attitude | 10 | - | 0.823 |
| Subjective Norms | 9 | - | 0.926 |
| Perceived Behavioral Control | 10 | - | 0.705 |

**Correlation Analysis:** Table 4 shows that attitude had relatively high correlation scores (r= 0.859). The same goes for subjective norms (r= 0.855) and perceived behavioral control (r= 0.736). The correlation score for all the variables had a positive value, signifying the positive association with ethical behavioral intention. Therefore, this means that as the variable increases in value, the other variable also increases in value. The correlation coefficients of the independent variables seemed to be close to 1, which implies that this variable has strong correlations with ethical behavioral intention.

**Table 4: Correlation Analysis**

| | Ethical Behavioral Intention | Attitude | Subjective Norms | Perceived Behavioral Control |
|---|---|---|---|---|
| Ethical Behavioral Intention | 1 | | | |
| Attitude | .859** | 1 | | |
| Subjective Norms | .855** | .836** | 1 | |
| Perceived Behavioral Control | .736** | .781** | 791** | 1 |

**Analysis of Variance (ANOVA):** Table 5 below shows that the p-value of the F-test is 0.000 which is less than 0.05. This means that the overall model is statistically significant to explain ethical behavioral intention. The

F-test is highly sig with F=128.163 which indicates the combination of attitude, subjective norms ad perceived behavioral control significantly explained the variation of ethical behavioral intention.

**Table 5: Analysis of Variance (ANOVA)**

| Model | | Sum of Squares | DF | Mean square | F | Sig |
|---|---|---|---|---|---|---|
| **1** | Regression | 30.365 | 3 | 10.122 | 128.163 | .000[b] |
| | Residual | 7.582 | 96 | .079 | | |
| | Total | 37.946 | 99 | | | |

**Regression Analysis:** As shown in Table 6, this is the result of a multiple regression analysis conducted which indicates the relationship between attitude, subjective norms and perceived behavioral control towards ethical behavioral intention. R' is the square root of R-Squared and the correlation between the observed and predicted value of the dependent variable. $R^2$ = 0.800. It can be concluded that 80.0% variation in ethical behavioral intention can be explained by all the attitudes, subjective norms and perceived behavioral control. However, about 20.0% variation cannot be explained by the factors in this study.

**Table 6: Multiple Regression-Model Summary**

| Model | R | R square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| **1** | .895 [a] | .800 | .794 | .28102 |

Table 7 shows that attitude scored β = .477 and t = 4.378. This showed that attitude had a significant influence on ethical behavioral intention as the value was 0.000, which is below 0.05 (95%). The findings are consistent with previous studies, which highlighted the positive link between attitude and ethical behavioral intention (Ferdous & Polonsky, 2013). Next, subjective norms β = .477 and t = 5.364. The significant value was 0.000. Hence, subjective norms had a significant impact on ethical behavioral intention. This implies that social influences such as friends, family, superiors and company management predicted ethical intention among insurance agents (Cooper and Frank, 2002). Meanwhile, the scores for perceived behavioral control were β = .008 and t = 0.104. This reflected that perceived behavioral control had no significant influence on ethical behavioral intention. Found that there is no relationship between perceived behavioral control and ethical behavioral intention.

**Table 7: Multiple Regressions – Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .885 | .202 | | 4.378 | .000 |
| | Attitude | .454 | .085 | .477 | 5.364 | .000 |
| | Subjective Norms | .347 | .070 | .450 | 4.954 | .000 |
| | Perceived Behavioral Control | .010 | .092 | .008 | .104 | .917 |

**Discussion**

The purpose of this study is to identify the factors that influence ethical behavioral intention among Takaful agents. Based on the study conducted, from reviewing the journals and articles, until the questionnaire has been collected, the analysis has found that attitude and subjective norms significantly predict ethical behavioral intention. Thus, it supports Hypothesis 1 and Hypothesis 2 and Hypothesis 3 is rejected as not significant. Attitude as an independent variable to determine ethical behavioral intention is significant for this study (Cheng et al., 2005 & Ferdous & Polonsky, 2013). Next, this study found that there is a strong relationship between subjective norms and ethical behavioral intention (Cooper & Frank, 2002). This is consistent with a study done by Bellizzi and Hasty (2003) and Kurland (1995) which stated that managers' sales pressure influenced insurance agents' ethical intentions. They discovered that managers are more lenient in punishing top-performing agents because they prefer sales production over ethical behavior. Lastly, there is no significant relationship between perceived behavioral control and ethical behavioral intention found in this study.

## 5. Managerial Implications and Recommendations

Agents serve as a vital link between customers and businesses. As a result, takaful agents must have high credibility to establish a positive attitude and behavior for the future of the takaful industry. Besides, this paper gives insights into the appropriate strategies that practitioners should adopt in their training needs for the Takaful agents respectively. This study has limitations as it only covers the factors derived from the Theory of Planned Behavior, hence, additional predictors such as past behavior, motivations and knowledge are suggested for future research. Other than that, contextual-wise, this study only covers the behavioral intentions of takaful agents. Hence, further discussion may expand into looking at the comparison study between takaful agents and conventional agents. This may enhance the generalizability of the study and contribute to more gaps in knowledge pertaining to ethical behaviors and the insurance industry.

**Conclusion:** The objective of this paper was to examine the relationship between attitude, subjective norms and perceived behavioral control on ethical behavioral intention among insurance agents by adopting the Theory of Planned Behaviour (TPB). This study showed that there is a strong and positive relationship between attitude and subjective norms with ethical behavioral intention as the dependent variable. However, perceived behavioral control failed to show a significant relationship with ethical behavioral intention. The regression analysis also showed that attitude predicts ethical behavior intention stronger than subjective norms as the insurance agents' belief that their judgments on the outcomes and consequences may encourage them to perform that behavior. Thus, once they understand that it can assist the Takaful agents to minimize their mistakes in attending to clients and encourage them to offer better service in the future.

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# Factors Inducing the Adoption of Knowledge Management System (KMS) In SMEs, Large and Government Organizations. What Are the Intercepting Factors? A Systematic Review

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**Abstract:** This paper aims to develop a systematic exploration of the literature investigating the factors that influence the adoption of the knowledge management system (KMS) in organizations as well as identifying the intercepting factors between different types of organizations such as small-medium enterprises (SMEs), large corporation and government organizations. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is used to structure the research field. The proposed research used filtering scientific papers published in Emerald Insight and Scopus from 2018 to 2022. This paper presents empirical evidence from six articles that identify intercepting factors between small-medium enterprises, large corporations, and government organizations. Among the factors analyzed, only IT capabilities were found to be common across all three types of organizations. The findings and analysis section includes a Venn diagram that illustrates other relevant factors that intercept between the organizations. The accumulation of reviewed research papers is necessary for academia and organizations to analyze the factors influencing the adoption of KMS. This study also will assist in providing information that will offer insights to organizations, particularly those in the small and medium enterprises (SME), large enterprises and government, in the process of implementing knowledge management.

**Keywords**: *knowledge management system, PRISMA, SME, organization, intercepting factors.*

## 1. Introduction

Knowledge management, or KM, is the activity of acquiring, preserving, and distributing employee knowledge capital throughout the enterprise (Girard & Girard, 2015). People may now readily access the documents and data they need to perform their tasks, thanks to knowledge management. Additionally, it helps the business retain that information for use in the future, which increases productivity, creates a better work atmosphere, and decreases the need for repeating chores. On top of that, the majority of businesses have recognized how crucial it is to integrate knowledge management, and they are working to do so in SMEs, large businesses, and the public sector.

**Issues, Research Problems and Research Question:** While implementing a knowledge management system (KMS) can be beneficial, it can also pose challenges. Knowledge management is a systematic and organizationally specific process that involves gathering, organizing, sustaining, applying, sharing, and renewing employees' tacit and explicit knowledge to improve organizational performance and provide value (Samuel & Odor, 2018). By cataloging each employee's expertise and making it accessible to other staff members, a corporation can better leverage its collective knowledge and improve decision-making processes. To successfully implement a KMS, organizations need to consider various factors, including the development of a comprehensive knowledge management strategy.

The provision of adequate IT infrastructure, and the establishment of a supportive organizational culture. By addressing these factors, organizations can overcome the challenges associated with KMS implementation and effectively utilize their knowledge resources. With a knowledge management system, employees will have access to training materials, best practices, and fixes for common problems all in one location. Rao et al. (2022) identify management leadership and support, culture, strategy (including IT and HRM), and measurement as essential elements for the success of knowledge management in SMEs. The use of knowledge

by micro firms to expand their potential can result in an improvement in competitiveness and overall success (Duarte Alonso et al., 2021). Essentially, efficiency, effectiveness, and innovation within a business are all governed by KM (Chen et al., 2022). As SMEs become more aware of the importance of managing information to remain competitive in their markets, they have been concentrating on KM techniques (Adam et al., 2022). Today, KM has been elevated to the top of all companies' priorities due to its connection to various performance measurements (Zhang et al., 2023).

KM has also demonstrated its value in a variety of fields and industries, including the public sector (Jain & Jeppe Jeppesen, 2013), non-governmental organizations (Corfield et al., 2013), small-to-medium-sized enterprises (Durst & Edvardsson, 2012), the banking industry (Oluikpe, 2012), life insurance businesses (Huang & Lai, 2014), human service and professional services firms (Palte et al., 2012) and manufacturing organizations (Birasnav & Rangnekar, 2010). The parameters examined by research on KMSs in big enterprises, however, cannot be completely applied to SMEs without understanding their specific context. According to Durst and Edvardsson (2012), further research is needed to fully understand this issue. As a result, mastering KMS implementation remains of utmost importance, particularly given that management has made significant efforts to take KMS initiatives (Kuo & Lee, 2011). When applying and implementing KM, many companies run into issues and roadblocks (Hashim et al., 2014; Henttonen et al., 2016). As a consequence, eleven factors have been identified for KM implementation in SMEs (Wong, 2005). This can help companies handle KM difficulties in SMEs.

Yap and Lock (2017) go on to state that the major organizational and cultural issues preventing the adoption of knowledge management methods are a lack of motivation, bureaucracy, and hierarchy. Lack of confidence is another serious issue. It was challenging to make generalizations and decide whether the adoption was appropriate for other organizations, such as the government or big enterprises because both studies focused on SMEs. Batra and Anand (2014) found that the Malaysian government and private companies are still looking for solutions to problems related to KM practices, especially issues with information sharing, in their study of knowledge management trends in China, Malaysia, and India. This demonstrates the pressing need for an organization to conduct more extensive research into KM challenges. Therefore, this study's primary goal is to better understand the variables that affect the adoption of knowledge management systems (KMS) in small and medium-sized businesses (SMEs), big corporations, and governmental organizations. The research seeks to provide insights that can help organizations overcome obstacles and achieve successful KMS adoption by identifying these factors.

## 2. Literature Review

Researchers and policymakers are presented with a country-specific conundrum by the definition of SMEs since "small," "medium," and "large" are relative measurements that change depending on how robust the country's economy is. Definitions frequently refer to criteria related to income, assets, and personnel count, as noted by Steenkamp and Kashyap (2010).

**KM in Small-Medium Enterprises:** Because many smaller businesses experience resource limitations, it's imperative to carefully use the resources that are already accessible (Jarillo, 1989). This is so that bad choices won't have the same negative impacts that they would in large corporations. For instance, small companies encourage innovation and entrepreneurship through their flexible management methods and flat organizational structures. There are frequently few rules, no formalities, and a relaxed environment. Control in SMEs typically depends on the owner's personal supervision, and written procedures are rarely in existence (Daft, 2016). In many smaller businesses, owner-managers also hold a crucial role (Bridge & O'Neill, 2012). It is common in this situation for the firm's planning and decision-making processes to involve just one person (Culkin & Smith, 2000).

These people are also in charge of realizing the benefits of information management to support business operations, which is another consequence of their centrality. However, the day-to-day activities of SMEs necessitate special consideration (Hofer & Charan, 1984). This frequently results in situations where there is insufficient time for strategic issues. Due to this, as well as a lack of financial resources and expertise, the majority of information is typically kept in the owner's thoughts and those of a select few key employees

rather than being physically preserved or shared through substitute agreements (Bridge et al., 2003; Wong & Aspinwall, 2004). As a consequence, information sharing in SMEs may occur during casual conversations or birthday celebrations for staff members (Wong & Aspinwall, 2004; Durst & Wilhelm, 2012).

**KM in Large Enterprises:** The modern business world is essentially a knowledge-based economy, which places a strong emphasis on the production and application of knowledge. Knowledge management is an integrated, methodical strategy to categorize, manage, use, and share an organization's information about assets, such as databases, policies, procedures, and documents, as well as the tacit knowledge of its current and former workforce (Audretsch & Belitski, 2020). An efficient KM process produces a distinctive workplace where knowledge and experience are readily shared (Aldehayyat et al., 2021). KM has been implemented in large organizations for a number of years, and yet resistance to change still exists, especially from the perspective of the individual (Ganapathy et al., 2019). Each company should be able to gather intangible knowledge that is pertinent to its main goals (Cardoni et al., 2020). Given that the development of stakeholder relationships, brand image, and reputation are affected by sustainable sources of business advantage, corporations have recognized the importance of managing intangible assets (Abbas & Eksandy, 2020). In this sense, processing information is essential to a company's success. By ensuring that knowledge is applied effectively through strategies that develop, organize, communicate, and retain resources through knowledge management, the key to gaining and maintaining a competitive advantage is based on attainable goals (Aldehayyat et al., 2021).

**KM in Government:** The competitive advantage of a country depends on knowledge management. KM, according to many, is crucial to e-Government and the provision of public sector services. The majority of modern companies use ICT to fill out forms, evaluate data, gather data, look at data, compute data, plan data, clarify data, and send data they have collected. The administration then makes plans using this data (Sulistiawaty et al., 2021). Because knowledge management has traditionally been associated with for-profit companies, the organizational culture that prevails in the public sector may be largely to blame (Ondari-Okemwa & Smith, 2009). Every government strives to use the public sector to deliver essential services as effectively as feasible. By reducing the expense of starting and running a company, the provision of basic services may contribute to improving the economic infrastructure, increasing effectiveness and efficiency, and fostering a business-friendly environment. Government-owned businesses frequently serve as levers to unleash development potential and promote macroeconomic stability.

## 3. Methodology

This systematic review, which adheres to the recommendations in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) document, aims to organize the research field by identifying the participants and variables that have been used in prior studies. This review will also go over how similar the factors are in big corporations, the government, and small to medium-sized businesses that affect the adoption of knowledge system management. This paper describes the steps that were done to reduce the possibility of bias using the PRISMA checklist. The systematic review process will be thoroughly explained in this section, covering subjects like the sources or databases used the screening procedures, and the selection of articles that were deemed appropriate for the current study.

**Resources**: Two examples of multidisciplinary electronic databases that were used for the paper search include Scopus and Emerald Insight. One of the most well-known digital publishers on the globe is Emerald Insight. It gathers published works from half a million researchers dispersed across 130 countries, and it gets 109 million visits annually in addition to 30 million downloads. As the largest abstract and citation collection of literature that has undergone peer review, Scopus is a sizable database as well. Scientific journals, books, and meeting proceedings all fall under this category. Scopus is used by more than 3,000 academic schools, governmental organizations, and private businesses worldwide.

### Systematic Review Process for Selecting Articles

**Identification**: PRISMA states that there are four different stages to conducting a systematic review (SLR). To determine the search terms that would be used; the study was first started in the third quarter of 2022. Table

1 shows that various efforts were made to use a range of keywords and synonyms related to the adoption of KMS in organizations. At this stage, 57 items that were duplicates were removed after the thorough and meticulous screening.

**Table 1: The Search String**

| Database | Keywords used |
|---|---|
| Emerald Insight | TS = (("knowledge management system" or "KMS") AND ('SME" OR "small medium enterprise" OR "large enterprise" OR "large corporation" OR "government" OR "e-government")) |
| Scopus | TITLE-ABS-KEY (("knowledge management" OR "KMS") AND ("SME" OR "small medium enterprise" OR "large enterprise" OR "large corporation" OR "government" OR "egovernment")) |

**Screening:** The main goal of the initial screening step was to eliminate duplicate articles. 57 items, in this case, were not cleared to move on to the next stage. In comparison, during the second phase of the process, 372 articles were assessed using a number of inclusion and exclusion criteria that were developed by the researchers. The researchers only continued with journal articles because they serve as primary sources and provide real data, which is the first criterion. As a result, it can be inferred the present search did not look for any publications in the form of a systematic review, meta-analysis, meta-synthesis, book, chapter in a book, or conference proceedings.

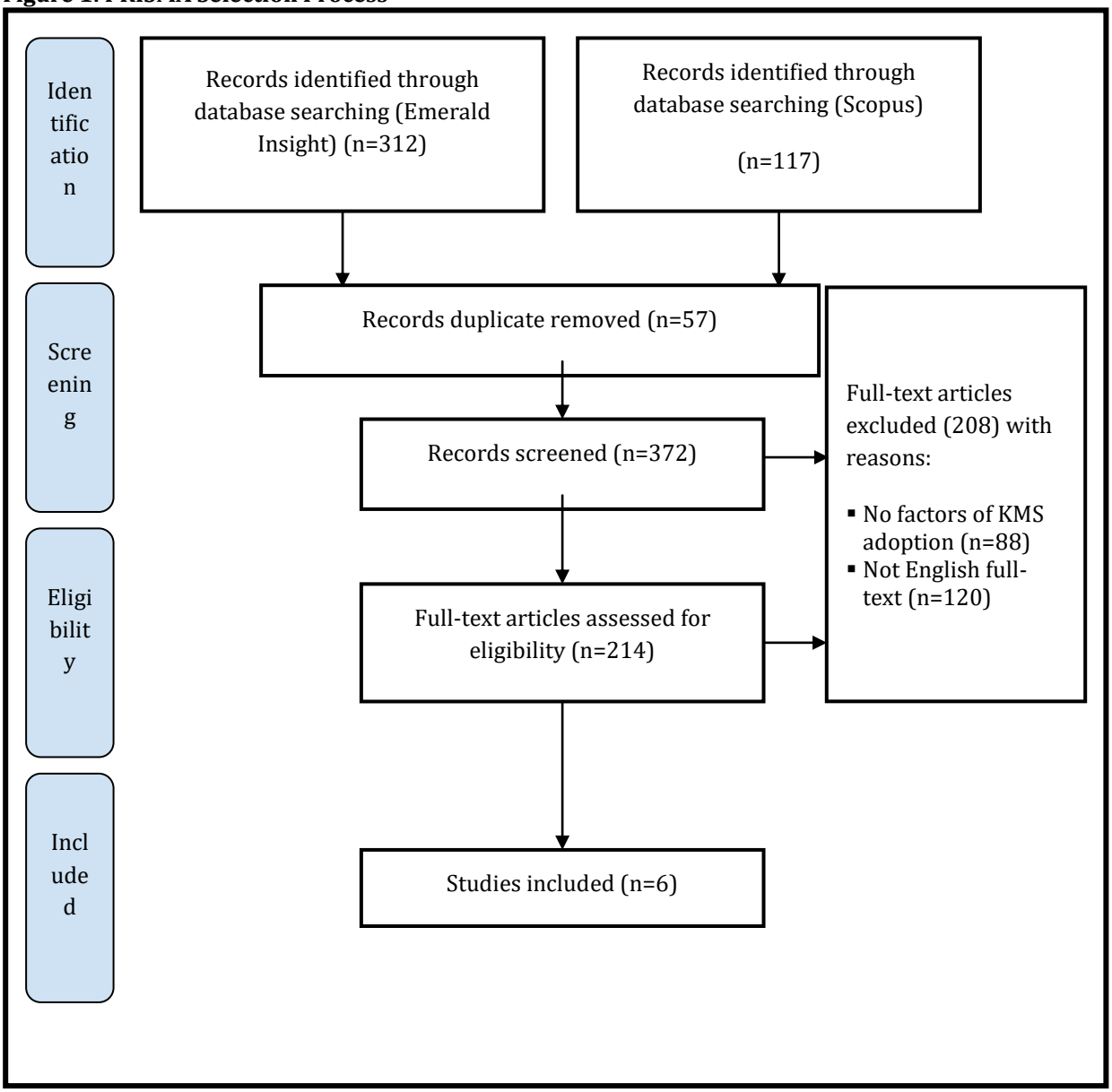
**Eligibility and Inclusion Criteria:** To decide whether existing and prospective publications could be subjected to analysis in this study, two criteria were used:

**a)** The dependent variable in the study was the adoption of KMS in organizations, and the independent, moderating, or mediating variables were the variables that affected the acceptance of the system.
**b)** The research only considers full-text articles written in English and released between 2018 and 2022.

Records must satisfy the first two requirements to be accepted in connection to the scoping view. Additionally, since English is generally acknowledged as a global language and the majority of scholarly publications are released in English, it was mandated that English be used as the research's primary language. Additionally, this lessens misunderstandings and facilitates a smooth translation of the entire content. After the search string was complete, the screening procedure was conducted. The data collection resulted in the elimination of 158 articles out of the 372 articles that passed the requirements for further examination. The next stage involved determining eligibility, which involved retrieving and reviewing all of the papers. 208 of the articles were determined to be unsuitable after a thorough review because specific criteria were not fulfilled. The final stage is then completed, which entails looking over six articles that will be beneficial for further research.

**Data Abstract and Analysis**: The remaining papers were examined, and appropriate evaluations of them were made; these evaluations centered on specific studies that provided answers to the established study goals. The abstracts will be examined first to extract the data, and then the complete pieces will be examined to identify pertinent topics and sub-themes. In addition, content analysis was used to conduct qualitative research to do a study that would discover the factors that influence the adoption of KMS.

**Figure 1: PRISMA Selection Process**




(Adapted from Moher et al., 2009).

## 4. Findings and Analysis

Table 2 indicates that the adoption of knowledge management (KM) systems in organizations has been a topic of significant interest both internationally and locally. Previous studies have predominantly used questionnaires to collect data from employees, with a minimum of 100 respondents typically involved. These questionnaires were often distributed physically or through email. Moreover, based on the systematic literature review performed on the literature found in Table 2, a Venn diagram (Ruskey & Weston, 2012) of factors influencing the adoption of KMS has been created as shown in Figure 2. The Venn diagram shows that the factor IT capabilities intercept with all organization types which means this is the most influential factor for an organization to adopt a knowledge management system regardless of the type of organization. IT capabilities are important to adopt any system due to its cost, stability and security of the system is crucial in protecting an organization's trade secret and process.

**Table 2: Publication Related to the Types of Respondents and Factors Influencing Knowledge Management**

| Title / Authors (year) | Organization Size/ Type | Respondents | Factors / Determinants |
|---|---|---|---|
| Examining the factors influencing knowledge management system (KMS) adoption in small and medium enterprises SMEs. (Shrafat, 2017) | SME | 247 respondents. Respondents are from various SMEs, primarily based in Jordan. | 1) Knowledge Management capabilities<br>2) Knowledge sharing<br>3) organizational learning capabilities<br>4) information technology capabilities |
| Success and failure factors in implementing quality management systems in small- and medium-sized enterprises: a mixed-method study. (Mohammadi et al., 2020) | SME | 480 questionnaires were sent; 298 completed questionnaires were received in Iran. | 1) IT capabilities<br>2) Process improvement<br>3) Organization structure<br>4) Culture<br>5) Behavior<br>6) Attitude |
| The Influence of Knowledge Management on the Smart Government Effectiveness: An Empirical Study in UAE. (Albreiki, 2019) | Government | 650 questionnaires have been sent out to Ministries and Federal Authorities. | 1) Knowledge Sharing<br>2) Knowledge Organization<br>3) Knowledge Accountability<br>4) Utilitarian Role of Knowledge Management<br>5) Engagement<br>6) Accessibility and Competitiveness. |
| The Impact of Knowledge Management, Administrative Management and Information Technology for E-Government Success. (Sulistiawaty et al., 2021) | Government | 100 respondents. Respondents are managers who are leaders in implementing E-government services in the special region of Yogyakarta, Indonesia. | 1) Security<br>2) Support<br>3) Trust<br>4) Convenience<br>5) Quality<br>6) Information<br>7) Benefits<br>8) comfort<br>9) Obstacles |
| Evaluation of the maturity level and critical success factors in the implementation of knowledge management in the national private construction service company in Indonesia. (Zain & Latief, 2020) | Large corporation | 105 questionnaires were distributed to the targeted respondents and only 68 were returned and usable for analysis. | 1) policies<br>2) HR planning and processes<br>3) KM culture<br>4) Information technology<br>5) training and improvement of human performance<br>6) approaches to capturing/using tacit knowledge<br>7) procedure methods & documentation processes |
| An evaluation of critical success factors for knowledge management in the Financial sector: evidence from developing country context. (Aldehayyat et al., 2021) | Large corporation | 490 questionnaires were distributed equally among Jordanian banks and the insurance company. Of these. 310 were completed and useable | 1) Leadership<br>2) organizational structure<br>3) ICT<br>4) Human Resource |

Organizational learning skills or capturing tacit knowledge are the intercepts for SMEs and large corporations, along with knowledge management culture. Depending on an organization's culture of knowledge management and its learning capacity, these two factors help to explain why it is necessary to implement the KMS. Third, knowledge sharing is a key component in the adoption of KMS as evidenced by the parallels in knowledge-sharing factors between the SME and government when they interact. The likelihood of the organization adopting the KMS will be lower if it has no plans to share information with other organizations. Last but not least, process documentation or knowledge organization is a shared characteristic of both the government and big corporations. This element is crucial for both kinds of organizations to organize and document their knowledge for long-term process sustainability and knowledge transfer.

**Figure 2: Venn Diagrams of Factors Influencing the Adoption of KMS in an Organization**

## 5. Conclusion and Direction for Future Research

This research will help to broaden understanding, provide more information, and add to the existing body of knowledge by helping to provide more information about the factors that influence the adoption of knowledge management systems in companies. Regarding the study's practical contributions, they include material that will help organizations, especially those in the small- and medium-sized business (SMB), large businesses and government sectors, gain understanding as they implement knowledge management. In conclusion, knowledge management is an essential procedure for any company. It primarily encourages creativity and invention within the company, which improves performance across the board. To ensure that the knowledge is used properly, it is crucial to use the correct support systems to create, codify and distribute it among the organization's participants. Furthermore, it is essential to acquire the information to prevent competitors from copying you. Effectively managing knowledge enables a company to function well, which enables it to obtain a competitive edge in the market.

Depending on the size of the organization and the type of company they run, different factors can affect the adoption of KMS; however, it has been discovered that IT capability is the most important factor in determining whether an organization chooses to implement a KMS. A company must comprehend the motivation, goal, and effects of implementing KMS to guarantee that the system will be profitable for both the company and its users. However, even though many other variables affect how KMS is adopted in an organization, this does not mean that those other factors do not have an impact on their own particular organization type. Future studies should look for additional variables like leadership styles and human resource management techniques that can increase the volume of knowledge production. Then, a comparative study could cast some light on cultural variances, particularly when analyzing the impact of a constricting organizational structure. Thirdly, cross-sectional research makes it difficult to track

advancements in the level of knowledge production. The respondents' assessments of the level of knowledge production in their organizations served as the study's primary data source. To test this model, future scholars might try to create a more accurate metric for knowledge creation.

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# Performance of Shariah vs Non-Shariah Firms: A Study of Manufacturing Sector in Malaysia

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**Abstract:** This research aims to examine the differences in the determinants of performance between Shariah-compliant and non-Shariah-compliant firms. The changes in the Shariah screening technique in Malaysia since 2013 have significantly affected how firms that comply with the Shariah principles, as opposed to non-compliant firms, leading to the motivation of this research being conducted. This research employs panel data regression analysis to test its hypotheses. Compiling data from 142 manufacturing firms (71 Shariah-compliant and 71 non-Shariah-compliant firms) from 2012 to 2021, this research found that Shariah-compliant firm performance is significantly influenced by firm size, leverage, tangibility and efficiency. In contrast, non-Shariah-compliant firm performance is significantly influenced by leverage, tangibility, working capital and efficiency. This research contributes to relevant parties, such as the manufacturing firms and policymakers, in providing insights on the most relevant indicators affecting firm performance, specifically those in the manufacturing sector.

**Keywords**: *Firm Performance, Shariah Compliant, Non-Shariah Compliant, Panel Regression Analysis, Manufacturing Sector.*

## 1. Introduction and Background

The comparison associated with Shariah and Non-Shariah compliant firms can be identified from the different firm characteristics, which may influence how the business performs. Generally, firm performance can be related to its financial behaviors and how well the firm uses its resources. Measuring financial performance will show the results of firm policies and operations in terms of money. One of the firm's financial indicators that can measure these results is known as the return on assets (ROA), commonly the main indicator for business performance (Saba et al., 2021). Particularly, firms that are Shariah compliant have different characteristics due to the firms' obligations to operate under the Shariah principles. Under Shariah principles, three main activities are prohibited, which are riba (interest), gharar (uncertainties) and maysir (gambling) (Aman, 2020). Avoiding these is essential so people can achieve social justice, economic success, and brotherhood in the community. Shariah principles also reflect the inclusive understanding of Islam, and maximizing profits is not the fundamental goal of an Islamic society overall.

Moreover, there are at least two characteristics that set Islamic businesses apart from non-Shariah compliant. They must first obey firm screening requirements and are not allowed to operate in the entertainment industry. Second, financial screening must be followed in all aspects of their operations. To ensure that their operations adhere to Shariah principles, businesses are analyzed using financial measures to determine whether or not they generate revenue from forbidden sources. These distinguishing characteristics of Islamic businesses may indicate different behavior from conventional businesses, which may affect how they perform in contrast to non-Shariah compliant firms.

Different markets have different screening techniques, which may be the root cause behind firms' performances. In Malaysia, the Shariah screening technique 2013 comprises of two-tier approach to the quantitative assessments and uses both the business activity standards and the newly proposed financial ratio benchmarks (Adam & Bakar, 2014). Accordingly, firms will have to maintain their Shariah-compliant status using the screening benchmark requirements. The firm must go through cash and debt ratio screening as part of the second tier of the quantitative evaluation, designed to quantify riba-based factors in the organization. Aside from the new financial ratios screening, the number of mixed operations permitted has decreased to ensure rigid compliance with the Shariah principles and a stable Islamic financial system. Thus,

the performance of Shariah-compliant may be higher than non-Shariah-compliant due to limitations in terms of debt, liquidity, and permitted activities. In contrast, most non-Shariah-compliant businesses will face significant risks due to excess liquidity, high debt and poor risk management, all of which contribute to uncertainty and lower profitability (Alahouel & Loukil, 2021). However, this could also mean that Shariah-compliant firms may miss the chance to make more money from a combination of activities to comply with the Shariah principles. Thus, this research highlights that the revision of the screening techniques for Shariah-compliant firms has somewhat altered the firms' business activities (Shariah or non-Shariah), urging this study to find out the difference between the determinants that affect the performance of Shariah-compliant firms and non-Shariah compliant firms.

From a business view, it is important to determine and make an effort to improve the firm's performance because the world is getting more advanced and developing. An emerging country such as Malaysia needs to adapt this quickly to stand together with other countries regarding economic growth (Ho & Mohd-Raff, 2019), especially in the manufacturing sector. It is widely acknowledged that Malaysia's manufacturing sector significantly impacts the country's exports, job creation, and economic growth. Malaysia has successfully attracted big investments from multinational corporations and built a world-class manufacturing base. Malaysia's manufacturing sales were worth RM143.9 billion in December 2021, which was 15.5% more than the same month last year (DOSM, 2021). Considering that the manufacturing sector is among the fastest-growing industry[1] in Malaysia, which is an area that can help with the country's economic growth (Islam & Karim, 2011), this research focuses its scope on the manufacturing sector.

This research paper emphasizes the performance of firms in Malaysian manufacturing businesses that are both Shariah and non-Shariah compliant. Since investments in Shariah-compliant instruments are growing quickly, it would be interesting to see if there are any differences between the factors that affect the performance of Shariah-compliant and non-Shariah-compliant firms. Regarding debt and liquidity, this research is proposing that Shariah-compliant firms should be less risky. It would be insightful to examine the different determinants that can affect the performance of firms listed explicitly under the manufacturing sectors. Theoretically, this research intends to add to the existing literature on determining firm performance in the Malaysian manufacturing industry, specifically those with Shariah and non-Shariah compliant status. Practically. The findings in this research should assist investors, fund managers, policymakers, and other players in the industry in developing a better investment plan by considering all of the variables that influence the firm's performance.

## 2. Literature Review

**Firm Performance:** In this research, firm performance is measured using the firms' level of profitability, i.e., the return on asset (ROA). The level of a firm's profitability is the major focus of any business since it is important to both internal and external parties. Firms need to ensure that they can generate profit. Several studies have measured firms' levels of profitability using ROA. For example, Margaretha and Supartika (2016) examine the relationships between firm-specific variables and the profitability of Indonesian Small and Medium Enterprises (SMEs) listed on the Indonesia Stock Exchange. The findings of this study, which were based on a sample of 22 SMEs between the years 2007 to 2012, revealed that factors such as firm size, growth, lagged profitability, productivity and industry affiliation significantly influence profitability. But the age of the firm has no significant impact on profitability. Ho and Mohd-Raff (2019) examine the relationship between external and internal determinants of the performances of Shariah and non-Shariah-compliant firms in Malaysia. The findings of this study, which were based on a sample of 51 Shariah-compliant and 18 non-Shariah-compliant firms between 1999-2015, revealed that firm size, financial distress, growth opportunity, liquidity, capital structure and working capital have a significant impact on the performance while for external factor revealed that interest rate, trade openness and the exchange rate has a significant influence towards performance.

[1] According to the Department of Statistics Malaysia Official Portal (2022), the manufacturing sector of Malaysia had its greatest sales value of RM144.6 billion in March 2022. This represents an increase of 13.9 % when compared to the same month of the previous year.

Al-Jafari and Al Samman (2015) studied 17 industrial firms in Oman that were issued on the Muscat securities market between 2006 and 2013, measuring the profitability of the firms using ROA and profit margin. The findings obtained from the regression analysis show that size, growth, and working capital have a positive and significant effect on ROA and profit margin. In contrast, leverage has a negative and significant impact on all profitability indicators. According to the findings of another study conducted by Vintilă and Nenu (2015), there is a significant correlation between the dependent variables, which is ROA with firm size and the ratio of sales to total equity. While growth, asset tangibility and debt structure are negatively related to ROA. Therefore, this research identifies that ROA has been commonly used as an indicator of firm performance.

**Firm Size:** There are a variety of ways that the size of a firm may be measured, which include the total assets, total sales, market capitalization, and the number of employees. The revenue or total sales measure product market competition and are used to indicate firm size in this research. When it comes to the relationship between firm size and profitability, the findings are inconsistent. Unal et al. (2017) examined 112 manufacturing firms listed on the Borsa Istanbul between 2005 to 2013. They found that the firm size has a positive relationship with profitability. The authors concluded that the larger the firm, the greater the profitability it may make from its operations.

Das et al. (2021) also discovered a positive relationship between the firm size and profitability in Bangladesh's nonfinancial sector from 2007 until 2016. According to the findings of the research, firm size has both a positive and significant influence on the return on equity (ROE) and ROA. The authors conclude that the larger the firm size, the better the firm's performance. Strong evidence of a positive link between business size and profitability was found in Doğan (2013) between 2008 to 2011. In this study, total sales were used as a proxy for firm size, and the author examined 200 firms listed on the Istanbul Stock Exchange. This also means that a firm is more profitable when sales increase. Therefore, this research suggests that larger firms will result in better performance.
**H1:** There is a positive relationship between firm size and firm performance.

**Liquidity:** Liquidity is the ability of a firm's assets or securities to be easily turned into cash. Liquidity ratios show how much of a safety margin a firm has and how well it can pay its short-term debts. Even though a firm needs liquidity to stay in business, too much can cause it to miss out on investment opportunities and make less money (Calcagnini et al., 2020). Several studies in the past have identified a favorable relationship between liquidity and profitability.

Alsharari and Alhmoud (2019) studied the determinants that affected the profitability of Shariah compliance in Jordan. Size, liquidity, leverage, sales growth, and gross domestic product were looked at as IVs, and the ROA was utilized to assess corporate profitability. Ordinary least squares (OLS) and fixed-effects estimates were used to analyze the data from 28 Sharia-compliant businesses from 2013 to 2015. The results show a positive and strong relationship between size, liquidity, sales growth and ROA. Similar results were found by Nanda and Panda (2018) using the data from Indian manufacturing enterprises between 2000 and 2015 to examine the variables that affect profitability. They reported that firm size and liquidity enhance firm profitability.

Nguyen and Nguyen (2020) studied the determinants of profitability based on Vietnam-listed enterprises. About 120 firms provided the information for the years 2012 through 2014. The study used the current ratio to measure liquidity, while ROA and ROE were utilized to measure firm profitability. The findings indicate that profitability is positively and significantly associated with business size, solvency, and liquidity. Consistent with past studies, this research hypothesizes that higher liquidity levels will result in favorable firm performance.
**H2:** There is a positive relationship between liquidity and firm performance.

**Leverage:** The amount of debt utilized to support additional capital expenditures that might enhance a firm's financial performance is known as leverage (Lin et al., 2006). It aims to determine the percentage of total assets funded by borrowed money. Additionally, several methods evaluate leverage, including total debt to total assets, short-term debt to total assets, and long-term debt to total assets (Le & Phan, 2017).

According to Mathur et al. (2021), leverage and firm performance are inversely associated. The findings demonstrate that the explanatory factors, total debt ratio, long-term debt ratio, and short-term debt ratio negatively affect the firm performance. The results are consistent with the pecking order concept, which holds that high debt financing decreases a firm's value since debt carries a repayment obligation and debt financiers prefer to avoid riskier undertakings. High debt financing also raises a firm's financial risk, which leads to liquidity and operational risk. However, Egbunike and Okerekeoti (2018) highlighted that leverage has a major impact on consumer products manufacturing businesses' profitability. Firm size, leverage, and liquidity all had positive and substantial effects, according to the study of firm characteristics. Charles et al. (2018) discovered that size and leverage considerably impact profitability in Nigeria, while liquidity has little impact. This is in line with Ayaz et al. (2021), who examined data from 528 nonfinancial firms registered on the Bursa Malaysia Stock Exchange over 12 years (2005-2016) and discovered a strong negative relationship between leverage and profitability. In line with past studies, this research suggests that higher leverage levels will deteriorate firms' performance.
**H3:** There is a negative relationship between leverage and firm performance.

**Tangibility:** The ratio of a firm's tangible assets to its total assets is the best indicator to measure tangibility. Furthermore, firms with a high amount of tangible assets were most likely to have greater debt (Saba et al., 2021b). Tariq Bhutta and Hasan (2013) study shows an insignificant positive correlation between tangibility and profitability. This is because tangibility has a negative coefficient, which indicates that it has an insignificant relationship with profitability. The authors concluded that the firm is more profitable if it has a lower tangibility of assets.

Zeitun and Saleh (2015) also get the same result when the authors investigate the relationship between the tangibility of firms in Gulf Cooperation Council (GCC) countries with firms' performance using ROA. The negative coefficient of tangibility suggests that a greater tangibility ratio might have a negative impact on the performance of a firm. The research recommends that businesses in the GCC countries either reduce the amount of money they spend on investing in fixed assets or increase the efficiency of fixed assets. Therefore, firms with more tangible assets should negatively impact firm performance.
**H4:** There is a negative relationship between tangibility and firm performance.

**Working Capital:** Working capital is the difference between a firm's current assets and its short-term liabilities. It is a monetary measure that reveals how liquid is a business, organization, or other entities in terms of its operations. Working capital management helps operations run smoothly and helps the firm make more money and be more profitable.

Alarussi and Gao (2021) examined the variables influencing profitability in Chinese listed businesses and discovered a significant relationship between working capital and profitability. According to the research, positive working capital is crucial to reducing the cost of capital and boosting a firm's profitability. Alarussi and Alhaderi (2018) also found a similar finding. Working capital and profitability have a significant positive relationship, which looks at the variables influencing profitability in Malaysian-listed firms. Tareq et al. (2021) have shown that a firm's working capital management has a major impact on its profitability and that firms may increase their profitability via working capital management.

In addition, Sawarni et al. (2022) measured the efficiency of a sample of 431 nonfinancial firms from 2012 to 2019. The findings indicated that a firm's working capital management significantly impacts its profitability and that working capital management may help businesses increase their profitability. There is also a study that found that working capital is not relevant to firm performance. For instance, Sivathaasan et al. (2013) examined the relationship between profitability as defined by ROE and ROA and factors such as capital structure, working capital, business size, non-debt tax shield, and growth rate. The findings indicate that the capital structure and non-debt tax shield have a statistically significant impact on profitability. On the other hand, this impact is not influenced by working capital, growth rate or business size. However, according to the majority of literature, this research hypothesizes that higher working capital can increase firms' profitability.
**H5:** There is a positive relationship between working capital and firm performance.

**Efficiency:** Firm efficiency assesses a firm's capacity to manage its obligations and efficiently use its assets to produce short-term income. Efficiency is, without a doubt, the key to generating bigger revenues. Efficiency may apply to a firm's whole operations. Firm efficiency will use the asset turnover ratio as a proxy whereby the calculation is net sales divided by average total assets (Alarussi, 2021).

Asset turnover ratio and profitability have a positive relationship. Gaio and Henriques (2018) studied the profitability and compared the large enterprises and small and medium-sized firms (SMEs) in the European Union. The analysis reveals that the asset turnover ratio significantly relates to profitability. Next, Warrad and Omari (2015) examined how the turnover ratios of total and fixed assets affected the ROA of businesses in the industrial sector of Jordan. From 2008 to 2011, a simple linear regression was used, and the total assets turnover ratio significantly impacted the ROA of the Jordanian industrial sector. Consequently, the total assets turnover ratio may explain changes in ROA.

A similar result was obtained by Alarussi and Alhaderi (2018), who investigated the relationship between business productivity and financial success in Malaysian listed businesses. A total of 120 firms provided information for the years 2012 through 2014. In this study, ROE and earnings per share (EPS) were used to evaluate the profitability of the firms, while total sales were used to evaluate the firm size, current asset-current liability ratio measured working capital, assets turnover ratio measured business efficiency, current ratio measured liquidity, and debt-equity ratio measured leverage. The findings revealed a significant positive relationship between firm efficiency (assets turnover ratio) and profitability.

However, Lim and Rokhim (2020) examined the profitability of Indonesia's pharmaceutical sector from 2014 to 2018. According to the findings, there is a negative relationship between profitability, sales growth, and the percentage of total assets. This research explores the assets turnover ratio as one of the profitability metrics. As a result, profitability and business efficiency (as determined by the assets turnover ratio) are anticipated to be positively significant.
**H6:** There is a positive relationship between efficiency and firm performance.

**Shariah-compliant:** In Malaysia, firms may be classified as either Shariah or non-Shariah-compliant. There may be differences in performance between Sharia-compliant and non-Sharia-compliant firms because of how they operate and react to unexpected events. According to research that was conducted by Farooq and Alahkam (2016), it was found that Shariah-compliant firms underperformed within the standard period. According to the same research findings, the authors also found that Shariah-compliant firms performed much better than non-Shariah-compliant firms throughout. This is because Shariah-compliant firms with less leverage have a reduced chance of going into bankruptcy risk. Shariah-compliant firms do minimize their leverage through a Shariah screening methodology (Mohd-Sanusi et al., 2015). Similarly, Alnori and Alqahtani (2019) have shown through empirical research that Sharia-compliant firms use less leverage and shift more slowly to their optimum levels of capital structure.

The same study on Shariah and non-Shariah firms in Malaysian listed firms by Guizani and Abdalkrim (2021) emphasized that Shariah-compliant firms have a lower potential for growth than non-Shariah-compliant firms. This is because Shariah-compliant firms have restricted access to available financing where they need to take riba, gharar and maysir into consideration. According to the authors, the slower growth of Shariah-compliant firms results in lower capital expenditures compared to non-Shariah-compliant firms, which have a greater variety of financing alternatives. Non-Shariah firms are doing better than Shariah-compliant firms in terms of total assets and profitability (Rehan & Abdul Hadi, 2019).
**H7:** There is a positive relationship between Shariah-compliant status firms and firm performance.

## 3. Research Methodology

### Research Design and Data Collection

The whole set of data for this research was gathered over ten years, from 2012 to 2021. The focus of this research is Malaysian manufacturing firms. First, the Bursa Malaysia website collected data on manufacturing businesses. In the manufacturing industry, there are 262 firms. In addition, this research eliminated some of

the firms for whom the data were not included in the data stream, leaving a final sample of 142 firms. The analysis then separates 142 firms into two categories: those that adhere to Shariah compliance and those that do not. In this research, to be classified as Shariah-compliant firms, the firms in the manufacturing sector need to be listed as such for the whole 10 years of the study period, which includes 20 announcements of the firms' Shariah status. In addition, to be classified as non-Shariah firms, the firms are screened by considering those who are unable to retain their status after the 20 announcements. The sample had 142 businesses remaining, 71 of which were Shariah-compliant and 71 were non-Shariah compliant firms.

Before the multiple regression analysis, this research tests for several diagnostic tests, some of which include the outlier test, normality test, stationary test, multicollinearity test, heteroskedasticity test and serial correlation test to fulfill the assumption of panel regression analysis. The regression model explains the relationship between firm size, liquidity, leverage, tangibility, working capital, efficiency, and Shariah-compliant firms and firm performance. The measurement of each variable is listed in Table 1. Equations 1, 2 and 3 describe the regression models tested in this research. Equation 1 indicates Model A, representing the full sample (combination of Shariah and Non-Shariah compliant firms). Equation 2 indicates Model B, representing the Shariah-compliant sample and Equation 3 indicates Model C, representing the non-Shariah-compliant sample.

$$FP_{it} = \beta_0 + \beta_1(FS)_{it} + \beta_2(LIQ)_{it} + \beta_3(LEV)_{it} + \beta_4(TATA)_{it} + \beta_5(WC)_{it} + \beta_6(EFF)_{it} + \beta_7(SC)_{it} + \mu_{it} \quad (1)$$

$$FP_{it} = \alpha_0 + \beta_1(FS)_{it} + \alpha_2(LIQ)_{it} + \alpha_3(LEV)_{it} + \alpha_4(TATA)_{it} + \alpha_5(WC)_{it} + \alpha_6(EFF)_{it} + \varepsilon_{it} \quad (2)$$

$$FP_{it} = \Upsilon_0 + \beta_1(FS)_{it} + \Upsilon_2(LIQ)_{it} + \Upsilon_3(LEV)_{it} + \Upsilon_4(TATA)_{it} + \Upsilon_5(WC)_{it} + \Upsilon_6(EFF)_{it} + \delta_{it} \quad (3)$$

where FP is the firm performance, FS is the Firm size, LIQ is the Liquidity, LEV is the Leverage, TATA is the Tangibility, WC is the Working Capital, EFF is the efficiency, and SC is the Shariah-compliant firm status.

**Table 1: Measurements of Variables**

| Variable | Proxy | Measurements | Source |
|---|---|---|---|
| Firm Performance | ROA | $= \frac{Net\ Income}{Total\ Asset}$ | (Agusta et al., 2018; Al-Jafari & Al Samman, 2015; Vintilă & Nenu, 2015) |
| Firm Size | Total Sales | Natural Logarithm of Firm's Total Sales | (Aydın Unal et al., 2017; Das et al., 2021; Doğan, 2013) |
| Liquidity | Quick Ratio | $= \frac{Current\ Assets - Inventories}{Current\ Liabilities}$ | (Ho & Mohd-Raff, 2019) |
| Leverage | Debt Ratio | $= \frac{Total\ Debt}{Total\ Asset}$ | (Dioha et al., 2018) |
| Tangibility | TATA | $= \frac{Tangible\ Asset}{Total\ Asset}$ | (Tariq Bhutta & Hasan, 2013; Zeitun & Saleh, 2015; Işık, 2017) |
| Working Capital | WC | $= \frac{Net\ Sales}{Sales\ Receivable}$ | (Tareq et al., 2021; Sivathaasa n et al., 2013) |
| Efficiency | Asset Turnover | $= \frac{Net\ Sales}{Average\ Total\ Asset}$ | (Gaio & Henriques, 2018; Warrad & Omari, 2015) |

## 4. Results and Discussions

### Descriptive Statistics

The findings for descriptive statistics analyses for Models A, B and C are presented in Tables 2, 3 and 4, correspondingly. Model A comes with 1,258 observations, comprising 141 manufacturing firms, Shariah-compliant firms and non-Shariah-compliant firms from 2012 until 2021. After that, 141 manufacturing firms are classified into Shariah firms and non-Shariah firms. Model B consists of Shariah firms with 71 firms and 654 observations. While for Model C consists of non-Shariah firms with 70 firms and 604 observations.

**Table 1: Descriptive Statistics (Full Sample)**
Model A

| | Min | Mean | Max | Median | Std. Dev. |
|---|---|---|---|---|---|
| **Profitability** (percent) | -0.16 | 0.03 | 0.20 | 0.03 | 0.06 |
| **Firm Size** (percent) | 6.21 | 12.11 | 16.95 | 12.06 | 1.55 |
| **Liquidity** (times) | 0.01 | 2.48 | 29.85 | 1.57 | 3.09 |
| **Leverage** (percent) | 0 | 0.16 | 0.65 | 0.12 | 0.14 |
| **Tangibility** (percent) | 0 | 0.35 | 0.96 | 0.32 | 0.21 |
| **Working Capital** (times) | 0.08 | 5.90 | 71.96 | 4.73 | 4.95 |
| **Efficiency** (times) | 0 | 0.80 | 3.15 | 0.76 | 0.48 |

**Table 2: Descriptive Statistics (Shariah-compliant Sample)**
Model B

| | Min | Mean | Max | Median | Std. Dev. |
|---|---|---|---|---|---|
| **Profitability** (percent) | -0.14 | 0.04 | 0.20 | 0.04 | 0.05 |
| **Firm Size** (percent) | 8.31 | 12.30 | 16.95 | 12.39 | 1.40 |
| **Liquidity** (times) | 0.01 | 1.95 | 14.01 | 1.48 | 1.74 |
| **Leverage** (percent) | 0 | 0.14 | 0.46 | 0.12 | 0.11 |
| **Tangibility** (percent) | 0.02 | 0.40 | 0.96 | 0.36 | 0.20 |
| **Working Capital** (times) | 0.73 | 6.68 | 71.96 | 5.32 | 5.73 |
| **Efficiency** (times) | 0.04 | 0.84 | 2.62 | 0.84 | 0.42 |

**Table 3: Descriptive Statistics (Non-Shariah Compliant Sample)**
Model C

| | Min | Mean | Max | Median | Std. Dev. |
|---|---|---|---|---|---|
| **Profitability** (percent) | -0.16 | 0.03 | 0.19 | 0.02 | 0.06 |
| **Firm Size** (percent) | 6.21 | 11.89 | 16.24 | 11.83 | 1.68 |
| **Liquidity** (times) | 0.16 | 3.05 | 29.85 | 1.71 | 4.00 |
| **Leverage** (percent) | 0 | 0.17 | 0.65 | 0.13 | 0.16 |
| **Tangibility** (percent) | 0 | 0.29 | 0.86 | 0.27 | 0.19 |
| **Working Capital** (times) | 0.08 | 5.06 | 29.51 | 4.13 | 3.76 |
| **Efficiency** (times) | 0 | 0.76 | 3.15 | 0.69 | 0.53 |

The findings of descriptive statistics indicate that, on average, the performance of Shariah-compliant firms and non-Shariah-compliant firms are almost identical. The result that can be drawn from this is that Shariah-compliant firms have a mean ROA value of 4%, which indicates that they are more profitable than non-Shariah-compliant firms (3%). As shown by Model B in Table 3, Shariah firms display the highest performance value, 20%, while non-Shariah firms present the lowest performance value, -16%. In addition, the findings demonstrate that Shariah firms have a greater size than non-Shariah firms, with average total sales of 12.30% compared to 11.89%, respectively. This result is supported by Das et al. (2021) mentioning that larger firm size leads to better firm performance. The descriptive statistics table for Model C shows that the non-Shariah firms have the smallest firm size, with a value of 6.21%, while the Shariah firms have the largest firm size, with a value of 16.95%.

It can also be seen from Table 3, Model C, that non-Shariah firms have larger average liquidity than Shariah firms. This may indicate that non-Shariah firms are better at meeting their short-term spending obligations and can create cash more quickly in an unexpected event. Model B shows that the Shariah-compliant firms have the lowest value of liquidity, 0.01 times, while non-Shariah-compliant firms, 29.85 times present the highest value of liquidity. Furthermore, non-Shariah firms show high leverage with a mean value of debt ratio of 17% more than Shariah firms, 14%. This may be because Shariah firms are restricted access to available financing where they need to take riba, gharar and maysir into consideration. However, non-Shariah firms have a greater variety of financing alternatives. In Model A, a minimum leverage value is 0%, and this value is derived from both Shariah firms and non-Shariah firms. Meanwhile, the maximum value of leverage in Model A is 65%, which is come from non-Shariah firms.

Table 3, Model B demonstrates that Shariah-compliant firms have a greater tangibility, up to 40%, compared to non-Shariah-compliant firms, which only have 29%. This may indicate that Shariah firms are making use of the tangibility of their assets to lessen the negative influence that debt has on their financial performance. In Model A, the lowest 51 value of tangibility is from non-Shariah firms, 0%, and the highest value of tangibility is from Shariah firms, 96%. Besides that, Shariah firms have an average working capital of 6.68 times, which is greater than the average of 5.06 times for non-Shariah firms. This demonstrates that Shariah firms have the potential for future growth and can maintain a higher level of profitability over the long term (Jaafar et al., 2020). From Model A, the statistic table shows that the minimum value of working capital, 0.08 times is from non-Shariah firms. In contrast, the maximum value of working capital is from Shariah firms, 71.96 times.

The average efficiency of Shariah firms is 0.84, which is higher than the average efficiency of non-Shariah firms, which is 0.76. As a result, this may be seen as evidence that Shariah firms are better at turning their assets into sales. From Model A, we can observe that the lowest and highest efficiency value is presented by non-Shariah firms with 0 times and 3.15 times, respectively.

**Diagnostic Testing**

Before the multiple regression analysis, this research runs several diagnostic tests, including outlier, normality, stationary, multicollinearity, heteroscedasticity and serial correlation tests. An outlier is a set of data or an observation that stands out from the rest of the points due to its abnormal distance from others and removing the outliers will prevent distortion of data due to extreme values. This research employs the Cook's Distance test to identify the outliers. After running an outlier's test, there are 119 observations removed from 1,377 observations, leaving 1,258 observations in Model A. Figure 1 and Figure 2 show the scatter plot before and after removing the outliers. Thus, the issue of outliers is resolved in this research.

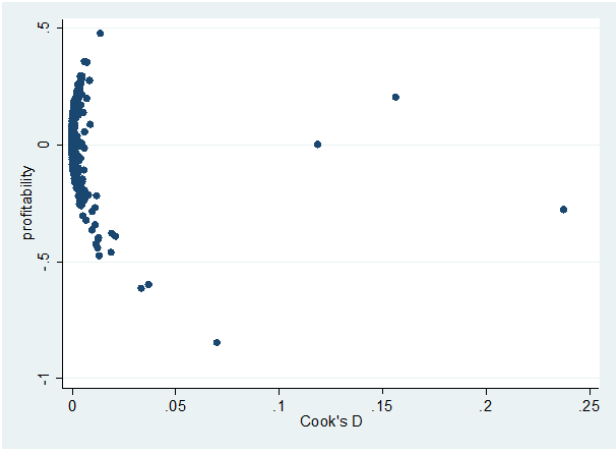


Figure 1: Before removal of outliers

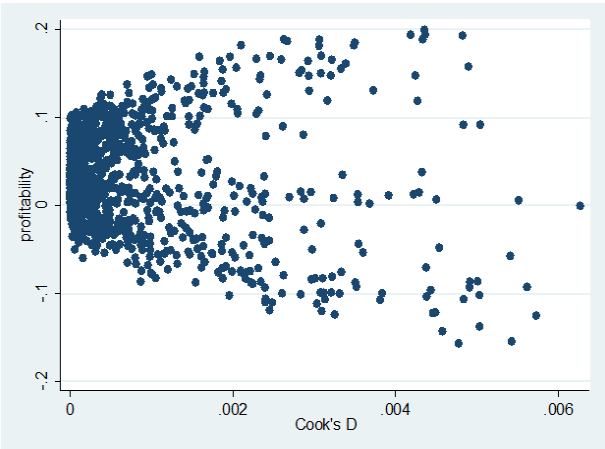


Figure 2: After removal of outliers

Next, this research runs the normality test, which the investigation is referred from the skewness and kurtosis of data. For Model A, based on Table 4 it shows that the prob>chi2 is 0.00 which is less than the threshold, 0.05. This means that the null hypothesis may be rejected since the residuals do not have a normal

distribution. In addition, Model B and Model C also have abnormal distributions, where the prob>chi2 is less than 0.05. The result indicates that all null hypotheses can be rejected since all the residuals in Models A, B and C are not normally distributed the violation of the normality assumption is only a concern when dealing with relatively small sample sizes, whereas it is not an issue when dealing with relatively high sample sizes (Schmidt and Finan, 2018). Therefore, the central limit theorem makes normality distribution less crucial for large sample sizes, which are also used in this research.

**Table 4: Skewness and Kurtosis Test**

| | Obs. | Prob. (Skewness) | Prob. (Kurtosis) | Adj. chi2 | Prob>chi2 |
|---|---|---|---|---|---|
| **Model A** | 1,258 | 0.0015 | 0.0002 | 21.46 | 0.0000*** |
| **Model B** | 654 | 0.0001 | 0.0018 | 21.24 | 0.0000*** |
| **Model C** | 601 | 0.7273 | 0.0069 | 7.29 | 0.0265** |

**** significant at 1% level, ** significant at 5% level, * significant at 10% level*

Moving on, this research runs for the stationary test to ensure long-term data stability. The Phillips–Perron test is used in the performance of this unit root test. The findings of the unit root test are shown in Table 5 of this research. The alternative hypothesis for panel data states that at least one of the panel data sets is stationary, in contrast to the null hypothesis for panel data, which states that all panel data contain unit roots. As a result, to provide a satisfactory result, the data must reject the null hypothesis, indicating that not all panel data includes a unit root. Based on the findings, this research concludes that profitability; firm size, liquidity, leverage, tangibility, working capital and efficiency have no unit root issue for the overall model and are significant at the 1% level. With a significant value lower than 0.10, we can reject the null hypothesis and accept the alternate hypothesis, which indicates that the data have no stationary issue. This means that panel data or long-run data used from the studies are correct and reliable.

**Table 5: Phillips-Perron Unit Root Test**

| Variables | Model A $Chi^2$ | Model B $Chi^2$ | Model C $Chi^2$ |
|---|---|---|---|
| **Profitability** | 521.10*** | 217.96*** | 303.14*** |
| **Firm Size** | 542.01*** | 204.60*** | 337.41*** |
| **Liquidity** | 612.32*** | 367.35*** | 244.97*** |
| **Leverage** | 635.20*** | 259.51*** | 375.70*** |
| **Tangibility** | 910.21*** | 321.86*** | 588.35*** |
| **Working Capital** | 515.38*** | 273.23*** | 242.15*** |
| **Efficiency** | 686.25*** | 397.54*** | 288.71*** |

In this research, a multicollinearity test is carried out to investigate the correlation that may exist between two or more independent variables, as well as to determine whether or not these variables are significantly associated with one another. The Variance Inflation Factor (VIF) test is conducted to investigate any possible multicollinearity issues that may be present in this data collection. The rule of thumb for the VIF is used to predict the outcomes of the centered VIF with a value lesser than 10 for the absence of multicollinearity in the model. Based on the findings in Table 6, suggests that the variables are in good condition (value less than 10). Thus, this study claims that there is no severe multicollinearity issue in this research for all models.

**Table 6: Variance Inflation Factor Test**

| Variables | Model A | Model B | Model C |
|---|---|---|---|
| **Firm Size** | 1.51 | 1.21 | 1.97 |
| **Liquidity** | 1.41 | 1.46 | 1.38 |
| **Leverage** | 1.49 | 1.51 | 1.59 |
| **Tangibility** | 1.36 | 1.63 | 1.18 |
| **Working Capital** | 1.28 | 1.27 | 1.58 |
| **Efficiency** | 1.40 | 1.43 | 1.66 |
| **Mean VIF** | 1.37 | 1.42 | 1.56 |

This research tests for heteroscedasticity to detect error components of the model with a constant variance. Using the Breusch-Pagan and Cook-Weisberg tests and the Modified Wald Test, this research found that there the null hypothesis is rejected, indicating the existence of a heteroscedasticity issue in the model (refer to Tables 7 and 8). To solve this issue and ensure that the final estimation is balanced and that there are no issues with reliability, robust standard error analysis is carried out for the panel data estimation. This research further conducts the last diagnostic test to overcome the issue of serial correlation using the Wooldridge test (refer to Table 9) to identify the correlation that would exist if the error terms of variables were found to be associated with one another over several times frames. Based on the results in Table 9, it has been determined that all of the models are significant at the 1% level of significance. If the probability is less than the 10% significant threshold, this indicates that the null hypothesis of the serial correlation test must be rejected as a result. Based on the result, we make use of the alternative hypothesis, which indicates that there is an issue with serial correlation. This research uses cluster robust standard error to solve these issues. Cluster robust standard error is conducted to remedy both the serial correlation and the heteroskedasticity problems that were discovered priory.

**Table 7: Breusch-Pagan and Cook-Weisberg Test**

| | Model A | Model B | Model C |
|---|---|---|---|
| **$Chi^2$** | 4.41** | 4.77** | 0.84 |

**Table 8: Modified Wald Test**

| | Model A | Model B | Model C |
|---|---|---|---|
| **$Chi^2$** | 16263.67*** | 10088.75*** | 2070.27*** |

**Table 9: Wooldridge Test**

| | Model A | Model B | Model C |
|---|---|---|---|
| **F** | 47.74*** | 20.34*** | 30.55*** |

**Panel Data Testing**

To choose the best-fitted model, this research conducts panel data testing by comparing all three-panel data estimations, Panel Ordinary Least Square model (POLS), Fixed Effect model (FEM), and Random Effect model (REM). There are three-panel data tests: The f-Chow test, the Breusch-Pagan Lagrangian model (BPLM) test, and the Hausman test, where the threshold for every test is 0.1.

The F-Chow test is conducted to compare POLS and FEM. Tables 10, 11, and 12 shows the result for the F-Chow test, BPLM test, and Hausman test, respectively. Model A, for the F-Chow test (Table 10), shows that the p-value is less than 0.1. Thus, the model chosen is FEM. For the BPLM test (Table 11), the p-value for chi-bar-square (chibar2) is 0.0000. This can indicate that the REM is better than POLS. The last panel data testing is to compare FEM and REM using the Hausman test. Based on Table 6, the test shows that the p-value for chi-square (chi2) is significant at a 1% level. However, the dummy variable results were omitted when regressed using FEM. It indicates that FEM is not suitable for achieving the research objective. This can be concluded that REM is an appropriate model for Model A.

For Model B, after running the F-Chow test (Table 10) to compare POLS and FEM, the p-value for the F statistic is significant at a 1% level. FEM is the appropriate model. For the BPLM test (Table 11), the p-value for Chibar2 showed that it is significant at a 1% level. This indicates that REM is better than POLS. Lastly, between FEM and REM, the Hausman test (Table 12) showed that FEM is an appropriate model of estimation because the p-value of Chi2 is significant at a 1% level. Therefore, FEM will be used as a model of estimation for Model B.

In Model C, the F-Chow test (Table 10) showed that the p-value for the F statistic is less than the threshold, 0.1. This indicates that FEM is better than POLS. Furthermore, in the BPLM test (Table 11), the result showed that REM is an appropriate model compared to POLS since the p-value of Chibar2 is significant at a 1% level. Lastly, the Hausman test (Table 12), showed that FEM is an appropriate model of estimation because the p-

value of Chi2 is significant at a 5% level. As a result, Model C will be based on the FEM Model as an interpretation of the result.

**Table 10: F-Chow test**

| | F | Prob>F | Appropriate model |
|---|---|---|---|
| **Model A** | 8.16 | 0.0000*** | FEM |
| **Model B** | 10.66 | 0.0000*** | FEM |
| **Model C** | 6.47 | 0.0000*** | FEM |

**** significant at 1% level, ** significant at 5% level, * significant at 10% level*

**Table 11: BPLM test**

| | Chibar2 | Prob> Chibar2 | Appropriate model |
|---|---|---|---|
| **Model A** | 783.35 | 0.0000*** | REM |
| **Model B** | 530.45 | 0.0000*** | REM |
| **Model C** | 267.80 | 0.0000*** | REM |

**** significant at 1% level, ** significant at 5% level, * significant at 10% level*

**Table 12: Hausman test**

| | Chi2 | Prob>Chi2 | Appropriate model |
|---|---|---|---|
| **Model A** | 45.22 | 0.0000*** | REM |
| **Model B** | 47.17 | 0.0000*** | FEM |
| **Model C** | 16.66 | 0.0106** | FEM |

**** significant at 1% level, ** significant at 5% level, * significant at 10% level*

**Determinants of Firm Performance**

The results of the Panel Data Testing indicate that the Random Effect Model is the one that provides the best fit for Model A and Model C. Meanwhile, the Fixed Effect Model provides the best fit for Model B. This research opts for the Cluster Standard Error Estimations to overcome the issue of heteroscedasticity. Table 13 is the Panel Regression analyses' findings, including Models A, B, and C.

The Wald chi2, also known as F statistics for Models A, is significant at a 1% level, indicating that Random Effect Model is an accurate estimation for this model. The Wald chi2 for Models B and C are also significant at a 1% level, proving that the Fixed Effect Model is an accurate estimation for both models. As for the R-Squared, it is determined based on the result of panel data estimations. The overall R-Squared for Random Effect Model A is 0.2279. This indicates that the independent variables of this research may explain 22.79% of the variations in the performance of Shariah and non-Shariah-compliant manufacturing firms. Another 77.21% of the data may be explained by a different variable not considered in the model. The R-squared test for Model B is 0.2653, which shows that the independent variables can explain 26.53% of the variation in the performances of Shariah manufacturing firms. The remaining can be explained by other variables not included in the model. Lastly, the R-squared for Model C is 0.2470, demonstrating that the independent variables explain 24.70% of the variation in performances for non-Shariah-compliant manufacturing firms. The rest could be explained by additional factors that were not considered.

**Table 13: Multiple Regression Analysis Results**

| Variables | Model A<br>Coef. | Model B<br>Coef. | Model C<br>Coef. |
|---|---|---|---|
| **Firm Size** | 0.0098*** | 0.0297*** | 0.0070 |
| **Liquidity** | 0.0008 | 0.0014 | 0.0001 |
| **Leverage** | -0.1269*** | -0.1093*** | -0.1173*** |
| **Tangibility** | -0.0462*** | -0.0701** | -0.0665** |
| **Working Capital** | 0.0013*** | 0.0008 | 0.0026** |
| **Efficiency** | 0.0446*** | 0.0610*** | 0.0578*** |
| **Shariah Compliance** | 0.0051 | - | - |

| | | | |
|---|---|---|---|
| **Constant** | -0.1006*** | -0.3437*** | -0.0761 |
| **R-Squared** | 0.2279 | 0.2470 | 0.2653 |
| **Wald chi²** | 169.79*** | 11.67*** | 11.76*** |
| **Observations** | 1256 | 654 | 602 |

Model A and Model B show a significant and positive relationship between the firm size and profitability for both firms and Shariah firms. The firm size for model A and model B has a significant relationship at the 1% level, which shows that firm size impacts profitability for Shariah firms. Chandrapala and Knápková (2013) confirm that the ability of firms to create profits seems to be steadily increasing as the firm becomes larger. This is consistent with the resource-based theory whereby when a firm grows, it becomes easier to access additional financial resources, lowering its capital cost and increasing its profit. However, this research found an insignificant relationship between firm size and profitability for non-Shariah-compliant manufacturing firms. Furthermore, based on this research observes that firm size for all models has a positive coefficient on profitability. This indicates that when the firm size increases, the profitability of firms also increases. The findings in this research are consistent with Unal et al. (2017), Das et al. (2021), and Doğan (2013), who discovered a positive coefficient between the size of the firm and the profitability of the firm.

Next, this research also found a significant relationship between leverage and firms' profitability. The leverage is highly significant at the 1% level where it shows that leverage has a negative impact on profitability for Shariah and non-Shariah firms. This means that when the leverage increases, the profitability will decrease. The findings are in line with the pecking order concept, which maintains that high debt financing lowers a firm's value because debt carries an obligation for repayment and debt financiers prefer to avoid riskier undertakings. The use of a large amount of debt to finance a business not only increases its financial risk but also its liquidity risk and its operational risk. This research finding is also consistent with past studies, such as Mathur et al. (2021) and Ayaz et al. (2021), confirming a negative relationship between leverage and firm performance.

Tangibility is found to have a significant and negative relationship with firm performance. Model A is highly significant, with profitability at a 1% level. While in Model B and Model C, the tangibility is significant, with profitability at a 5% level. It indicates that tangibility impacts a firm's profitability for all models. According to Tariq Bhutta and Hasan (2013), firms are more profitable if they have a lower tangibility of assets because of lower commitment and costs in maintaining the assets. The negative coefficient between tangibility and the performance of firms is also supported by Zeitun and Saleh (2015). The researcher stated that sizable fixed assets could reduce a firm's performance. In addition, the researchers conclude that to overcome this situation, whether the investment in fixed assets should be reduced or the fixed assets should be used more effectively. The findings are in line with resource-based theory, in which businesses with internal resources are more likely to have a competitive advantage via the effective use of their strategic resources, which may serve as the basis for the growth of business skills that eventually result in better performance. In other words, if a firm has more fixed assets and uses them well, this will result in higher returns.

Working capital is found to be significant and positively related to the firm performance in Model A and Model C. The working capital in Model A is significant, with profitability at a 1% level, while Model C is significant at a 5% level. However, this research found an insignificant relationship between working capital and profitability for Shariah-compliant manufacturing firms. The reason is clear that managers of Shariah-compliant firms cannot enhance the firm profitability by optimizing working capital. To increase their business' profitability, managers must carefully manage their cash and accounts receivable (Sivathaasan et al., 2013; Dong & Su, 2010). The significant positive relationship may be explained by the fact that every firm has to control daily expenses to raise yield carefully. Therefore, the efficiency ratio should be increased. The findings are consistent with the agency theory because high working capital will increase shareholder and management conflict, raising agency costs. Managers will utilize their limited resources more profitably to lower agency costs (Alarussi & Alhaderi, 2018; Tareq et al., 2021; Sawarni et al., 2022).

The last significant determinant in the models is efficiency, which this research found all models to be significantly related to firm performance. The efficiency is highly significant at a 1% level and positively related to the firm's profitability. The result shows that efficiency is a major factor determining changes in

Shariah and non-Shariah-compliant manufacturing firms. The reason is that efficiency is key to generating bigger revenues, and firms have the full capacity to manage their obligations and efficiently use their assets to produce short-term income. This result is consistent with the resource-based theory, which highlights that firms should efficiently use their resources to gain a competitive advantage since they are valuable, rare, difficult to duplicate, and cannot be replaced. Efficiency is necessary for firms to improve market performance, maintain competitiveness, and reduce their vulnerability to outside competition. These findings are consistent with the findings of Warrad & Omari (2015), Gaio & Henriques (2018) and Alarussi (2021).

Nevertheless, two independent variables are found to have an insignificant relationship with firm performance: liquidity and shariah compliance status. Perhaps, the reason is that a firm's success is not dependent on its cash base, and nonfinancial businesses do not have a significant need for liquidity in the same way that financial institutions do. The insignificance of the Shariah-compliant status suggests that the profitability of Sharia-compliant and non-Shariah-compliant firms' practices behave similarly.

## 5. Conclusion

The manufacturing industry in Malaysia is expected to continue playing an important part in developing the country's economy. Their contributions to Malaysia's export earnings and the generation of jobs ensured that the country would keep growing despite the instability of the global economy. The study investigates the relationship between the performance of Shariah and non-Shariah-compliant manufacturing firms in Malaysia from 2012 to 2021. The independent variables examined include firm size, liquidity, leverage, tangibility, working capital, efficiency, and Shariah-compliant status. The purpose of using all of these independent variables is to determine whether there is a significant impact on the performance of manufacturing firms in Malaysia. In this study, the researchers look at the significance and factors determining the relationship between manufacturing firm performances and independent variables.

Analyses and discussions of literature review on the firm's performance are carried out to get more knowledge on the factors that determine it. Different tests are carried out in advance of the data estimation to ensure the findings' reliability. According to this research findings, Model A, known as a Shariah and non-Shariah manufacturing firm, shows that the firm size, leverage, tangibility, working capital, and efficiency all have a significant relationship with the performance of the firm. Related to the firm liquidity, the research did not successfully prove any significant relationship with the firm's performance. Model B, known as Shariah compliant firm, shows that firm size, leverage, tangibility and efficiency have a significant relationship with the firm's performance. In terms of both liquidity and working capital, the research could not identify any significant relationships to firm performance. The results for non-Shariah manufacturing firms (Model C) indicate that leverage, tangibility, working capital, and efficiency strongly affect firm performance. Except for firm size and liquidity, this study cannot find any significant relationship between the firm's performance.

The impacts of firm size, liquidity, leverage, tangibility, working capital, and efficiency on firm performance may be used to differentiate between Shariah-compliant and non-Shariah-compliant businesses. Conclusively, to check for the robustness of this research's results, this research makes a recommendation to future researchers. Since the scope of this study was limited to the performance of Shariah and non-Shariah firms in Malaysia, future research would be expected to conduct a comparative study with other countries that are also experiencing expansion in Islamic finance. This might provide helpful information for internal and external users in managing their firms.

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# Accelerating digital talent readiness in Malaysian banking sector: A study on technology adoption through the intention to use customer-focused digital solutions

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**Abstract:** The COVID-19 pandemic has accelerated the digital transformation of the banking sector, both globally and locally. As the adoption of new technology relies on the perception and behavior of users towards the system, bank employees need to have the intention to use digital solutions implemented by the organization. The purpose of this research is to examine the influence of job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy on the intention to use digital solutions. A quantitative approach using a purposive sampling technique was carried out, where a survey was conducted involving 313 employees at a local retail bank's headquarters in Kuala Lumpur. The results showed that job relevance and perceived usefulness had a significant positive influence on the intention to use digital solutions, with job relevance being a unique and important predictor. However, perceived ease of use and perceived self-efficacy did not have a significant impact on the intention to use digital solutions among the retail bank's employees. These findings suggest that the employees are already adept and comfortable in using digital solutions as they have developed the necessary skills and aptitude. This research contributes to the understanding of factors that can influence the intention of banking employees to use digital solutions, based on an extended Technology Acceptance Model developed for this study. This research further recommends the implementation of change management strategies, focus on acquiring on-premise database management and developing a digital talent readiness roadmap for talent acquisition & retention and investing in advanced technologies such as machine learning, data analytics and the Internet of Things.

**Keywords**: *Digitalization, Digital Transformation, Technology Acceptance Model, Perceived Usefulness, Job Relevance, Malaysian Banking Sector.*

## 1. Introduction and Background

The COVID-19 pandemic has led to rapid digitalization and changes in business models. With the adoption of hybrid working arrangements, where employees can work both in the office and remotely, many business processes that previously required physical engagement can now be completed virtually and instantly using platforms such as Cisco, Google Meet, Teams, and Webex. It has also become common for customers to submit electronic or email orders and for contactless door-to-door delivery of purchases. As the post-pandemic phase brings new challenges and opportunities, there is an increasing trend toward digitalization. For organizational members to demonstrate digital dexterity, organizations must ensure that their ecosystem is digitally ready, including the system, process, and people. The key factor here is the people, as talent readiness in adopting technology is necessary for the system and process to fall into place. The task-technology fit model, developed by Goodhue and Thomson (1995), suggests that if the technology aligns with the duties performed by an employee, it will benefit their performance.

The Technology Acceptance Model, developed by Davis (1989) and extended by Venkatesh and Bala (2008), Venkatesh and Davis (2000), and Venkatesh et al. (2003), states that individual-level IT adoption and use are based on behavioral intention, which is determined by two beliefs: the belief that using IT will enhance job performance and the belief that it will be effortless. A study by Mbama and Ezepue (2018) found that customer experience in UK banks is affected by the perceived usability of mobile and internet banking services and consumers' stickiness behavior towards the WeChat wallet is influenced by social influences and satisfaction with its ease of use (Matemba & Li, 2018).

While there has been extensive research on digital transformation in the financial and banking (FB) sector, there is a lack of focus on technology adoption in the local sector (Kannan & Garad, 2021; Kumar et al., 2021). Banks should consider how quickly evolving technological applications can impact their business models (Morkunas et al., 2019). Carbó-Valverde et al. (2020) are among the few researchers who have studied technology adoption in areas such as cryptocurrencies, payment gateways, smart contracts, digital accounting, and regulatory networking. However, much of the current attention on technology adoption has focused on its ability to fundamentally change the financial services industry (Daluwathumullagamage & Sims, 2021), rather than on the digital dexterity of the industry's workforce.

The modern global trends in retail banking, including the adoption of digitalization and biometric techniques for client identification, the decrease in the number of physical branches, and the development of challenger business models and shared services ecosystems, highlight the significant gap between Malaysian retail banking performance and the reality of the bank in question in providing retail banking services to customers (Kannan & Garad, 2021; Miraz et al., 2020). The recent awarding of digital bank licenses to three consortia by the Bank Negara Malaysia (BNM) poses a threat to the bank, which has previously enjoyed a competitive advantage in serving underserved and unserved communities. With the agility, flexibility, and broad coverage of digital banks, they will be able to challenge the status quo and potentially result in the bank losing its edge over the new entrants as reported by Rella (2019) and further supported by Wati and Manaf (2019), therefore exposing it to the risk of high churn rates and lower loyalty retention, particularly among underserved and unserved communities. There are still sizeable customer segments that are only comfortable dealing with physical bank branches; however, traditional players may face a significant reduction in their customer base due to the digital nativity of the current demographic (Baicu et al., 2020; Jeník et al., 2020). Therefore, traditional players need to consider collaborating with fintech players and focus on specializations in business segments that cannot be easily replicated by non-traditional players.

To address this threat, the bank needs to develop a robust digital strategy and accelerate its implementation through digital talent readiness, which is gauged based on successful technology adoption. For the strategy to be successful, it is necessary for employees to be on board, demonstrated through their behavioral intention to use digital solutions implemented by the bank. While digital transformation in the financial and banking sector has been well-researched globally, there is a lack of focus on technology adoption in the Malaysian sector (Lehominova & Goloborodko, 2020; Sajjad & Zaman, 2020). To address this gap, the present study aims to examine its employees' intention to use customer-focused digital solutions based on identified job-related and individual-related factors and to map out actionable strategies to accelerate digital talent readiness in the organization. Furthermore, it will provide the bank with insights into what it needs to do to improve its business processes, integrate digital service platforms into its activities, and provide personalized human interaction to meet customer expectations and remain relevant in the Malaysian banking ecosystem. The acceptance and adoption of new technology depend on the perception and behavior of users towards the system, including the belief that the technology is relevant and useful for their tasks, easy to use, and requires minimal training to learn how to use it. These requirements can be defined as job relevance, perceived usefulness, perceived ease of use, and perceived self-efficacy, which contribute to behavioral intention.

## 2. Literature Review

**Intention to use digital solutions as a reflection of digital talent readiness:** The digital readiness of an individual, as defined by Nasution et al. (2021), will determine their predisposition to accept and adopt new technology and is influenced by behavioral intention. Behavioral intention, or intention to use, refers to the intensity of an individual's intention and desire to perform a targeted or expected behavior (Alambaigi & Ahangari, 2015). Grewal et al. (2017) also suggest that an individual's digital proficiency is determined by their willingness and purposefulness in wanting to use digital tools. This study proposes that several factors influence employees to engage in a specific work-related behavior, such as adopting technology in digital solutions, for both internal and external customers. The Theory of Planned Behavior states that behavioral achievement depends on both motivation (intention) and ability (behavioral control). Fahmi et al. (2020) posit that attitude toward change is a critical factor in transforming individual capability toward digital transformation.

Individuals who are open to digital technology and have a positive view of its various impacts will believe that great benefits can be obtained through various digital applications (Kitsios et al., 2021; Nasution et al., 2021). In that respect, the intention or determination to adopt IT is crucial as a driver for digital talent readiness. In addition to organizational policies, several factors may influence an individual's decision to exhibit the intention to use digital solutions, such as observing others within the organization actively using technological tools in their tasks or considering the benefits of using these digital tools, such as improved productivity and quality of work. This aligns with Bandura's (1977) social learning theory, which suggests that environmental and cognitive factors interact to influence human learning and behavior. Successful change management in any digital transformation process includes creating a systematic approach and preparation for its implementation. Kitsios et al. (2021) argue that an individual's attitude towards change also determines the success or failure of any venture that could potentially risk their employment status quo.

Several factors influence the intention to use digital solutions. Initially developed by Davis (1989) as having two determinants – perceived usefulness and perceived ease of use – other researchers have subsequently studied and used several factors within various iterations of the Technology Acceptance Model (TAM), including perceived usefulness, perceived ease of use, and perceived risk of technology adoption (Nasution et al., 2021; Venkatesh & Bala, 2008); perceived usefulness, perceived ease of use, and perceived self-efficacy (Alambaigi & Ahangari, 2015; Chao, 2019; Kitsios et al. 2021); and job relevance (Alambaigi & Ahangari, 2015; Manapragada, 2017). According to Bronfenbrenner's (1979) ecological systems theory, systems are dynamic and constantly changing, and an individual's behavior is influenced by multiple levels of systems, including the microsystem, mesosystem, exosystem, and macrosystem. These systems interact with and influence one another, and an individual's behavior is the result of this complex interaction.

**Job relevance:** Job relevance, or the degree to which technology is considered applicable to an individual's job, influences an employee's intention to use it (Venkatesh et al., 2012). With the shift to virtual workplaces and virtual banking activities, employees have been forced to adopt the use of online productivity tools to connect and perform tasks. Therefore, if bank employees consider the use of digital solutions critical to the effective functioning of their business and consider it relevant to their job, they may be more likely to have the intention to use said solutions or technology. This is supported by findings that the business criticality of technology use influences an individual's intention to use technology (Alambaigi & Ahangari, 2015; Manapragada, 2017).
**H1:** Job relevance will positively influence the intention to use customer-focused digital solutions.

**Perceived usefulness:** Perceived usefulness, or the degree to which an individual feels that using a certain technology will enhance their job performance, influences the intention to use it. External variables such as system characteristics and system training can also influence perceptions of usefulness. Employees are more likely to engage in the behavior of using technology if they believe it will make them better performers, increase productivity, and/or aid in completing tasks more efficiently (Manapragada, 2017; Talwar et al., 2020). When bank employees feel that technology improves the quality of their work in terms of efficiency and productivity, regulates tasks, and supports the essential aspects of their work, they will be more inclined towards using digital solutions introduced by the organization. Since the adoption of digital solutions can be considered an organizational citizenship behavior, individuals who consider engaging in this behavior to increase their job performance or productivity will be more likely to intend to use said solutions (Guo & Liang, 2016; Hwang et al., 2021; Venkatesh, 2003; Venkatesh et al., 2003).
**H2:** Perceived usefulness will positively influence the intention to use customer-focused digital solutions.

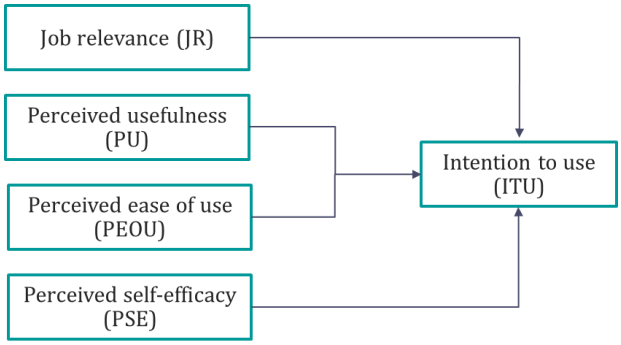
**Perceived ease of use:** Perceived ease of use refers to how easy an individual thinks it is to use a particular system or technology. According to Kitsios et al. (2021), it is the degree of comprehension that consumers have of new branchless banking systems. In the context of this study, perceived ease of use is defined as the degree to which employees at the local retail bank think that adopting technology in customer-focused digital solutions would be effortless. If employees feel that the technology is easy to learn and use, they will be more likely to have the intention to use it. Studies have shown that perceived ease of use is a key factor in the adoption of digital banking services (İmamoğlu, 2021; Suhaimi & Hassan, 2018) and can enhance acceptance of branchless digital banking among Generation Y in Malaysia (Suhaimi & Hassan, 2018). In the banking

industry, digitalization requires employees to be trained on new technologies, and if a new technology is easy to use and set up, employees will be more motivated to embrace it (Kitsios et al., 2021).
**H3:** Perceived ease of use will positively influence the intention to use customer-focused digital solutions

**Perceived self-efficacy:** Self-efficacy, or the personal belief in one's ability to successfully perform tasks related to technology, is an important factor in determining an individual's intention to use a particular system or product. This is especially relevant in the current digital age, where many employees are working remotely or in hybrid arrangements and relying on technology to complete business processes. In a study of Taiwanese university students, Chao (2019) found that self-efficacy had a significantly positive effect on the perceived enjoyment of mobile learning. Additionally, Mbama & Ezepue (2018) explored the relationship between perceived usability and customer experience in UK banks, highlighting the importance of understanding how perceived self-efficacy influences the intention to use a specific system.
**H4:** Perceived self-efficacy will positively influence the intention to use customer-focused digital solutions.

**Research framework:** The proposed research framework as illustrated in Figure 1 comprises four independent variables i.e. job relevance, perceived ease of use, perceived usefulness and perceived self-efficacy. The TAM model was adopted and extended by incorporating the constructs of TAM2, i.e. perceived self-efficacy and job relevance in addition to perceived ease of use and perceived usefulness in investigating bank employees' intention to use digital solutions in their daily work. The modified model was then empirically tested.

**Figure 1: Research Framework**




## 3. Research Methodology

This research is a correlational study to examine the relationship between job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy and the intention to use digital solutions. Four independent variables i.e. job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy were tested to determine each variable's relationship to intention to use. Our research instrument of choice is an online questionnaire, developed from tested measures of studies conducted by Kitsios et al. (2021), Manapragada (2017), and Venkatesh & Bala (2008) for perceived usefulness; perceived ease of use, perceived self-efficacy and intention to use adopted from Kitsios et al. (2021) and Venkatesh & Bala (2008); while job relevance is adopted from Manapragada (2017).

The unit of analysis was individual bank employees who are attached to various departments within the headquarters and are required to use customer-focused digital solutions such as Microsoft Suite and internal digital solutions like SAP and MIRO. As such, from the headquarters' existing workforce population size of 1,795 employees, the sample size selected was 313 employees.

The questionnaires were distributed by the administrative assistant of each division and department through Google Form link sharing, who assisted to blast the link to their respective department and division members through Teams and Whatsapp. Google Form was selected as the medium due to its convenience and because to date, the bank is still practicing a hybrid working arrangement. A purposive sampling method was deployed whereby the questionnaire was distributed to employees in departments housed in the

headquarters to eliminate any form of biases that may arise. The purposive sampling method is adopted as researchers do not have a list of respondents for questionnaire distribution.

The questionnaire underwent a pilot study first, where it was conducted to determine the feasibility of the instrument used. The questionnaire was randomly distributed to 30 employees from the headquarters, and upon receipt of responses, a reliability test was carried out. This research adopted recommended pilot study sample size of 30 by Browne (1995). Upon obtaining satisfactory results, the questionnaire subsequently was distributed to the masses, with these pilot study participants excluded from the main data collection. Finally, using SPSS (Statistical Package for The Social Science), researchers run the required data analyses including data screening, descriptive analysis, reliability analysis, correlation analysis and also multiple regression.

## 4. Results

This section presents sets of results relating to the profile of respondents' experiences in using work-related digital tools/solutions, the characteristics of the total sample, and the comparison of participants regarding their experience based on demographic and geographic characteristics (gender, age, level of education, work experience and position level).

**Profile of Respondents:** Table 1 displays a summary of the characteristics of the total sample of bank employees who participated in the study.

**Table 1: Demographic and Geographic Information Pertaining to Respondents**

| VARIABLE | FREQUENCY | PERCENTAGE |
|---|---|---|
| **GENDER** | | |
| Males | 147 | 47% |
| Females | 166 | 53% |
| **Total** | **313** | **100%** |
| **AGE** | | |
| 21-30 | 97 | 31% |
| 31-40 | 89 | 28.4% |
| 41-50 | 70 | 22.4% |
| 51-60 | 57 | 18.2% |
| **Total** | **313** | **100%** |
| **EDUCATION** | | |
| Bachelor's Degree | 135 | 43.1% |
| Master's Degree | 18 | 5.8% |
| SPM | 90 | 28.8% |
| STPM/Diploma | 70 | 22.4% |
| **Total** | **313** | **100%** |
| **CUMULATIVE WORK EXPERIENCE** | | |
| > 20 years | 100 | 31.9% |
| 0-5 years | 126 | 40.3% |
| 11-15 years | 32 | 10.2% |
| 16-20 years | 6 | 1.9% |
| 6-10 years | 49 | 15.7% |
| **Total** | **313** | **100%** |
| **CURRENT POSITION LEVEL** | | |
| Clerical/Administrative | 120 | 38.3% |
| Executive | 141 | 45% |
| General Manager | 2 | 0.6% |
| Manager | 44 | 14.1% |
| Senior Manager | 6 | 1.9% |
| **Total** | **313** | **100%** |
| **AVERAGE TIME SPENT ON DIGITAL TOOLS/SOLUTIONS AT WORK** | | |
| >7 hours | 104 | 33.2% |

| | | |
|---|---|---|
| 1-3 hours | 56 | 17.9% |
| 3-5 hours | 65 | 20.8% |
| 5-7 hours | 88 | 28.1% |
| **Total** | **313** | **100%** |
| **READINESS TO USE DIGITAL TOOLS/SOLUTIONS** | | |
| Strongly Disagree | 4 | 1.3% |
| Disagree | 1 | 0.3% |
| Neither agree nor disagree | 42 | 13.4% |
| Agree | 117 | 37.4% |
| Strongly Aee | 149 | 47.6% |
| **Total** | **313** | **100%** |

**Reliability Analysis:** In essence, each variable with an alpha of >0.9 demonstrated good internal consistency. In summary, all constructs exceeded the recommended cutoff of 0.7 (Fornell & Larcker, 1981; Hair et al., 2018), thereby suggesting high internal reliability.

From the table below, the value of Cronbach's alphas for perceived ease of use and perceived self-efficacy are recorded at 0.85 and 0.87 respectively. This indicates that the strength of association is very good for these constructs. The Cronbach's alpha for the remaining three constructs' alpha values is above 0.9. The key model adopted is by Hair et al. (2018), whose rule of thumb stated that where the value of the alpha coefficient range is above 0.9 (>0.9), the strength of association is excellent. This guideline was adopted by numerous researchers of various fields; as seen in among others human capital investment research by Nawi et al. (2020) and mobile health application by Yen & Atan (2021). In addition, several studies were identified to record alpha value above 0.9 for the TAM constructs such as Ha (2020) recorded 0.92 for behavioral intent in online shopping intention, as well as Yen & Atan (2021), where the perceived ease of use and perceived risk alpha values were 0.90 and 0.95 respectively.

**Table 2: Value of Cronbach's Alpha for all dimensions–Reliability Test**

| No. | Variables | No. of Items | Cronbach α |
|---|---|---|---|
| 1 | Job relevance | 6 | 0.92 |
| 2 | Perceived usefulness | 10 | 0.97 |
| 3 | Perceived ease of use | 10 | 0.85 |
| 4 | Perceived self-efficacy | 4 | 0.87 |
| 5 | Intention to use | 4 | 0.92 |

**Descriptive Statistics:** In this research, the characteristics and background of the respondent are described in the frequency in the form of percentages, according to the items asked such as gender, age, education level and years of working experience. Table 3 below displays the outcome.

**Table 3: Descriptive Statistics**

| | Descriptive Statistics | | |
|---|---|---|---|
| **Variable** | **Factor Name** | **Mean** | **Std. Dev.** |
| ITU | Intention to Use | 4.34 | 0.67 |
| JR | Job Relevance | 4.30 | 0.64 |
| PU | Perceived Usefulness | 4.26 | 0.68 |
| PEU | Perceived Ease of Use | 3.29 | 0.57 |
| PSE | Perceived Self-Efficacy | 3.92 | 0.74 |

The mean scores ranging from 4.30, 4.26, 3.29 and 3.92 were obtained from the job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy. For perceived self-efficacy, a significant number of respondents were on the fence between neutrality and agreement, which may require further deep dive into the neutral ground sought. The mean scores for intention to use, job relevance and perceived usefulness are higher than 4, which means most of the respondents agree with the items presented for each variable.

**Correlation Analysis:** Correlation analysis is used to define the direction and strength of a linear relationship between two variables. In Pearson Correlation, the coefficient value can only be from -1 to +1 with the positive sign indicating a positive relationship between two variables and vice versa. Table 4 denotes the correlation between job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy to use digital tools/solutions.

**Table 4: Correlation Coefficient Matrix**

| | | | | | | |
|---|---|---|---|---|---|---|
| Job Relevance | Pearson Correlation | 1 | .86** | .58** | .58** | **.83**** |
| | Sig. (2-tailed) | | <.001 | <.001 | <.001 | <.001 |
| | N | 313 | 313 | 313 | 313 | 313 |
| Perceived Usefulness | Pearson Correlation | .86** | 1 | .59** | .58** | **.78**** |
| | Sig. (2-tailed) | <.001 | | <.001 | <.001 | <.001 |
| | N | 313 | 313 | 313 | 313 | 313 |
| Perceived Ease of Use | Pearson Correlation | .58** | .59** | 1 | .56** | **.51**** |
| | Sig. (2-tailed) | <.001 | <.001 | | <.001 | <.001 |
| | N | 313 | 313 | 313 | 313 | 313 |
| Perceived Self-Efficacy | Pearson Correlation | .58** | .58** | .56** | 1 | **.47**** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | | <.001 |
| | N | 313 | 313 | 313 | 313 | 313 |
| Intention to Use | Pearson Correlation | **.83**** | **.78**** | **.51**** | **.47**** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | |
| | N | 313 | 313 | 313 | 313 | 313 |

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

There was a strong and positive correlation between job relevance and intention to use, $r = .83$, $p < 0.01$. In addition, a strong and positive correlation was noted between perceived usefulness and intention to use, $r = .78$, $p < 0.01$. In short, job factor elements of job relevance and perceived usefulness r values are larger than 0.7, demonstrating a strong and positive association between these variables and intention to use. Perceived ease of use and intention to use were found to be moderately positively correlated, $r = .51$, $p < 0.01$. Similarly, perceived self-efficacy and intention to use were found to be moderately positively correlated as well, $r = .47$, $p < 0.01$. In terms of individual factors, both perceived ease of use and perceived self-efficacy demonstrate moderate and positive correlations to use.

**Analysis of Variance (ANOVA, and Multiple Regressions):** Multiple linear regression was used to test if job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy will significantly influence the intention to use digital tools/solutions. The coefficient of determination, $R^2$, provides information about the goodness of fit of the regression model (Gujarati, 2006). Several assumptions need to be evaluated on the data of the results obtained to ensure that the analysis generated is valid and reliable.

**Table 5: Model of Summary – Regression analysis**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | 0.840[a] | 0.71 | 0.70 | 0.37 |

a. Predictors: (Constant), JR, PU, PEOU, PSE

Table 5 contains the model summary for this study. The $R^2$ is 0.71 and the adjusted $R^2$ is 0.70. These values indicate that 71% of the variance in intention to use is described by the independent variables job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy. The F statistic in Table 6 is 185.05 with 312 degrees of freedom (4 from the regression and 308 from residuals), and the significance value is less than $p < 0.05$ (0.00). Therefore, the model is significant.

The ANOVA was performed to compare the effect of job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy on intention to use. Table 6 revealed that there was a statistically significant difference in mean intention to use between at least two groups ($F(4,308) = [185.05]$, $p = 0.00$). The ANOVA table demonstrates a test of significance for the overall regression model.

**Table 6: ANOVA statistics of regression**

| Model | Sum of Squares | DF | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 98.70 | 4 | 24.67 | 185.05 | <.001[b] |
| Residual | 41.07 | 308 | .13 | | |
| Total | 139.77 | 312 | | | |

a. Dependent Variable: ITU
b. Predictors: (Constant), JR, PU, PEOU, PSE

**Table 7: Coefficient Summary**

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | β | Std. Error | Beta | | |
| (Constant) | .55 | .15 | | 3.64 | <.001 |
| Job Relevance | .64 | .06 | **.61** | 9.94 | **<.001** |
| Perceived Usefulness | .27 | .06 | **.27** | 4.40 | **<.001** |
| Perceived Ease of Use | .02 | .04 | .02 | .50 | .621 |
| Perceived Self-Efficacy | -.05 | .04 | -.06 | -1.39 | .165 |

From Table 7 above, there was a statistically significant relationship between job relevance, perceived usefulness and intention to use. Job relevance and perceived usefulness had a significantly positive influence on the intention to use digital solutions (β values of 0.61 and 0.27 respectively, $p<0.01$). Therefore, Hypotheses 1 and 2 were supported. Job relevance was a unique and crucial predictor of intention to use.

On the other hand, there was statistically no significant relationship between perceived ease of use, perceived self-efficacy and intention to use. This could be interpreted to imply that the dimension of perceived ease of use and perceived self-efficacy had no significant impact on the intention to use digital solutions among the employees. Therefore, Hypotheses 3 and 4 were not supported. The result for perceived ease of use was inconsistent with previous studies which reported a positive and significant relationship between the variable and intention to use (Chao, 2019; Kitsios et al., 2021; Suhaimi & Hassan, 2018; Tiong, 2020). However, with regard to perceived self-efficacy, the results of this study were consistent with the findings of Kitsios et al. (2021).

**Discussion:** The findings denoted that job relevance has the highest significant influence on the intention to use customer-focused digital solutions. The bank's employees place high importance on the technology to be relevant and useful to them in performing their daily work. This is supported by Alambaigi & Ahangari (2015) who identified that demonstrating the technology's abilities and capabilities in helping the employee perform their duties better is one way of breaking down resistance to technology acceptance. Additionally, perceived usefulness has a significant influence on the intention to use digital solutions as well. As suggested and supported by Manapragada (2017), individuals' perception of the degree to which they think using emails is useful for their job performance has a strong influence on one's decision to use work-related emails.

The positive relationship between job relevance and perceived usefulness to use customer-focused digital solutions can be interpreted as follows; an employee who has a high intention to use digital solutions or tools, in general, will find a specific system useful, and easier to use than someone who has a low intention to use it. Conversely, employees do not find it important for them to have a technology that is easy to use, and for them to have a sense of familiarity with the system. To deep dive into this phenomenon, we must understand the talents currently in employment.

On that note, between the two constructs which are job relevance and perceived usefulness, job relevance is found to have been placed as the most significant determinant of intention to use. As such, it is posited that the bank must ensure that the digital solution is highly relevant to the job for employees to demonstrate the intent to adopt its usage. Therefore, it must pay attention to the job deliverables in crafting its digital strategy,

where the technology must be relevant and useful to its employees at most. It is imperative that in its communication with the organizational members on digital solutions rollout, employees are briefed on the relevance of the digital solution to the job they hold.

Regarding individual factors that are perceived ease of use and perceived self-efficacy, it was seen that as far as perceived ease of use is concerned, a significant percentage of the employees consider that familiarity with new technologies does not require special skills and learning sessions. This is evident in the results for perceived self-efficacy as well. As supported by Kitsios et al. (2021), employees who have prior knowledge of the use of similar applications and who are given less guidance appear to have high perceived self-efficacy and thus do not affect their choice to use digital banking. As the adoption of technology has been integrated into the employees' daily lives during the pandemic, regardless of how difficult and unfamiliar it may be for employees to use the technology, they will still need to use it.

Based on our results, the question that arises is how can perceived ease of use and perceived self-efficacy not influence the intention to use? One possible explanation is that perceived ease of use and perceived self-efficacy would easily cease to become determinant as people become more intuitive in adopting new technologies due to experience, aptitude and self-confidence. In explaining the results further, it is worthwhile to note that this result is sample-specific and may not translate into how the population behaves or respond considering that from the demographic distribution of respondents' profile, whereby most or 61.3% of them spend more than 5 hours using digital solutions at work, as work processes within the organization have been digitalized during the pandemic onset. This is further driven by the need for hybrid working arrangements during movement control order which forces the organizational members to adopt the use of digital tools in their work. As they have already possessed the needed skills and required aptitude, it can be construed that there is no change in their behavioral intention.

This is exceptionally true with the young workforce this retail bank boasts. The younger generation especially those who have been in the organization for less than 10 years have, to a certain degree, developed aptitude and skills in using digital solutions, especially during the pandemic. The various movement control orders up until the end of 2021 saw between 50-80% of the employees adopting work-from-home arrangements. To ensure no disruption to business, the bank was forced to adopt the use of digital platforms for internal communication, alignment and work deliveries; as well as revamping its in-house internet banking solution and rolling out duitNow to enable instantaneous money transfer and as a national initiative supported by PayNet to modernize Malaysia's retail payments to facilitate and drive innovation in e-Payments. The pandemic is seen to be a significant determinant for providing applicable practices to formulate strategies to improve banking services, increase the acceptance of digital banking by employees and make changes to traditional working processes.

## 5. Managerial Implications and Recommendations

There are several implications of the study identified to bring significant impact to the bank specifically and the industry as a whole. First, to successfully develop digital talent readiness within the organization, for any new digital solutions or tools introduced, the bank needs to focus on the usefulness and relevance of new technologies to the job and job holder. Hence, to communicate this effectively, change management must be implemented. One of the best practices is setting up a Project Management Office where change management activities will be managed by the PMO. The various workshops, engagements and focus group sessions, should put more weightage on communicating the benefits digital technologies bring to employees' job performance.

Other than that, to become a digitally dexterous organization, digital talent readiness not only requires members of the organization to be accepting of digitalization, but it also includes getting the right talents in the right positions. As such, this research serves as an opportunity for the bank specifically and the banking industry as a whole, to promote policies and strategies to enhance the adoption of digital banking. For example, there should be a consideration in developing a realistic job preview (RJP), a talent acquisition approach that communicates important aspects of the job before making the offer. One of the quick wins in doing so is creating a "day in the life of" which not only provides a glimpse into what are the expected

deliverables, but also the bank's digital culture, career development opportunities as well as the skills required of a potential candidate. Nowadays, proficiency in Microsoft 365 is a basic requirement, with more organizations on the lookout for data analytics, machine learning and data architecture skills.

From the recommended strategies, in terms of priority, the bank should consider these worst, base and best-case scenarios.

**Worst case scenario:** Suppose the operating expenses continue to increase due to its responsibility of serving the underserved and unserved communities, and the digital banking landscape becomes more competitive. In that case, the bank should deploy the bottom-line optimization and network rationalization strategy and direct capital gained from this into digital product development and deployment.

**Base case scenario:** If the current market condition maintains i.e., digital banking grows at pace, the bank should accelerate its current digitalization plan by focusing on resolving the pain point of data management through transitioning on-premise database management onto cloud platforms like Amazon Web Services (AWS). In addition, the development of a digital talent readiness roadmap in terms of talent acquisition and talent retention should be accelerated, with a focus on ensuring digital solutions implementation are useful and relevant to the job performed by the employees.

**Best case scenario:** If digital finance literacy continues to increase and the bank continues to be backed by the Government, it needs to prioritize investment in advanced technologies such as machine learning, data analytics and the Internet of Things. In tandem, the bank is proposed to invest in digital talents by developing and launching Digital Academy to upskill and reskill its employees and expand its digital talent pool through aggressive talent recruitment and an attractive retention plan.

**Conclusion**

The objective of this research was to test the relationship between job relevance, perceived usefulness, perceived ease of use and perceived self-efficacy to use customer-focused digital solutions in the retail bank. As mentioned earlier, the key focus is for the bank to capitalize on its internal strength by leveraging its young workforce to prepare for external factors such as growing digital literacy as well as digital fintech and banking services which may prompt intense competition in the market. Job factors i.e., job relevance and perceived usefulness are the factors influencing the employees' intention to use customer-focused digital solutions, while individual factors (perceived ease of use and perceived self-efficacy) do not influence the employees' intention to use. Moreover, key strategies to accelerate digital talent readiness were proposed, focusing on the acquisition of on-premise database management, digital talent roadmap for talent acquisition and retention, and investment in advanced technologies such as machine learning, data analytics and the Internet of Things.

There are several limitations to be mentioned regarding this study. First, by testing the model on four constructs from the different iterations of TAM simultaneously, the total outcome may be presented to be biased. For instance, the subgroups within our sample display demographic differences. The significant number of clerical/administrative position level respondents at 38.3% and cumulative working experience of more than 20 years at 31.9% may be reflected in the response relating to perceived ease of use and perceived self-efficacy constructs; as the definition of digital solutions is not restricted to administrative work i.e. record keeping and data management; but also data analytics which may require more time for this demographic group to assimilate, as compared to the executive level respondents who are exposed to digital technology from their university days. The different kinds of homogeneity in position level, working experience and average time spent may have biased the results too.

In addition, generalizing these results to other technologies and other industries should be done with caution. Depending on the speed of technological growth within an industry, the results may vary. For example, adopting the framework of this research for the agriculture industry may be skewed, as the various key players may be at different levels of technology adoption, especially the frontliners or farmers who may not be heavily reliant on digital tools and solutions to grow their business due to education level, digital awareness level, etc.

An aspect to be considered for future research is testing technological readiness and technological acceptance in the banking industry through the integration of two key concepts of the Technology Readiness Index by Parasuraman (2000) and the Technology Acceptance Model by Davis (1989). We believe the link between these two dimensions is worthy of further consideration. Additionally, investigating the effects of psychological dimensions on behavioral intention or intention to use technology may be a worthy endeavor.

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# The Adaptation of Social Media Marketing Activities in S-Commerce: TikTok Shop

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**Abstract:** The growing number of digital platforms nowadays has made the competition to gain users' attention a challenging task for businesses. Clutter in advertising and sponsored brand posts have made the task even harder as consumers repel to avoid that clutter daily. In contrast with the past, consumers use social media to fulfill certain needs when they are aware of the needs such as hedonic needs, cognitive needs, and social needs. This is why the existence of social media marketing activities known as entertainment, interactivity, and electronic word-of-mouth (e-WOM) is crucial in the marketing planning of a business. Guided by a unique, diversified and preferences-tailored algorithm, TikTok social media app is showing significant growth over the few years since the year of its commencement in comparison to its competitors of social media providers like Facebook and Instagram. The short video app has included a new business model of social commerce called TikTok Shop to promote continuous use providing more than just entertainment. Therefore, to fulfill the objective of this paper in exploring the SMMAs impact on the s-commerce of TikTok Shop, secondary data was employed. The analysis concludes that social media marketing activities or also known as SMMAs in the newly added feature of TikTok Shop have a significant impact in influencing its users. The significant difference between traditional e-commerce and s-commerce was also highlighted to further outline the bright sides of s-commerce.

**Keywords**: *Social Media Marketing Activities, Social Commerce, TikTok Shop, Entertainment, Interactivity, Electronic Word-of-Mouth.*

## 1. Introduction and Background

A significant impact of the pandemic in the past few years has contributed to the growth of TikTok – a social media app featuring short videos feed. With the rapid increase of its users worldwide, TikTok has seen opportunities to further expand its base by introducing the feature of social commerce or s-commerce into the mobile app known as TikTok Shop. Launched in 2016, TikTok has become the number one most downloaded mobile app in 2022 surpassing other social media apps, Facebook and Instagram (Chan, 2021). TikTok possessed unique algorithms where users scroll through their feeds that have elements of surprises but are tailored to the user's unique preferences. Globally, TikTok surpassed one billion users in the second quarter of 2022 (Data Reportal, 2022) where on average each user spends 1.5 hours per day scrolling through the application (Influencer Marketing Hub, 2023). The introduction of the TikTok Shop feature in 2022 has allowed its users to make in-app purchases. Even though TikTok is a little behind in the s-commerce game compared to its competitors like Facebook and Instagram, its users which are mostly Generation-Z and millennial give them an advantage in terms of loyalty. Furthermore, it makes TikTok grows more popular when everything that is trending around the globe revolves within the application in fun short videos embedded with trending music.

The interesting part of this phenomenon is that it allows the merchants to take advantage of showcasing creatively their products via the in-feed short videos while users can buy them directly by clicking the "yellow bag". As a result, it provides the merchants with more orders, sales increment, and views and followers for their page (Digital News Asia, 2022). Conveniently, while spending time scrolling videos on TikTok that are diversified and interest-recommended, users making purchases can easily make payments, track their shipping, and order fulfillment within the app itself. Malaysia's current TikTok users in 2022 are 6.9 million compared to 2021 with 5.8 million users and expected to rise by 52% in 2026 (The B2B House, 2022). In addition to that, the total revenue of e-commerce in Malaysia in the third quarter of 2020 rose by 17% in the third quarter of 2021 (TikTok Newsroom, 2022) demonstrating that TikTok Shop launching in Malaysia possesses huge potential to tap into the e-commerce market. Strategy and Operations Manager of TikTok Malaysia, Darren Quek said that the purpose of this feature is to support the local Small and Medium Enterprises (SMEs) to better approach their target market who are yet to set up physical and brick-and-

mortar shops due to huge capital investments needed. The upper hand of the e-commerce feature in TikTok is the combination of the unique algorithms of the application.

Where users enjoy scrolling their feed while enabling them to make real purchases and consume the products being showcased in the video they saw. This combination is known as social commerce or s-commerce where users socialize with each other virtually while enabling them to make real transactions. The utilization of the elements of entertainment, fun, interactivity, and electronic word-of-mouth (e-WOM) in a social media app has sparked interest among its users to use it (Gupta et al., 2020). This is what the TikTok app has been well-known for among its users. With the emergence of user-generated content (Mayrhofer, 2019) and micro-influencers, 0the advertising of products and services has turned the market's attention to more authentic and original content rather than published advertisements or brand posts. Consequently, studies reported that users' have been making impulsive purchases on TikTok Shop because of the great influence of the promotional programs, influencers' reviews and live broadcasts passing through their TikTok feed (Edwy et al., 2023). The elements of entertainment, fun, interactivity, and e-WOM have been manifested as social media marketing activities (SMMAs) in the previous studies by Choedon & Lee, 2020; Kim & Ko, 2012; Chen & Lin, 2019 and Gupta & Syed, 2020. SMMAs are reported to have a positive influence on consumers' purchase intention in the context of cosmetics products (Choedon & Lee, 2020) as well as users' continuance intention, participation intention and purchase intention (Chen & Lin, 2019). Therefore, this paper highlights the utilization of SMMAs on TikTok Shop s-commerce that can trigger purchase intention among its users.

## 2. Literature Review and Discussions

**Social commerce and TikTok Shop**: Social commerce or s-commerce is an integration of both social media platforms and e-commerce. It applies the concepts of social networks and online shopping simultaneously (Yu et al., 2020). The term 's-commerce' was first proposed by Yahoo in 2005 indicating a practice of information sharing over products and services ratings and opinions by online users (Yang, 2021). Enabling social and interactive relationships among its users, s-commerce provides a one-to-one interaction between the seller and its target market (Afrasiabi Rad & Benyoucef, 2011). S-commerce's characteristics mainly layover on social media apps where its users can communicate more often than the e-commerce platform which is why it is called social commerce. While e-commerce is practiced by businesses to solely promote features of products and services online, s-commerce has developed over time. Utilizing an enormous number of loyal users through social media apps, s-commerce has become crucial for many businesses today whether it's large or small businesses. Practicing s-commerce has enabled businesses to avoid advertising clutter among their target audience because of its distinguished attributes and cost-efficient. This has allowed business activities to be performed more efficiently as interpersonal interaction becomes the core development to enhance users' social networking rather than just a product review as traditional e-commerce does (Wang & Xie, 2020). TikTok Shop is one of the popular s-commerce platforms that has been expanding rapidly. Driven by the elements of creativity and experimentation. Bresnick (2019) stated that the app has been acting as a virtual playground and described it as a creative media more than a social media due to its audio-visual effects that intrigues make-believe providing an escape from reality.

Most people publicly know the term e-commerce only as they are buying products through the platform more often than the s-commerce. Only in the third quarter of 2021 Malaysia itself recorded a sum of RM279 billion in total revenue on e-commerce showing a hike of 17.1% than 2020 (Department of Statistics Malaysia, 2021). The report was highlighted by TikTok Malaysia's Strategy Operations Manager, Darren Quek as they are convinced with such numbers TikTok Shop will be able to catch up with the current market. TikTok Malaysia was hoping with the new feature launched in the country, local small and medium enterprises (SMEs) can fully maximize their business potential and drives more growth with better customer engagement. With only 6.1 million users in Malaysia, TikTok is a promising platform for businesses to explore more business opportunities using the TikTok Shop feature. This is because the platform's number of users is expanding significantly from year to year due to its unique video loop attribute which enhanced interactions between its users. Generally, the business motive of s-commerce is simply steered by a social goal, where everyone can be the sellers, consumers, content creators as well as opinion leaders (Wang & Xie, 2020). It means that the platform provides a virtual place where the society speaks to each other in written form or audio and visual which are equal to the characteristics of TikTok. Basically, it combines the roles of sellers

and consumers together within an online social platform and websites (Fang & Li, 2020) where they interact with each other.

Moreover, s-commerce has a lower cost of acquiring traffic, a higher rate of purchase conversion, larger consumer stickiness and more accurate marketing (Geng, 2017). In light, these advantages lead to better business opportunities and outcomes for brands when engaging in s-commerce. With numerous promotional programs offered in s-commerce such as discounts, free shipping vouchers, flash sales and cashback, sellers can grow their sales volume (Fernanda, 2019). As an infant to the s-commerce game, TikTok Shop is committed to giving more to its users including the merchants and consumers by charging only 1% of the commission fee and rewarding with sales promotions campaign like shipping vouchers (Digital News Asia, 2022). This initiative has attracted many parties whether new or old businesses to participate in the s-commerce platform. Furthermore, more businesses joining the platform will be able to provide more exposure to millions of users, particularly while promoting their products to the users.

**Social Media Marketing Activities**: Social media has a vital role in carving the opinions of consumers and influencing their attitudes and purchase decisions (Mangold et al., 2009). Social media has revolved around the human world and has been an integral part of our daily lives. Owning smart devices is not a trend nowadays but has become a necessity for people to also own an account in several social media apps to keep up with the trend. A number of businesses have been forced to make social media their primary marketing strategy in advertising so that they can maintain and increase their market share (Schultz & Peltier, 2013). On the other hand, social media marketing is defined as the use of social media platforms to conduct commercial marketing activities and processes to influence consumers' purchasing behavior (Dann, 2010). There is no one specific definition of social media marketing. It depends on the marketing objectives that an entity aims to fulfill. Amongst the other definitions highlighted was a basic one by Barefoot & Szabo (2010) which is the utilization of social media as a channel to promote a brand and its products.

Other definitions are by Weinberg (2009), "a process that empowers individuals to promote their websites, products, or services through online social channels and to communicate with and tap into a much larger community that may not have been available via traditional advertising channels" which is similar with community marketing (Hunt, 2009). Kim & Ko (2012) defined SMMAs as "two-way communication-seeking empathy with young users, and even enforcing the familiar emotions associated with existing luxury fashion brands to a higher age group". In this context, social media marketing activities highlighted were entertainment, interactivity and e-WOM which contribute to social media marketing significant impacts. Chen & Lin (2019) proposed that these social media marketing activities (SMMAs) are the most important in encouraging the continuance intention of users to engage with the online community in the future, their participation intention as well as purchase intention. Implementing marketing campaigns is like playing with the emotions and mental state of users. Enterprises must be meticulous in setting up a marketing plan to cater to the users' needs and then fulfilling those needs even before the users know the needs have to be fulfilled (Kim & Perdue, 2013). Marketing campaigns that caught the attention of users the most in their minds and hearts will be able to provide the most valuable effect (Hsu & Tsou, 2011).

**Entertainment:** One of the SMMAs which is entertainment found to be crucial in stimulating brand association, enhancing brand loyalty as well as encouraging consumer interactions (Godey et al., 2016). It is a form of communication that gives some fun and pleasure to the audience (Bates & Ferri, 2010). In the context of luxury brands' pages on social media, users follow them to have fun, initiate interactions and opinions sharing with other users, get the latest information and gain customized service (Kim & Ko, 2012). In light, brands must provide users with an amazing experience for the users as product features are no longer the primary concern for them (Sheu et al., 2009; Komppula et al., 2006). Instead, users are seeking emotional satisfaction like fun and pleasure that can provide them with positive experiences and feelings. This is because users are spending more time on social media apps like TikTok to escape from reality. Plus, information sharing nowadays has been transformed into a more entertaining medium to catch the eye of its consumer. Being surrounded by information across various social media platforms has made us information overloaded. The contra side of the massive availability of the sources of information is downward in making decisions selecting the most relevant information (Lee et al., 2016). Nonetheless, with the SMMA of entertainment, users may easily choose the relevant information that they want or need. TikTok

characteristics of scroll-through feed allow the users to skip up videos they choose to ignore or let it play until it is finished playing.

Unlike other social media platforms where long texts are captioned on photos and videos, TikTok's written text, is normally embedded within the videos or the multiple photos they posted while background sound is playing when users watch them. Thus, boredom and time taken to read the content of posts are eliminated and reduced respectively because the element of entertainment is present. What becomes more fun and interesting is when the content creators are choosing trending sounds worldwide making the users sing along as well while watching the short videos. Apaolaza et al. (2014) illustrated that in the Chinese social networking platform context, entertainment has been able to enhance teenagers' positive moods. Positive mood can shape consumers' attitude towards the platform which then can forecast their purchase intention and revisit intention (Verhagen et al., 2015). Merchants or sellers on TikTok Shop have taken advantage of this SMMA. They create videos demonstrating the real functions, features and benefits of a product or service with a ready built-in call-to-action (CTA) button in the platform to tell the users they can have it too. Just with one tap on the yellow bag, the users are ready to go shopping and then track their shipment conveniently after the orders are confirmed. Consequently, continuous attention from the users to use the s-commerce can greatly increase sales volume (Ren et al., 2021) resulting from the entertaining content they received.

**Interactivity and Electronic Word-of-Mouth (e-WOM):** Second SMMA is interactivity. Verhagen et al. (2015) outlined that interactivity on social media between users and brands and between users themselves has improved through two-way communication. Instant sharing by these online communities whether it is a text comment, videos or photo replies made brand promotion possible while enhancing relationship building. Interactivity has allowed brands to connect with consumers specifically not to promote products and services only, but able to initiate conversations when replying to customers' feedback too (Hanna, Rohm & Crittenden, 2011). The nature of social media is unlike the traditional media. It provides consumers with space to express their experiences, opinions, requests, and suggestions that can assist businesses (Vukasovic, 2013) in enhancing business opportunities and improving their performance. Previously, communication of brands is made with one-way communication only, e.g., advertising. It gave us the idea that only businesses can be the senders of information for products or services while the public consumers receive the information and then they will decide on their own whether to purchase any products and services or not.

Nowadays, there are no exceptions to that cycle because of the existence of s-commerce as consumers interact intensively via social media platforms. They create content, share it with other users, initiate discussions and gather information from the opinions that they shared with each other and then reach a conclusive purchase decision. As SMMA's goals are to obtain new customers and to increase sales (Tsimonis & Dimitriadis, 2014), s-commerce could influence the consumers' purchase decisions when users share and communicate about a product with their peers (Sashi, 2012). Plus, more brands are realizing the facts that building relationships with their consumers and target consumers are crucial as drivers of two-way communication and facilitate interactivity which could create awareness (Choi & Sohn, 2008). Similarly, TikTok Shop enables users to interact with each other before they make any purchases. Consumers that once bought products from the same merchants are able to share their experiences through the comment section by replying using texts or videos about the products. Interactivity is what makes s-commerce a social commerce because its users are socializing actively through virtual online platforms regardless of current issues or product reviews.

In TikTok Shop, users engage actively in the live feed and comments section when replying to each other in written form or video replies. A greater audience reach is more possible for businesses that actively utilize gathering information to assist in their social media marketing strategy (So et al., 2017). When interactivity often takes place among users, e-WOM could also happen. A previous study by Cheng et al. (2019) stated that trust among members of an online community strongly encourages WOM intention. This implies that e-WOM happens when online users interact with each other with trust is greatly enhanced. The last SMMA highlighted in this paper is e-WOM, which is defined as "an informal communication between private parties concerning evaluations of goods and services rather than the formal complaints to the firms" (Anderson, 2020). Therefore, businesses need to realize that being active on social media responding to customers' feedback and opinions is profitable to them. This is because; e-WOM can be categorized into positive e-WOM

and negative e-WOM. Positive e-WOM about a business can encourage the users to purchase through social media hence, increasing the sales and profits of a business.

Likewise, negative e-WOM could also tarnish the reputation of a business if not handled excellently thus, affecting sales and profits unfavorably. High engagement of e-WOM from consumers can contribute favorable results to brands (Wu et al., 2018). The sharing of innovative ideas by consumers within the brand community (Filieri, 2013) may contribute to the performance of businesses. Initiating WOM in online platforms like s-commerce is highly unpredictable due to the dynamic and diversified needs and relevance of users. In short, every user wishes to gratify a need like social and personal needs (Nambison & Baron, 2009) whenever they visit a social media platform as implied by the uses and gratifications theory. This is consistent with a study by Brakus et al. (2009) where perceived SMMAs by consumers can trigger their sensorial, affective, behavioral, and intellectual reactions. These reactions are aligned with the highlighted SMMAs in this paper which are, entertainment that reacts as the stimuli for sensorial reactions of users where they seek fun and entertaining content; interactivity as the stimuli for affective and behavioral reactions where it is a people's norm and security needs to socialize with each other and lastly the e-WOM they initiate with other users for intellectual reactions where they share relevant information with others.

## 3. Research Methodology

A comprehensive literature review was made to fully achieve the goal of this paper. Secondary data was employed by using past studies which are journal articles, news articles and statistical reports by government agencies. Important terms included are "social commerce" or s-commerce, "social media marketing activities" or "SMMAs" and "TikTok Shop". Twenty journal articles were included in this paper excluding the news articles and statistical reports to support the literature and discussions on the emergence of SMMAs in TikTok Shop.

## 4. Conclusion and Future Research

The objective of this paper was to explore, compare and highlight discussions on the adaptation of SMMAs in s-commerce like TikTok Shop which is able to provide positive outcomes for businesses. The behavior of online communities in terms of interaction and e-WOM was also discussed as users' motives to engage in s-commerce besides acquiring entertainment. These elements which are readily embedded within the s-commerce app have become TikTok's competitive advantage. However, it is too early to conclude the app's strengths as technological advancement transformed rapidly from day to day. With growing numbers of competitors in digital platforms, TikTok must fulfill users' needs and be relevant to that needs to retain and enhance loyalty. Thus, other influential factors on the continuous intention to use TikTok s-commerce should be made empirically by approaching its users. Since the analysis of this paper depends on secondary data, empirical evidence is lacking in terms of users' perspectives towards the s-commerce app such as information overloading and techno stress. Other than that, factors of impulsive buying on TikTok should also be explored and how businesses can leverage profits from that behavior. These suggestions could contribute to a better understanding by businesses of the dynamic users' preferences with supporting evidence. Lastly, future research can also be focused on the impact of SMMAs in the context of Malaysian SMEs in s-commerce like TikTok Shop.

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# The Importance of Managerial Coaching in Public Organisation: A Conceptual Paper

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**Abstract:** Managers are facing an ever more complex and demanding work environment that requires them to prioritize their organization's excellence. One of the significant hurdles they encounter is finding ways for their organizations to effectively compete not only within their domestic market but also on an international or global scale. In the organizational context, effective managerial coaching involves five dimensions to be practiced by the immediate superiors, the closest individuals to employees: practicing open communication, promoting working in groups, practicing employees' orientation, embracing diversity, and facilitating employees' development. Therefore, their coaching can help employees improve their work performance from time to time. The sensitivity of immediate superiors in enhancing employees' development by providing required resources for work assignments, such as budget, raw materials, and adequate work equipment to employees, providing clear goals and explanations of assigned tasks, leads to increased employee confidence in completing assigned tasks effectively. Providing sufficient resources enables employees to complete new and more challenging tasks.

**Keywords**: *Managerial Coaching, open communication, working in groups, orientation, employee development.*

## 1. Introduction and Background

Managers face a complex and challenging working world in their pursuit of organizational excellence. Competing successfully in the global and local markets is one of the main challenges. To achieve this, managers must re-evaluate the structure of their organizations and find ways to make their work more effective and efficient. This challenge is even more significant in the fourth industrial revolution (Industry 4.0) era, which combines new computing and automation technologies. Consequently, there is an increased dependence on technology. Every business must, therefore, embrace this technology to stay competitive.

Nevertheless, the critical role of human resources in leveraging the benefits of computing and automation technologies will not be replaced by the increasing introduction and utilization of technology. Although human resources rely on technology, technology also relies on human competencies and readiness for successful implementation. According to Sung (2018), human capital is a significant issue in Industry 4.0 due to employee reluctance to change, skills gap, and threats to unskilled workers. Hence, management must act appropriately to shape a highly knowledgeable and skilled human capital ready to adopt new technologies.

Overall, this study aims to investigate the significance of the immediate manager's behavior as a coach and how this role and behavior can improve work performance. The public sector places a high value on work performance because the 2018 exit policy rules require that employees under the age of 80 be subject to immediate action or training to ensure that task performance can be improved regularly. The immediate leader's role as a coach can assist the organization in maintaining individual and organizational performance. As a result, this research course aims to identify the significance of the manager's role as a coach in improving employee performance.

### Problem Statement

Human capital is essential to organizations because it serves to achieve organizational goals and develop and sustain innovation. Many businesses nowadays are oriented towards sustainability by focusing on achieving the triple bottom line. This orientation, among others, specifies that people are as important as profit. For example, customers expect organizations to provide better products and services in the Industry 4.0 era. It is

because advanced technologies can alleviate conventional processes, hence boosting innovation. By meeting customer expectations, organizations will be able to increase their profits. Nevertheless, it can only be materialized when organizations are willing to pay close attention to their human capital development and efficient utilization.

The role of human capital also goes beyond the organizational boundary. According to Kim et al. (2014), human capital influences a nation's income. According to Nafukho et al. (2004), Romer (1990) defined human capital as the total stock of human capabilities of an organization, nation, or economy. An economy with a larger human capital total stock tends to experience a faster growth rate. As such, organizations should be willing to make significant investments to improve human capital quality so that the economic well-being of a nation can also be improved.

Implementing the responsibilities played by the immediate management demonstrates the issue of managerial coaching in the public sector. From the middle of 2018 to 2022, the coaching practice in the public sector is still not clearly and thoroughly structured. According to the findings of interviews conducted with the Ministry of Human Resources' immediate managers, nearly 80% of the closest managers practice coaching. However, there is no clear structure shown to explain this process. Since 2016, there has been a problem with civil servants' work performance, and employees with a performance rating of less than 70 percent (70%) are subject to the exit policy. Besides the immediate manager, try to solve this problem by coaching and helping employees improve their performance regularly so they do not fall under the policy exit group.

The manager's role as a coach can not only improve employees' overall performance, but it can also make it easier for organizations to persuade. An excellent organizational culture always emphasizes the immediate supervisor's role as essential to their employees' development. Public service is an important service that will be a pillar of national excellence in the future.

The same decision will make them put their work on hold while they are away to attend the training program. Despite this, the human capital theory (Becker, 1964) operates under the assumption that employees invest in themselves to raise their future earnings potential. The theory posits that the earlier employees invest in their training and development, the longer they will reap the rewards of their investments. Hence, acquiring skills earlier is more profitable for employees. The same dilemma is encountered by management. Training participation will lower employee productivity, adversely affecting the organization's output. However, their productivity after the training will likely increase, increasing the organization's output. Besides, the human capital theory also indicates that the uncertainty concerning the return leads to the investment costs and benefits sharing between the organizations and employees in specific human capital (Delsen, 2007).

## 2. Literature Review

The development of coaching practices can be traced back to the early days of the industrial revolution, around the second half of the 19th century, in European countries and the US (Jong & Hartog, 2007; Kim et al., 2014). This approach has also begun to be discussed widely in the organizational context in the 1980s. Ellinger et al. (1999) have put forward the mentoring concept in the workplace, resulting in a more positive change in employees' behavior.

Coaching generally differs from mentoring in terms of duration, a short-term and long-term process. Besides, the former occurs in a formal and structured setting, while the latter focuses on the informal relationship between the mentor (immediate superior) and the mentee (supervised employee). In terms of focus, coaching is performance-driven, aiming at improving employees' on-the-job performance. At the same time, mentoring is development driven, looking beyond the current job function and taking a holistic approach to employees' career development. Simultaneously, mentoring focuses on development, looking beyond employees' current job functions and taking a comprehensive approach to their career growth and development.

According to a study conducted by Ahmad et al. (2021) at public organizations, managers can improve employee behavior by implementing behavioral coaching. The immediate manager's commitment can

encourage good work performance in an organization. Employees feel directed and guided when their immediate manager is a good coach.

Managerial coaching involves an indirect relationship between immediate superiors and subordinates and occurs continuously during working hours (Fournies, 1987; Hagen, 2013). The immediate superiors coach and support their supervised employees (Kim et al., 2014). In addition to giving instructions on specific tasks, they must also offer opportunities and valuable resources to their subordinates. It differs from other coaching types in terms of the way it has been implemented. Executive coaching primarily focuses on personal development rather than business outcomes. Communication skills improvement, motivational techniques enhancement, and the promotion of better teamwork skills are essential components of this personal development (Gan & Chong, 2015). In contrast, managerial coaching's primary objective is to facilitate the learning of subordinates within an organization.

A business's sales performance can be improved by using the closest manager as a coach. Employee behavior at work improves after learning through demonstrated behavior. Another effect is that exchanging knowledge and information improves the performance and quality of a person's employee in a public organization. In this situation, the immediate supervisors serve as coaches or learning facilitators; they enact specific behaviors enabling their employees (coachees) to learn, develop, and improve their job performance (Coimbra & Proença, 2022).

The primary purpose of practicing managerial coaching in organizations is to enhance organizational achievement by improving employees' work behavior (Ellinger et al., 2013). Through a structured system design, immediate superiors and subordinates are expected to adopt managerial coaching to cope with task conditions (Hashim, 2022). Specifically, the immediate superiors are the individuals responsible for guiding their supervised employees by transferring relevant working experience, knowledge, and skills while carrying out the core duties in an organization.

On the other hand, Hashim (2022) pointed out that subordinates bring their commitment to the task to their immediate superiors rather than derive commitment from their immediate superiors. They also highlighted that the subordinates should focus on producing results rather than scoring points with their immediate superiors. The current work performance can be improved through this structured learning system between the immediate superiors and subordinates. It is consistent with the current organizational environment, encouraging the employees' involvement or participation in a task and the power distribution to help them, especially in decision-making (Kim et al., 2013; 2014).

Applying managerial coaching is appropriate for the public service sector. In this sector, the managers responsible for managing human resources are immediate superiors. Therefore, the role of the immediate superiors extends beyond the essential functions of management, which are controlling, coordinating, organizing, and planning, including coaching their subordinates. The immediate superiors are expected to coach the employees in understanding the tasks to be carried out. It uses several approaches, such as carrying out tasks in groups, having open discussions, promoting diversity in view, and working toward employee and organizational development (McLean, 2020). Like organizations having to change over time, a superior should also change to adapt to the environment. Human beings cannot be organized like other resources, such as equipment, finance, and raw materials. Human resources involve the emotions and mind associated with human persuasion, influence, and powerful action system (Fayol, 1949). Therefore, the role of immediate superiors is essential in directing and leading employees in one direction.

## 3. Dimension of Managerial Coaching

In the organizational context, effective coaching practices refer to the role of immediate superiors, the closest individuals to employees, in practicing open communication, promoting working in groups and employee orientation, embracing diversity, and facilitating employees' development (Beattie, 2006, Ellinger & Bostrom, 1999; Graham et al., 1994). Therefore, their coaching can help employees improve their work performance from time to time.

Discussions on on-the-job training often highlight the importance of open communication as a critical factor in effective coaching (Peterson & Hicks, 1996). McLean and Tolbert (2007) emphasized that an open exchange of thoughts, feelings, and information is necessary to develop the interpersonal rapport required to influence others. Open communication helps immediate superiors and employees understand each other better and serves as the foundation for building a relationship. Evered and Selman (1989) emphasized the significance of communication in coaching effectiveness and suggested that researching coaching would benefit from exploring the qualities of listening and speaking between immediate superiors as coaches and employees. The specific skills facilitating effective communication include the immediate superiors' ability to share information, opinions, and values.

According to McLean et al. (2007), the openness and sharing of thoughts, feelings, and information is one way to create an interpersonal relationship that can help one influence others. For example, open communication in the management coaching of the federal government helps create a good understanding between the immediate superiors and their supervised employees. The understanding has directly helped to improve the effectiveness of tasks carried out by the employees. The effectiveness results from the employees' belief in their ability to carry out the assigned tasks well (McLean et al., 2005; Kim et al., 2014).

The next concept of management coaching, practiced by immediate superiors in the federal government's organization, suggests implementing group-oriented tasks. In working in groups, immediate superiors see employees as partners; the employees will usually be free to voice their views. Making decisions will be taken on discussion and joint agreement between immediate superiors and the employees. In this context, the immediate superiors will facilitate discussing the employees' ideas and views on certain matters. Joint decision-making makes the employees feel valued and needed within the organization. Therefore, the employees will be more confident in completing their assigned tasks (Kim et al., 2014).

Coaching practitioners in the federal government agree that effective coaching requires acknowledging individuals' needs and applying them to tasks. However, the organization prioritizes task accomplishments over people's needs, which requires a shift. This situation is also related to the concern of employees' needs and employees-oriented approaches (Evered & Selman, 1989). Besides, embracing ambiguity is also an essential characteristic of effective coaching. It allows immediate superiors in the government sector to be receptive to new ideas from others and consider multiple perspectives when working with employees and making decisions.

The notion of embracing ambiguity is closely linked to adaptability and cognitive flexibility, as Peterson and Hicks (1996) suggested. When faced with a complex and rapidly changing business environment, exploring various plausible answers rather than fixating on a single answer can help immediate superiors handle problems and inspire employees to embrace the possibilities presented by uncertainty. Effective coaching practices should clarify what can be clarified to alleviate the discomfort of uncertainty and encourage employees to seize the opportunities that arise from it.

Finally, another effective coaching skill involves various ways to facilitate employee development in this sector. Effective coaching demands immediate superiors possess certain techniques to aid employees' development. This managerial coaching aspect was not included in McLean et al.'s original four components (Peterson & Little, 2005). Based on their previous research, Peterson and Hicks (1996) defined this coaching as the learning facilitation aspect by defining coaching as the learning facilitation (Beattie, 2006). They aimed to identify how effective coaches aid the employees' learning and compared their findings to their previous research. Examples of specific behaviors include providing resources, giving feedback, setting objectives, and using examples, scenarios, role-playing, and questioning to encourage employees to think critically and creatively.

The sensitivity of immediate superiors in improving employees' development by providing required resources for work assignments, such as capital, raw materials, and adequate work equipment to employees, providing clear goals and explanations of assigned tasks, has directly led to increased employee confidence in completing assigned tasks effectively (Ellinger et al., 2013; Park, McLean & Yang 2008). Providing adequate resources enables employees to complete new and more challenging tasks.

## 4. Conclusion

Human capital attracts the attention of many practitioners and scholars since it is essential to organizations, including public service. The management has initiated several efforts to ensure the quality of human capital and its performance are always at its best. One of the efforts is to put managerial coaching into practice. Managerial coaching emphasizes the effective relationship between immediate superiors and their supervised employees within working hours. It aims at enhancing organizational achievements through the employees' performance improvement.

The application for future research focuses on managerial coaching practice and applies to private and public sectors. It involves five dimensions that should be effective for immediate superiors. The dimensions are practicing open communication, promoting working in groups, practicing employee orientation, embracing diversity, and facilitating employee development. Besides, three managerial coaching enablers are employees' commitment, motivation, and leadership style. The Coaching Assessment System is introduced to assess the managerial coaching practice. It is developed to assist organizations, including the public service, in enhancing task effectiveness and employee performance by enhancing the managerial coaching practice.

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# A Study on Awareness, Exposure and Attitude towards Digital Citizenship among University Students in Malaysia

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**Abstract:** Digital citizenship has received considerable huge attention from numerous researchers in recent years. Due to the tremendous work put forth by the scholars, the researchers aimed to explore in-depth the relationship between students' aptitude towards digital citizenship in the Malaysian educational context. This survey gathered 256 responses from 17 public universities from the central region, north region, south region, and east region as well as East Malaysia. Three independent variables namely students' awareness, students' exposure, and students' attitude and their relationships with digital citizenship (digital security, digital etiquette, and digital rights and responsibilities) as dependent variables were examined. This study relied on Partial Least Square Modeling (PLS-SEM) to probe the relationship between the IV and DV. A higher-order construct was studied with a focus on the reflective model. The internal consistency, factor loading, convergent validity, and discriminant validity of the constructs with their indicators were all tested using the measurement model. The structural model was applied to measure the relationship between the constructs. This research reported that there was a substantial relationship between students' awareness, exposure, and attitude toward digital citizenship. In conclusion, public university students in Malaysia were well informed, exposed, and had a meticulous attitude towards digital citizenship; however, proper training and well guidelines have to be emphasized in a certain area, especially from the spectrum of digital security. Further study is encouraged, and further recommendations were also discussed in this paper.

**Keywords**: *Digital Citizenship, Digital Awareness, Digital Exposure, Digital Attitude, Malaysian University.*

## 1. Introduction and Background

Digital citizenship covers a broad range of topics such as responsibilities, ethics and etiquette, privacy and security with a main focus on responsible participation by digital citizens when using the Internet (Ribble and Bailey, 2007). The International Society for Technology in Education (ISTE) defines digital citizenship as appropriate behavioral standards when using technology. ISTE believes that one of the key qualities of good citizenship is supporting global digital equality, such as treating others with respect in the digital sphere to protect their physical and mental health (ISTE, 2016). Another definition of digital citizenship is teaching students to secure online collaboration and communication Öztürk (2021). Based on research among students and teachers, Ribble et al. (2015) perceived digital citizenship as the adoption of digital standards of behavior to be responsible online users and exhibit moral guidance in the online environment. Malaysia has been significantly impacted by the technology and internet. The country has seen improved communication, access to extensive information, and new opportunities for advancement in education, business, and lifestyle.

According to the Department of Statistics Malaysia (DOSM), there has been an increase in the percentage of Malaysians using the Internet and related technology from 2013 to 2021. In 2017, individuals aged 15 and above used the Internet at a rate of 80 percent, demonstrating that a majority of people now rely on the Internet for digital activities (DOSM, 2018). The growth in ICT usage and household survey results had a significant impact on social network usage, reaching 97.1 percent in 2019 (DOSM, 2019). The Malaysian Communications & Multimedia Commission (MCMC) reported that Internet access was the highest percentage among all ICT and device surveys in 2020 due to the work-from-home (WFH) and online learning phenomena (MCMC, 2020). In 2021, the majority of users participated in digital social activities 95.5 percent (DOSM, 2020). Therefore, technology and the internet have created new challenges, particularly for university students who need to learn proper digital citizenship. Studies by Kant (2016), Sung et al. (2016), and Jusoh & Al Fawareh (2017) highlight the increasing reliance of university students on mobile phones for various purposes. However, this reliance on technology and the Internet also presents new challenges for students in terms of digital citizenship.

To address these challenges, Theis et al. (2022) suggest that a common online platform used by lecturers could assist students in developing proficiency in using applications for their studies and improve their overall experience with technology. A report by Class Central (2021) shows that 40 million new learners signed up for at least one MOOC among the top providers in 2021. These providers include Coursera (97 million), edX (42 million), Future Learn (17 million), and Swayam (22 million). This demonstrates the growing demand for MOOCs and the need for students to develop the skills and knowledge necessary to navigate the digital landscape in proper digital citizenship. This research aims to study the impact of the scarcity of digital citizenship curricula on public university students in Malaysia, in terms of their awareness, exposure, and attitude toward proper digital citizenship practices such as avoiding digital vulnerability, improper netiquette, and digital bullying. The theory of digital citizenship will be used as a guide in examining the students' understanding of good digital citizenship practices.

## 2. Literature Review

**The Evolution of Digital Age Malaysia**: The telecommunication sector in Malaysia has taken measures to digitize traditional business transactions to enhance customer experience (Zimmer, 2018). The Malaysian government established the National 5G Taskforce in 2018 to deploy 5G technology in the country (MCMC, 2019). The country's ICT infrastructure has evolved from 1G to 5G, referred to as the Connected Generation, which is comfortable with technology and driven by the growth of telecommunication (Kusá & Piatrov, 2020). This technology includes features such as industrial automation, IoT, cloud services, augmented reality, smart homes and cities, and self-driving vehicles. The National Policy on Industry 4.0 (Industry4WRD) was introduced in 2018 to prepare the manufacturing industry for Industry 4.0. The government is promoting upskilling and reskilling to ensure the successful transformation of the workforce (MITI, 2018). In response to the growth of technology, government agencies such as the Malaysia Digital Economy Corporation (MDEC) have taken initiatives to promote technology adoption through programs like Global Online Workforce (GLOW), eRezeki, and eUsahawan, aimed at improving quality of life (MDEC, 2019). The Malaysia Digital Economy Corporation (MDEC) launched a digital adoption strategy that involves both the public and private sectors.

To keep up with changing technologies and avoid business decline, companies are urged to invest in digital technology and increase their employees' digital skills. Former Prime Minister Tun Mahathir Mohammad also emphasized the importance of innovation and research and development (R&D) to improve products and services (MDEC, 2019). According to McKinsey Global Institute, automation in the industry could lead to the displacement of 800 million workers globally by 2030. This means that 75 to 375 million people may need to change jobs and learn new skills (Manyika et al. 2017). In 2018, Dr. Mazlee Malik, a former Education Minister in Malaysia, said that many new fields related to Industry 4.0 are coming and education institutions aren't preparing students with the right skills. As a result, up to 60% of graduates are unemployed because there's a mismatch between what they learned and what the market needs (The Star, 2020). Shahroom and Hussin (2018) highlight the challenges faced by parents in preparing their children for the job market through education in an era of rapid technological advancements. They emphasize the need for new teaching methods to help students not only stay up-to-date with emerging technologies, such as artificial intelligence, IoT, predictive analytics, virtual reality, and augmented reality but also cultivate ethical values and responsibilities.

**Digital Citizenship:** The concept of digital citizenship, as defined by Ribble and Miller (2013) and further developed by Ribble (2015, 2017), comprises the standard behavior and ethical codes of conduct in the digital world. It involves being responsible and accountable for one's actions and decisions in the digital space and contributing positively to the digital society. Several studies have explored the concept of digital citizenship from different perspectives (Al-Zahrani, 2015; Nordin, 2015; Choi et al., 2017; Erdem & Koçyigit, 2019). For instance, Al-Zahrani (2015) conducted a quantitative study in Jeddah, Saudi Arabia of 174 faculties of education students from King Abdul Aziz University using survey questionnaires to examine the factors that influence digital citizenship. The findings revealed a positive correlation between computer self-efficacy and digital citizenship and concluded that students with more computer experience tend to participate better, connect with others, and have a higher level of online safety for themselves and others. Nordin (2015) used a

survey to assess the impact of self-regulated behaviors on digital citizenship among students and found that online self-regulated behaviors were the most contributing factor.

Choi et al. (2017) provided a comprehensive theoretical framework for digital citizenship. Cooney et al. (2018) conducted a study in Ireland where they initiated workshops to raise awareness of digital citizenship in higher education institutions. In another study, Erdem & Koçyigit (2019) found a positive correlation between digital technology skills and the level of digital citizenship among undergraduates across eight universities in Turkey. The rapid development of digital technology has significantly transformed lifestyles, but with it also come risks that need to be addressed. To fully embrace and effectively navigate the digital world, digital citizenship skills are essential (Erdem & Koçyigit, 2019). Manzuoli et al. (2019) conducted a systematic review of digital citizenship research over the past decade and found that scholars have investigated the concept of digital citizenship, digital citizenship skills, as well as other criteria such as digital citizenship topics, instruments, programs, and technology that promote digital citizenship.

**Awareness:** Awareness refers to the knowledge or understanding of something important. It is characterized as knowledge in the educational context and is linked to a greater understanding of public and scientific issues (Gafoor, 2012). A study by Alqahtani & Alqurashi (2017) found high levels of digital citizenship awareness among university students in the U.S. The Ribble Four-Stage Technology Framework highlights the importance of digital literacy in the first stage of technology awareness (Jwaifell, 2018).

**Exposure:** The second stage of Ribble's Four Stage Technology Framework suggests guided practice for students, where they can safely use technology under teacher supervision and learn to probe, discover and take risks. In the third stage, teachers and parents serve as role models for good digital citizenship. The final stage involves feedback and reflection, allowing students to continually improve their digital citizenship. A workshop on digital citizenship at the University of Macerata in Italy has been incorporated into the education science syllabus, providing students with valuable exposure to communication about digital citizenship through media (Fedeli, 2020).

**Attitude:** The study by Çiftci & Aladag (2018) showed a strong relationship between attitudes towards digital technology and digital citizenship. They found that attitudes have a significant impact on digital citizenship. The relationship between the two was found to be significant in their analysis. (Nourinezhad & Kashefian-Naeeini, 2020)

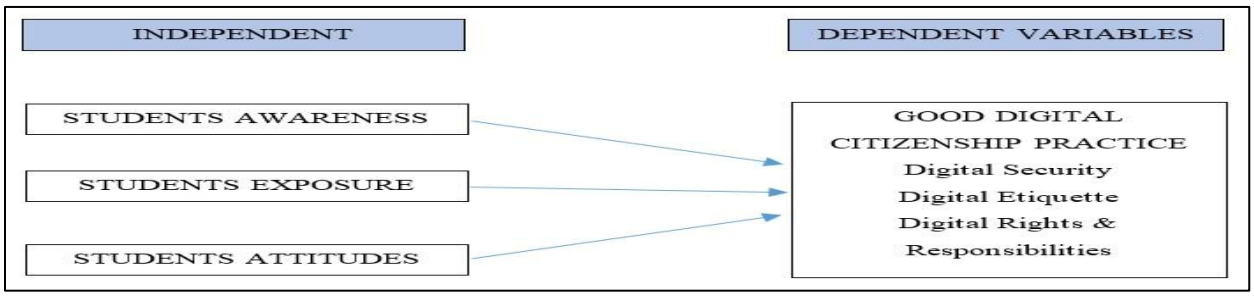
**The Digital Connectivism Theory by George Siemens:** The 8 principles of connectivism, developed by George Siemens, emphasize the importance of diversity of opinions in learning, connecting information sources, utilizing technology in learning, valuing the ability to learn over current knowledge, maintaining connections, recognizing connections between fields and concepts, seeking accurate and up-to-date knowledge, and viewing decision-making as a learning process (Siemens, 2005). According to Holland (2017), this theory addresses the demands of 21st-century education that have been impacted by technological changes in learning and communication. This theory integrates technology and the digital edge into learning activities and supersedes previous theories such as cognitivism, constructivism and behaviorism. The study by Utecht & Keller, (2019) revealed this theory has been integrated into learning activities, including the creation of learning websites like MOOCs. The eight principles of connectivism have also been used as a framework for studying the use of technology in education.

**The Digital Literacy Theory by Eshet Alkalai:** The study of digital literacy was established by Eshet Alkalai (2004) and he believed that having clear-cut digital skills is important for learners to be able to effectively navigate the digital environment. He presented a framework for digital literacy that includes five skill sets: photo-visual literacy, reproduction literacy, branching literacy, information literacy, and social-emotional literacy. A study by Eshet-Alkalai & Chajut (2009) found that there were significant changes in digital literacy over 5 years but no significant changes in critical and creative skills. Eshet later added the six skills of real-time thinking to the previous five digital literacy skills, emphasizing the need for fast processing of fluid information in the digital age. These skills involve motoric, emotional and cognitive abilities to effectively operate in the digital environment (Eshet, 2012).

**The Nine Elements of Digital Citizenship by Ribble:** This study focuses on three aspects of the nine elements of digital citizenship defined by Ribble (2017): digital security, digital etiquette, and digital rights and responsibilities. Digital access refers to the fair dissemination of online resources for all and should be made available in school and at home (Ribble, 2017; Walters et al., 2019). Digital commerce involves performing online business transactions with the use of appropriate digital tools and safety measures (Ribble, 2017; Logan, 2016). Digital communication and collaboration refer to the way people interact and exchange information online (Ribble, 2017). Digital etiquette is the code of conduct in the digital space to ensure harmony in the community (Walters et al., 2019; Ribble, 2017). Digital fluency is the ability to use technology effectively and make informed decisions while online (Ribble, 2017; Sparrow, 2018). Digital health and welfare are the impacts of technology on physical and psychological health, and students should maintain a balanced online and offline life (Ribble, 2017). Digital law is the knowledge of digital acts, rules and regulations, and not breaking the law to protect one and others (Ribble, 2017). Digital rights and responsibilities include acting responsibly and being accountable when accessing online resources, and good parenting practices such as monitoring children's online activities (Ribble, 2017; Walters et al., 2019). Digital security and privacy are precautions taken to protect against digital threats such as viruses and data breaches (Ribble, 2017; Walters et al., 2019).

**Development of Conceptual Framework:** The researcher adopted three elements of digital citizenship by Ribble (2015) to develop the conceptual framework. This study aims to examine the relationship between students' attributes and their outcomes in the good practice of digital citizenship. The three factors being studied are students' awareness of digital security, their exposure to digital etiquette, and their attitudes toward rights and responsibilities. Figure 1 depicts the conceptual framework for the study.

**Figure 1: Conceptual Framework Guided by the Nine Elements Framework for Digital Citizenship by Ribble (2015)**




**Hypothesis Development**

**Relationship between Awareness and Digital Security:** Researchers have used questionnaires to gauge digital security awareness among university students. They often adapt existing questionnaires or design their own based on prior literature (Subramaniam, 2017; Moallem, 2019; Muniandy et al., 2017). Subramaniam (2017) found average awareness and no significant gender differences, with IT-literate students having better awareness. Muniandy et al. (2017) found low levels of digital security awareness and vulnerability to digital threats. Moallem (2019) found a surprisingly low concern for digital security among technically savvy students in Silicon Valley. It is therefore hypothesized that;
**H1:** There is a relationship between students' awareness and digital citizenship among public university students in Malaysia.

**Relationship between Exposure and Digital Etiquette: Nor Hidayah et al. (2014)** found in their study that students only practiced digital etiquette at school, under the supervision of their teachers, but not at home. Sabariah (2019) echoed these findings and also raises concerns about the limited exposure students receive to internet etiquette and managing social media, as this lack of exposure can lead to negative consequences such as digital abuse. YouTube also plays an important role in educating people about digital etiquette. Many YouTubers (Tarver Academy, 2020; Karon, 2014; Rivera, 2016) shared valuable tips on digital etiquette and their videos have gained thousands of viewers. The interactive nature of YouTube has

made it a better learning platform for students and has led to a more satisfying and committed learning experience (Orús et al., 2016; Roodt et al., 2017). Thus, it is therefore hypothesized that;
**H2:** There is a relationship between students' exposure and digital citizenship among public university students in Malaysia.

**Relationship between Attitude and Rights & Responsibility:** Plagiarism has been a major concern in education, for many years. It is defined as copying the work of others and is considered academic dishonesty or misconduct (Jones, 2011; Ramos et al., 2019; Bretag, 2016; Uzun & Kilis, 2020). In the digital age, students are becoming more prone to plagiarism due to easy access to information. There have been instances of students using content from websites without giving proper credit (TheStar 2019; NST, 2019). This includes written text, pictures, images, audio, and video files. The materials that tend to plagiarize come from various sources of academic documents such as a thesis and project papers (Karim, 2019). Laziness and ignorance have been identified as reasons for plagiarism in universities (Rajaendram, 2019). However, Naicker (2019) argues that poor training by educational institutions is a more significant issue, as students have not been taught about the technical challenges of plagiarism. Therefore, it is hypothesized that;
**H3:** There is a relationship between students' attitudes and digital citizenship among public university students in Malaysia.

## 3. Research Methodology

The researcher utilized the Statistical Package for the Social Science Software (SPSS) to analyze demographic data. The data analysis was conducted through the Partial Least Squares Structural Equation Modeling (PLS-SEM), which encompassed both the measurement model and structural model assessments to examine the relationship between students' competency in digital citizenship (security, etiquette, rights and responsibilities) and their awareness, exposure, and attitude among public university students in Malaysia. The total population was 528,654 public university students in Malaysia as of December 31, 2018. The sampling frame was taken from 20 public universities divided into 5 regions (northern, central, southern, east coast, and East Malaysia). The study used a disproportionate stratified sampling technique, with the accessible population being undergraduate students based on their regions. The sample size was calculated using G*Power and was initially estimated to be 119 undergraduate students, but was increased to 200 to avoid sampling issues. The unit of analysis was the individual undergraduate students from public universities in Malaysia. A pilot study was carried out with 30 participants to ascertain the validity and reliability of the constructs utilized in the study. The reliability of the instrument was checked using Cronbach's alpha, a common method for measuring consistency. A reliability result of greater than 0.7 is considered standard.

## 4. Results

This section is to report on the analysis of the data collected for this study. 20 public universities in Malaysia to understand the relationship between students' awareness, exposure, and attitude toward digital citizenship. PLS-SEM was used to examine the quality of variables by using a measurement model. The calculation was done through an algorithm and some items were discarded. The structural model was run with bootstrapping to find the path coefficient between constructs.

**The Measurement Model:** The measurement model in PLS-SEM signified the relations between the constructs and indicators. The procedure of the measurement model includes Internal Consistency Reliability (Composite Reliability), Indicator Reliability (the outer loading), Convergent Validity (AVE), and Discriminant Validity (Cross Loading, Fornell & Lacker's Criterion and HTMT Criterion. A path model that comprises constructs and indicators was created. The first-order constructs in this study are awareness (AW), exposure (EX) and attitude (AT) while the second-order constructs are digital security, digital etiquette and digital rights and responsibility (Digital citizenship – DC).

**The Indicator Loading:** The primary step in the measurement model was to observe the indicator loadings. The overall sample was tested. 0.708 and a higher value were considered to have 50% more variance for the indicators (Hair et al., 2019). The reading exhibited some constructs scored less than 0.708. Since some

constructs reliability and validity did not meet the minimum indices requirement, 20% of samples were deleted from 55 samples due to the low level of acceptance for factor loading.

**Convergent Validity:** Variables were tested with Cronbach's Alpha, Composite Reliability (CR) and Average Variance Extracted (AVE). The Cronbach alpha values and the CR had more than the suggested values of 0.700 for all the constructs. The validity of the construct was also tested with Average Variance Extracted (AVE) to determine the construct accuracy. AVE was measured, guided by its rules of thumb where all the AVE scored > 0.500.

**Figure 2: Measurement Model Analysis using Smart PLS**

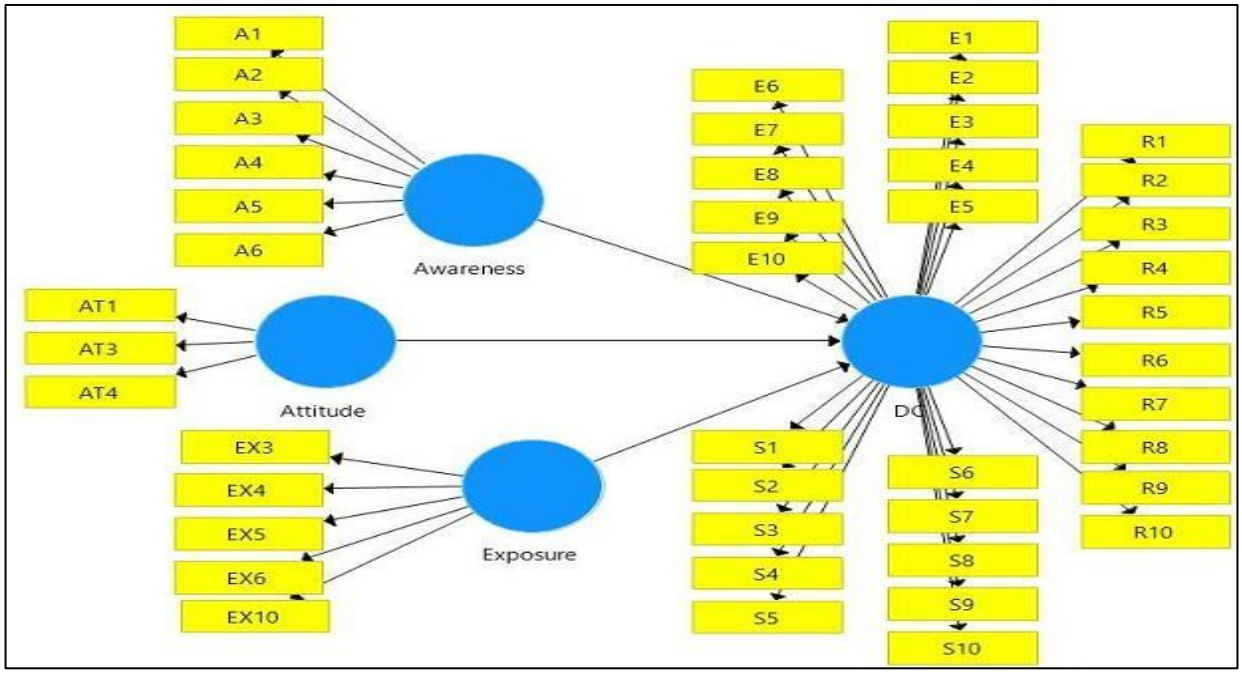



**Table 1: Initial Cronbach's Alpha, Composite Reliability and AVE**

| | Cronbach's Alpha (> 0.700) | Composite Reliability (> 0.700) | AVE (> 0.500) |
|---|---|---|---|
| Attitude | 0.791 | 0.876 | 0.702 |
| Awareness | 0.814 | 0.864 | 0.515 |
| DC | 0.841 | 0.852 | 0.219 |
| Exposure | 0.779 | 0.849 | 0.53 |

Cronbach's alpha, CR and AVE values are shown in Table 1. The findings disclosed that all constructs had fulfilled the minimal indices, which implied that measurements were valid and reliable except for DC. A different calculation was made to measure the composite reliability (CR) and average variance extraction (AVE) for DC – higher order. Based on the results, it was shown the CR was 0.750 and the AVE was 0.898 which both indices were above the acceptable value. The results are shown in Table 2;

**Table 2: Improved CR and AVE**

| | Std Loading | STD Loading Squared | Error Variance = 1- loadings squared |
|---|---|---|---|
| Item1 | 0.695 | 0.483025 | 0.516975 |
| Item 2 | 0.957 | 0.915849 | 0.084151 |
| Item 3 | 0.922 | 0.850084 | 0.149916 |
| Total Loadings | 2.574 | 2.248958 | 0.751042 |
| Total Loadings Squared | 6.625476 | | |

| | Std Loading | STD Loading Squared | Error Variance = 1- loadings squared |
|---|---|---|---|
| | | | 7.376518 |
| | AVE | 0.750 | |
| | Composite Reliability | | 0.898 |

**Table 3: Result of Measurement Model**

| Constructs | Items | Factor Loadings | CR | AVE |
|---|---|---|---|---|
| Awareness | A1 | 0.764 | 0.864 | 0.515 |
| | A2 | 0.735 | | |
| | A3 | 0.765 | | |
| | A4 | 0.728 | | |
| | A5 | 0.689 | | |
| | A6 | 0.615 | | |
| Exposure | EX3 | 0.684 | 0.849 | 0.53 |
| | EX4 | 0.74 | | |
| | EX5 | 0.779 | | |
| | EX6 | 0.71 | | |
| | EX10 | 0.725 | | |
| Attitude | AT1 | 0.767 | 0.876 | 0.702 |
| | AT3 | 0.884 | | |
| | AT4 | 0.859 | | |
| Digital Citizenship | S1 | 0.453 | 0.852 | 0.75 |
| | S2 | 0.49 | | |
| | S3 | 0.517 | | |
| | S4 | 0.01 | | |
| | S5 | 0.177 | | |
| | S6 | 0.129 | | |
| | S7 | 0.325 | | |
| | S8 | 0.477 | | |
| | S9 | 0.54 | | |
| | S10 | 0.168 | | |
| | E1 | 0.047 | | |
| | E2 | -0.023 | | |
| | E3 | -0.052 | | |
| | E4 | -0.075 | | |
| | E5 | -0.166 | | |
| | E6 | 0.599 | | |
| | E7 | 0.595 | | |
| | E8 | 0.644 | | |
| | E9 | 0.476 | | |
| | E10 | 0.702 | | |
| | R1 | 0.548 | | |
| | R2 | 0.45 | | |
| | R3 | 0.292 | | |
| | R4 | 0.465 | | |
| | R5 | 0.695 | | |
| | R6 | 0.712 | | |
| | R7 | 0.746 | | |
| | R8 | 0.623 | | |
| | R9 | 0.526 | | |
| | R10 | 0.513 | | |

**Discriminant Validity:** Researchers used discriminant validity to see if the observed variables in the constructs were different from one another in the path model. The indicator Cross-loading, Fornell & Larcker and Heterotrait-Monotrait Ratio (HTMT) can all be used to measure discriminant validity.

**Fornell-Larcker (FL) Criterion:** The FL criteria determined the square root of the construct of the AVE. To establish discriminant validity, the correlations between the construct and the other constructs in the model should be higher than the result of the underneath construct.

**Table 4: Fornell-Larcker (FL) Criterion**

| | Attitude | Awareness | DC | Exposure |
|---|---|---|---|---|
| Attitude | 0.838 | | | |
| Awareness | -0.011 | 0.718 | | |
| DC | -0.277 | 0.538 | 0.468 | |
| Exposure | -0.31 | 0.197 | 0.578 | 0.728 |

Based on the results, when AVE was higher than its associated construct Attitude, Awareness and Exposure met the requirement for discriminant validity. However, DC did not meet the requirements of discriminant validity when it scored lower than its associated construct. Thus the discriminant validity was not established for DC.

**Cross Loading:** The cross-loading result shown in Table 5 reported that there were no discriminant validity issues for Awareness, Attitude and Exposure. However, the highlighted items in the table were having validity issues as there were loadings that were highest than their designated construct Therefore the items were not representing their construct well.

**Table 5: Cross Loading**

| | Awareness | Attitude | Exposure | DC |
|---|---|---|---|---|
| A1 | 0.764 | -0.067 | 0.156 | 0.382 |
| A2 | 0.735 | -0.067 | 0.115 | 0.354 |
| A3 | 0.765 | 0.123 | 0.034 | 0.354 |
| A4 | 0.728 | -0.094 | 0.249 | 0.46 |
| A5 | 0.689 | 0.007 | 0.204 | 0.458 |
| A6 | 0.615 | 0.13 | -0.018 | 0.216 |
| AT1 | -0.054 | 0.767 | -0.264 | -0.169 |
| AT3 | -0.028 | 0.884 | -0.241 | -0.266 |
| AT4 | 0.041 | 0.859 | -0.285 | -0.247 |
| EX3 | 0.111 | -0.126 | 0.684 | 0.364 |
| EX4 | 0.14 | -0.198 | 0.74 | 0.392 |
| EX5 | 0.135 | -0.221 | 0.779 | 0.392 |
| EX6 | 0.14 | -0.249 | 0.71 | 0.436 |
| EX10 | 0.18 | -0.304 | 0.725 | 0.494 |
| E1 | 0.001 | 0.085 | 0.178 | 0.047 |
| E2 | -0.079 | 0.125 | 0.038 | -0.023 |
| E3 | 0.002 | 0.206 | -0.014 | -0.052 |
| E4 | -0.018 | 0.309 | -0.11 | -0.075 |
| E5 | 0.03 | 0.458 | -0.179 | -0.166 |
| E6 | 0.207 | -0.223 | 0.474 | 0.599 |
| E7 | 0.141 | -0.132 | 0.489 | 0.595 |

| | Awareness | Attitude | Exposure | DC |
|---|---|---|---|---|
| E8 | 0.166 | -0.25 | 0.574 | 0.644 |
| E9 | 0.092 | -0.146 | 0.394 | 0.476 |
| E10 | 0.282 | -0.187 | 0.506 | 0.702 |
| R1 | 0.192 | -0.216 | 0.411 | 0.548 |
| R2 | 0.395 | 0.035 | 0.125 | 0.45 |
| R3 | 0.179 | -0.015 | 0.113 | 0.292 |
| R4 | 0.233 | -0.094 | 0.334 | 0.465 |
| R5 | 0.392 | -0.215 | 0.346 | 0.695 |
| R6 | 0.311 | -0.288 | 0.47 | 0.712 |
| R7 | 0.319 | -0.216 | 0.446 | 0.746 |
| R8 | 0.287 | -0.215 | 0.376 | 0.623 |
| R9 | 0.172 | -0.202 | 0.376 | 0.526 |
| R10 | 0.275 | -0.052 | 0.218 | 0.513 |
| S1 | 0.458 | -0.144 | 0.134 | 0.453 |
| S2 | 0.399 | -0.076 | 0.143 | 0.49 |
| S3 | 0.44 | -0.022 | 0.199 | 0.517 |
| S4 | 0.025 | 0.232 | 0.007 | 0.01 |
| S5 | 0.034 | -0.048 | 0.089 | 0.177 |
| S6 | 0.18 | -0.067 | -0.04 | 0.129 |
| S7 | 0.286 | -0.046 | 0.075 | 0.325 |
| S8 | 0.583 | 0.025 | 0.022 | 0.477 |
| S9 | 0.567 | -0.029 | 0.091 | 0.54 |
| S10 | 0.264 | 0.163 | -0.057 | 0.168 |

**Heterotrait-Monotrait Ratio (HTMT) Criterion:** Another method to check on discriminant validity is through HTMT. Kline, (2011) suggested that for any ratio that was less than 0.85, the discriminant validity is established. Therefore, there was no discriminant validity issue arise.

**Table 6: Heterotrait-Monotrait Ratio (HTMT) $^{0.85}$ Criterion**

| | Attitude | Awareness | DC | Exposure |
|---|---|---|---|---|
| Attitude | | | | |
| Awareness | 0.155 | | | |
| DC | 0.411 | 0.634 | | |
| Exposure | 0.388 | 0.231 | 0.641 | |

**Structural Model:** The structural model was used to find the significant relationship among hypotheses. In this study, the path modal was tested using a bootstrapping method to check if the variables were related to one another by using lateral collinearity (VIF), path coefficients, coefficient determination ($R^2$), and Effect size ($F^2$).

**Collinearity Statistics:** Collinearity describes the relationship between two variables that were associated with a regression model. In this study, the researcher used variance inflator factor (VIF) to investigate multicollinearity issues.

**Table 7: Collinearity Statistics Results**

| | Attitude | Awareness | DC | Exposure |
|---|---|---|---|---|
| Attitude | | | 1.109 | |
| Awareness | | | 1.043 | |
| DC | | | | |
| Exposure | | | 1.154 | |

The result in Table 7 shows that all values for VIF were less than 5.0 for Attitude = 1.109, Awareness 1.043 and Exposure = 1.154. Therefore it indicated that there were no multicollinearity issues in this study (Hair et al., 2017).

**Hypothesis Testing:** A structural analysis was run to test hypotheses and the results are presented in Table 8.

**Table 8: Hypothesis Testing**

| | Beta (β) | Standard Error | T Value | P-Value | CIBC 5.00% | 95.00% | Effect Size(f2) |
|---|---|---|---|---|---|---|---|
| H1 Awareness -> DC | 0.448 | 0.062 | 7.188 | 0 | 0.333 | 0.539 | 0.001 |
| H2 Exposure -> DC | 0.448 | 0.059 | 7.657 | 0 | 0.349 | 0.538 | 0.001 |
| H3 Attitude -> DC | -0.134 | 0.072 | 1.85 | 0.032 | -0.222 | 0.047 | 0.122 |

Based on the Hypothesis testing results, there was a substantial relationship between Awareness and Digital Citizenship ($\beta = 0.448$, $p < 0.01$). The effect size (f2) was 0.001, which suggests a smaller effect size. Hence, H1 is supported. There was also a significant relationship between Exposure and Digital Citizenship ($\beta = 0.448$, $p < 0.01$) with effect size (f2) 0.001, which suggests a smaller effect size. Thus, H2 is also supported. For Attitude and Digital Citizenship, there was a strong relationship between ($\beta = -0.134$, $p < 0.05$). The effect size (f2) was 0.122, which suggests a smaller effect size between Attitude and Digital Citizenship. Therefore, H3 was also supported. The relationship between IV and DV has shown a positive relationship from the survey. Students' awareness, exposure and attitude were influencing good digital citizenship practice. According to this study, public university students in Malaysia were aware of digital security protection for their gadgetry devices and password usage. The study also showed students had a high level of exposure to digital etiquette across media social, video conferencing and cyberbullying. Furthermore, students possessed a positive attitude with concerns about plagiarism, e-waste, and being good digital users.

**Discussion:** There were 3 research questions developed in the preliminary stage of this study.

**Students' Awareness and Digital Citizenship:** This study investigated the relationship between students' awareness and digital citizenship in public universities in Malaysia. The study found that most students were not aware of digital threats such as malware, phishing, cloud jacking, password management, training, and digital security. This is supported by previous studies in Nigeria, the USA, and Malaysia that found students have a limited understanding of digital security. SN Maon et al. (2020) highlighted the importance of paying attention to the use of digital technology among youth to protect them from potential digital threats and victimization. According to Negi & Magre (2017), Kaspersky (2020), Zulkifli et al. (2020), Onyema et al. (2021), Bhatnagar et al. (2020), and Hamzah (2021), students need to be educated and trained on how to protect themselves in the digital space. Therefore, there is a need for formal education and training to increase awareness and protect students from digital threats.

**Students' Exposure and Digital Citizenship:** The purpose of the study was to examine how students' exposure influences good practices in digital citizenship. In the survey, students were asked about media social etiquette and online class (Q1), WhatsApp group procedure (Q2), professionalism (Q3), plagiarism (Q4), and citation (Q5). The results showed that most students had good exposure to digital etiquette with high scores for all questions: Q1 = 82%, Q2 = 87%, Q3 = 81%, Q4 = 88% and Q5 = 86%. However, when it came to using similarity check software on assignments, most students were unsure and confused. Research

by Singh & Ganapathy (2018) found that first-year university students failed to identify plagiarism activities. This was supported by Mahmud (2021) who reported that plagiarism among university students was on the rise despite exposure by educators. Venter & Bouter (2020) highlighted the responsibilities of a group administrator in a WhatsApp group, including the possibility of inappropriate content, legal implications, and other issues that may arise.

**Students' Attitude and Digital Citizenship:** The survey aimed to explore students' attitudes towards good digital citizenship practices and academic misconduct. Results showed that 78% of students claimed they did not engage in academic misconduct, but research by Gamage et al. (2020) found that the increasing number of misconduct cases may be due to a focus on the labor market and profit-oriented institutions in higher education. Another question in the survey focused on students' understanding of proper citation, with 63% disagreeing with the statement "did not credit the author". However, research by Rezeki (2018) found that poor writing abilities may contribute to suspected plagiarism. The final question in the survey explored students' attitudes towards manipulating internet resources for university tasks, with 77% disagreeing with this behavior. Shahibi & Rusli (2017) found that the use of the Internet by final-year students had a positive impact on their learning but a negative impact on their academic performance.

## 5. Conclusion

In conclusion, the study on students' awareness, exposure, and attitudes toward digital citizenship in public universities in Malaysia revealed a mix of findings. While most students had good exposure to digital etiquette and a positive attitude toward good digital citizenship practices, there were still areas of improvement such as a limited understanding of digital security, confusion about plagiarism, and a need for proper citation techniques. Research supports the need for formal education and training to increase awareness and protect
Student, from digital threats. Previous studies also found that poor writing abilities and profit-oriented institutions may contribute to academic misconduct. Thus, there is a need for formal education and training to educate students on proper digital citizenship practices and ensure academic integrity.

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# A Systematic Review on Marketing Strategies of China's Import Cross-border E-commerce B2C Platforms

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**Abstract:** With the continuous progress of Internet information technology and the further strengthening of Internet popularity in China, the evolving circumstance of its cross-border e-commerce platforms is presently fully operating. In particular, the B2C platforms for import cross-border e-commerce are developing rapidly. This article first provides a brief introduction to the development status of China's import cross-border e-commerce. It then reviews and synthesizes relevant literature about imported cross-border e-commerce. Based on the collation of literature, this article analyses existing marketing strategies of B2C platforms within the import cross-border e-commerce industry and comprehends the relevant marketing problems generated by these platform providers via two identified case analyses. Finally, combined with the current status of international trade procedures and cross-border e-commerce development trends, the corresponding marketing strategy improvement is proposed.

**Keywords**: *Import Cross-border E-commerce, B2C platforms, Marketing Strategy*

## 1. Introduction and Background

As a result of the recent global coronavirus pandemic (termed COVID-19), and the overall development of China's cross-border e-commerce, the industry has been exhibiting new business characteristics from the year 2020 onwards. For example, the COVID-19 epidemic has in actual fact, accelerated the online development of foreign trade enterprises, and the homebody economy has also given birth to new hot spots of cross-border e-commerce consumption. Consumers have gradually switched from overseas shopping to online, hence further stimulating the continuous development of import cross-border e-commerce in China. According to current data, the size of China's cross-border e-commerce market in 2021 is 14.2 trillion yuan, among which the size of China's import cross-border e-commerce market is 3.2 trillion yuan, a year-on-year growth of 14.28% compared with 2.8 trillion yuan in 2020, and the size of China's import cross-border e-commerce market is 1.6 trillion yuan in the first half of 2022 (Executive Committee Office, 2023). At the same time, with the acceleration of import consumption shifting to the online, more and more overseas small and medium-sized brands, through the mode of import cross-border e-commerce bring high-quality "overseas shopping excellent products" into China to satisfy Chinese consumers. In 2021, the number of cross-border e-commerce consumers in China reached 155 million, and in the first half of 2022, the number of cross-border e-commerce consumers in China has already reached 160 million (Yang, 2022).

China's cross-border e-commerce platforms can be classified into export cross-border e-commerce platforms and import cross-border e-commerce platforms according to the import and export directions, while B2B, B2C and C2C cross-border e-commerce platforms are classified according to the subject of transactions. The main focus of this article is on the development status of B2C platforms for import cross-border e-commerce. Such platforms in China are mainly represented by Tmall International, Kaola Overseas Shopping, Miya, Amazon Overseas Shopping, and Ymatou amongst others. The next emphasis is on the review and synthesis of relevant literature relating to imported cross-border e-commerce. From the collation of literature, this article analyses existing marketing strategies of B2C platforms within the import cross-border e-commerce industry and comprehends the relevant marketing problems generated by these platform providers via two identified case analyses. Finally, in combination with the current status of international trade procedures and cross-border e-commerce development trends, the proposed improvement of appropriate marketing strategies is subsequently proposed.

## 2. Literature Review

Based on the keyword search of " import cross-border e-commerce" on CNKI (China National Knowledge Infrastructure), which is an important digital periodical database in China, there are 25 works of literature related to import cross-border e-commerce, focusing mainly on studying the status quo, development modes, brand marketing, logistics issues and regulatory mechanism of import cross-border e-commerce in China. There are also articles that utilize "Xiao Hongshu", "Kaola Overseas Shopping", "Vipshop" and "Tmall International" as case studies, by primarily studying the business model development and marketing strategy of the above platforms. Zhang (2022) mentioned in the article that apart from other imports cross-border e-commerce platforms, “Xiao Hongshu” with its unique "social + e-commerce" business model and community marketing strategy, has taken the lead in the industry and completed multiple financing within just a few years. Yang (2020) applies Kaola Overseas Shopping as an example to study the platform’s big data marketing strategy and draws on its marketing experience to provide relevant big data marketing strategies as a reference for other import cross-border e-commerce platforms. Yuting (2016) identified Tmall International as an example to analyse the business model of import cross-border e-commerce platforms, as well as put forward suggestions on the development of such a business model.

Based on the Scopus search for "import cross-border e-commerce platforms", there are several articles that conduct in-depth research on the import cross-border e-commerce platforms from different perspectives. For example, Yaping, Baoqing & Congying (2022) took platform trust as the intermediary variable to study the impact of content marketing (e.g. information content, entertainment content, emotional content and interactive content) from import cross-border e-commerce platforms on consumer loyalty. Cheng et al. (2022) studied the business model of ecosystem value co-creation of import cross-border e-commerce platforms based on the grounded theory method from the perspective of the platform ecosystem. Hongbo et al. (2022) proposed a selection model of import cross-border e-commerce platforms from the perspective of perceived value theory through comprehensive literature analysis. In this mentioned article, the author used OPSIS technology to evaluate three import cross-border e-commerce platforms in China, including Tmall International, Kaola Overseas Shopping and Jingdong Global to verify the correctness of the constructed model. Undeniably, some other scholars have analysed and discussed the supply chain, logistics, customs supervision and other related issues of import cross-border e-commerce, and put forward relevant suggestions on import cross-border e-commerce platforms.

In general, past studies on import cross-border e-commerce platforms have gradually become comprehensive, but studies from different perspectives need to be supplemented for different cases. Hence, this article appraises the marketing strategies of China's import cross-border e-commerce platforms from the perspective of B2C import e-commerce platforms, with the aim of playing a significant complementary role to previous research.

## 3. Research Methodology

The research method used in this article is mainly via the case study approach in qualitative research. Eisenhardt (1989) once summarized a classic definition of the case study method. It is believed that the case study method discusses ‘why’ and ‘how’ to solve problems; it mainly states and explains the phenomenon in reality through a philosophical description of the situation, by using extensive descriptions to build the large picture. Case studies can be divided into single-case studies and multi-case studies. Data sources of case study methods mainly include literature collation, observation and interview. This article obtains data sources by means of literature reading and network data arrangement; it selects several typical cases of import cross-border e-commerce B2C platforms to reflect the current problems of import cross-border e-commerce platforms, which belongs to the multi-case study analysis method.

**Case Study**

**Case Selection**

In terms of cross-border import e-commerce, China's B2C market presents an outstanding practice, with Tmall International, Kaola Overseas Shopping, Jingdong International and Vipshop International ranking topmost in the list. The whole market is in the rising stage. Alibaba, as the leading cross-border e-commerce enterprise in China, owns the big B2C platforms which include Tmall International and Kaola Overseas Shopping, etc., which has a stable position in the import 2C end. The whole market pattern is basically stable. Tmall International, as the largest import e-commerce platform in China, provides great convenience for Chinese consumers to buy overseas commodities. Kaola Overseas Shopping is in a leading position in the field of cross-border e-commerce and global business.

However, with such development in the cross-border e-commerce industry, a variety of marketing problems have gradually emerged; consumer complaints often occur, and consumers' rights and interests have been violated. According to the "Complaint list of import cross-border e-commerce in 2022" released by China Network Economic Society, consumer complaints about B2C import cross-border e-commerce platforms in 2022 mainly include refund problems, delivery problems, commodity quality, online fraud, return and exchange problems, online counterfeit sales, logistics problems and so on.

In view of the above, the researchers have chosen two (2) typical cases to primarily discuss problems of online counterfeit sales and logistics services, which are also plaguing cross-border e-commerce consumers.

**4. Case Presentation**

Case 1: On August 16, 2022, Mr Zhou from Guangdong Province in China complained that he bought a Samsung watch online from Tmall International e-commerce mall platform on July 31, 2022. After receiving the goods, his mobile phone could not be connected, and he went to the merchant to communicate with them about the after-sales treatment. But the merchant refused to refund the money, thus violating Mr. Zhou's personal rights and interests. Mr. Zhou's appeal was to ask Tmall International for a refund. The purchased goods was required to be sent back offline, but Tmall International refused the refund on the basis that the watch needed to be tested for 30 days and claimed that the original goods would be returned after 30 days of testing.

Case 2: Mr. Li from Henan Province complained that he purchased several items on foreign websites and needed a trans-shipment service. On April 23, 2022, he placed a trans-shipment order (t17 batches) on Mingxuan Overseas Shopping e-commerce mall, but the shipment was delayed. A week later, the online mall's customer service informed him that he needed to pay an extra 70 yuan for the freight because the goods' weight had changed. Mr. Li thought that he had paid for it already, but then was informed thereafter that the weight had changed, resulting in him feeling speechless. Nevertheless, he had no choice but to pay for the amended charges. It was a long wait after that, and Mr. Li did not know the exact time that he would receive the package. Mr. Li communicated with Mingxuan Overseas Shopping's customer service many times, but they always took the Tianjin epidemic as an excuse and put it on hold again numerous times. There was no official explanation for this long wait. Mingxuan Overseas Shopping had not responded positively, and it also did not give a clear waiting time expectation.

**Case Discussion**

The first case mainly relates to online counterfeit sales and customer refund complaints. In this case, Tmall International, as the intermediary of both buyers and sellers, failed to timely deal with the relationship between customers and sellers on the B2C platform. This has resulted in the infringement of consumers' rights and interests and subsequently leads to customer dissatisfaction. The second case is mainly narrating about logistics and transportation services. In this case, the B2C platform of "Mingxuan Overseas Shopping" had problems such as inefficiency and unreasonable charges in its transportation services, thus leading to customer complaints. Although the two cases presented different problems, the common issue observed here is that the two B2C platforms did not attempt to fully understand the customers' perceived predicament when providing services to them. These business platform providers also did not appropriately deal with the

relationship between consumers and sellers on their respective platforms, and the level of service quality provided was unsatisfactory during the trading process, hence resulting in poor communication and blame-shifting between the parties involved.

Jiang et al (2020) mentioned that cross-border e-commerce platform functions; brands affect consumer perceived value, and consumer perceived value is positively correlated with consumer purchase intention. If consumers purchase fake and shoddy products, expose personal information or have payment security risks when shopping on import cross-border e-commerce platforms, the presence of risks will be perceived by consumers, and these perceived risks have negative impacts on consumers' purchase intention (Wang, 2021). As such, the importance of consumers' perceived value is essential in the process of any business practice. This is especially so when consumers perceive risks in their transactions that need to be resolved immediately. In the event of these complaints, each B2C platform of import cross-border e-commerce has to reflect, improve, and minimize user complaints in order to improve consumers' shopping experience on the said platform and enhance customer satisfaction.

## 5. Managerial Implications and Recommendations

Following the above case analyses, combined with the current development of international trade status and the prospects of cross-border e-commerce development, it is proposed to develop appropriate marketing strategies for B2C platforms of import cross-border e-commerce. The recommendations are as follows:

### Strengthen Platform Supervision

The selling of fake goods online has always been a significant issue that not only confuses consumers but is also considered as enabling consumers' level of perceived risk. Generally, all cross-border e-commerce B2C platforms could provide traffic entry only, but are unable to directly control the overseas production quality process of each commodity. Consequently, it is impossible to ensure that genuine products could be purchased through these platforms. In view of this, it is recommended that the B2C platforms of import cross-border e-commerce should strengthen the supervision of incoming merchants, formulate strict rules or regulations, establish precise entry thresholds, and supervise the whole process of selling goods by respective merchants in an attempt to ensure quality clearance and proper process of doing business.

### Create Platform Characteristics

With the creation of specific criteria for the platforms' services, consumers would have a distinct understanding of the import cross-border e-commerce platforms and be able to form guaranteed brand recognition as well as customer loyalty. For example, Tmall International may perhaps adopt the marketing strategy of global live streaming so that consumers would be able to have a more comprehensive and direct understanding of overseas commodities. Kaola Overseas Shopping, on the other hand, could establish professional purchasing teams to visit and evaluate the global distribution points of product origin for high-quality procurement. Consumers can then determine suitable platforms for shopping according to different platform services that are able to meet their respective personalized shopping needs.

### Refine Consumer Demand

Refining consumer needs can effectively improve consumers' purchase intention and purchasing efficiency. The current consumer groups of import cross-border e-commerce also include the younger population demographics, and they generally pay more attention to beauty, food, pets, and digital products amongst others. In addition, there are also rapid growths of the "she economy" market, and the "staying at home" consumers. All of these market demands are influencing many import cross-border e-commerce platforms to develop different marketing strategies for such diverse consumers. On this basis, combined with live streaming e-commerce, content e-commerce and other experiential marketing methods, it is thus imperative for platform providers to bridge the gaps between seller and buyers, thus subsequently improving potential consumers' purchase intention.

### Intensify Social Media Marketing

In the era of mobile social networking, network traffic has become a valuable asset for many business enterprises. There is a need to maximize cost benefits and optimize customers' shopping experiences, which,

are increasingly becoming the focus of import cross-border e-commerce B2C platforms. Besides traditional marketing communication approaches, these platforms should intensify the use of integrated marketing communication strategies such as social media marketing, viral marketing, experiential marketing and omnichannel marketing, so that consumers are able to select products accordingly and adopt various modes in the process of purchasing products, such as VR immersive shopping and social online shopping.

**Strengthen the Problem-Solving Ability of Platforms**

When faced with customer complaints and dissatisfaction, each B2C platform of import cross-border e-commerce should be able to strengthen its ability to solve problems and address customer needs in a timely manner. Attention should be focused more on the logistics efficiency of cross-border commodities, by actively building overseas warehouses, and improving the management system of cross-border logistics. In addition, with the introduction of laws and regulations on cross-border e-commerce, more explicit regulations on commodity safety, taxation, logistics, after-sales and other aspects are further required, which would enable various platforms to follow rules and continue to strengthen the protection of consumers' rights and interests.

## Conclusion

In essence, this article has adopted the case study approach to analyse the B2C platforms of import cross-border e-commerce. Although China's cross-border e-commerce industry has experienced rapid growth over recent years, it has now reached the adjustment period, in which some cross-border e-commerce sellers and various platforms are facing intense competitive pressures and business transformation. Nevertheless, Chinese domestic policies are still favourable for the cross-border e-commerce industry development, which will also bring about digital transformation to its international trade. All import cross-border e-commerce B2C platform providers should thus seize the growth opportunity in this sector by solving the current problems, considering consumer demand from the perspective of consumers, and improving consumers' shopping experience and purchase intention. Conversely, limitations are observed in this study. Although qualitative research via case study research method adopted is a typical representative case, it is still challenging for the researchers to form a substantiated conclusion because its extensibility is not robust enough, with limited scientific research support. It is thus recommended that future research be carried out via a quantitative research design with empirical analytical procedures to further investigate the consumers' perception towards China's cross-border e-commerce industry.

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# A Cointegration Study of Life Insurance Demand in Malaysia

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**Abstract:** The expansion of the insurance sector has a profound effect on a country's economy. Insurance companies experienced a slowdown in premiums during the COVID-19 pandemic, particularly in the life sector. Due to consumers' discretionary decision to spend less on life insurance policies, premium volumes decreased globally. One way to provide income protection for dependents or beneficiaries upon the death of an insured person, total permanent disability, or policy contract maturity is through life insurance. This study, therefore, this study considers recent events as it examines the factors that influence the demand for life insurance in Malaysia. The ordinary least square (OLS) method is employed using 34 years of data spanning from 1988 until 2021. The result of VECM showed that Income positively affects demand in the long run, while the other two variables, savings, and unemployment negatively affect demand in the long run. The empirical findings are expected to enrich the existing literature and to create awareness of the benefits that life insurance may offer in potential risks transferred to the insurer. Furthermore, the research findings could also help policymakers create preventative measures to protect life insurance companies from the consequences of diminished market confidence in the slowdown of the business cycle.

**Keywords**: *Demand, Life Insurance, Income, Savings, Unemployment, Long Run.*

## 1. Introduction and Background

The life insurance services sector has been aware of the various economic situations because history has demonstrated that the insurance industry grows in tandem with economic conditions. Life insurance is one of the approaches to give dependents or beneficiaries financial security if the insured person passes away, suffers a total and permanent disability, or when the contract for the policy matures. The development of the insurance industry has shown the rise of the industry has a profound effect on a country's economic progress. Insurance companies worldwide experienced a marked slowdown in premiums. Premium volumes in the life sector particularly recorded a declining trend following customers' decision in cutting back their discretionary expenditure on life insurance policies (OECD, 2022). According to BNM (2022), the Malaysian economy contracted the most by 4.5 percent in the third quarter of 2021 (2Q 2021: 15.9%, 1Q 2021: -0.5%) 2021. This happened as a result of the National Recovery Plan's rigorous containment efforts, which resulted in new demand and supply shocks (NRP).

With the Full Movement Control Order announced on the 28th of May 2021, these events pressured the economy and created a great degree of uncertainty in its economic recovery. This study employs an empirical quantitative framework with a 34-year data span between 1988 and 2021 to study the co-integration of life insurance demand in Malaysia. Life insurance-related data are gathered from reports by the Life Insurance Association of Malaysia (LIAM). Meanwhile, the macroeconomic variables' data are sourced from Bank Negara Malaysia (BNM), the Department of Statistics Malaysia (DOSM), the International Monetary Fund (IMF), and the World Bank. This study is expected to contribute to the existing literature by showing that household income has a positive relationship with the demand for life insurance in Malaysia while unemployment and savings showed a negative relationship with the life insurance demand. The results of this study should raise awareness of the advantages that life insurance may provide by partially shifting risk to the insurer. Therefore, it is hoped to persuade more people to acquire life insurance policies in an effort to raise their standard of living.

## 2. Literature Review

**Demand for life Insurance:** the economic considerations are the most significant of the many elements that have an impact on the demand for life insurance. Researchers have started looking into different facets of life insurance by using the numerous types of economic data and research techniques available because there are so many economic factors to consider. Life insurance serves as a risk transfer tool in addition to providing financial and social security to safeguard the surviving family members (Fadun 2013; Surminski 2013). Thus, life insurance is among the best tools for preventing financial hardship for one's family and loved ones in the case of the death or permanent disability of the breadwinner. The demand for life insurance is what matters, the majority of research projects are primarily focusing on the discovery of factors that affect the consumption of life insurance.

This is in line with a study undertaken by Mathew and Sivaraman (2017) that looked at the co-integration link between macroeconomic factors and the demand for life insurance in India. The development of the financial sector and the level of social security spending were added to the list of independent variables along with inflation, the real interest rate, and income. In the early 2000s, Beck and Webb (2002) discovered that most emerging nations have very low rates of life insurance usage. According to the World Bank (2019), premiums as a percentage of gross domestic product (GDP) in developed countries are recorded to be higher than in developing countries. Developed economies like Singapore (5.9%), Hong Kong (6.18%), and Japan (6.23%) have a higher level of premium expenditures as compared to developing countries like Malaysia, recording a meager 2.8% of GDP.

**Income:** Higher income may make things more affordable for an individual, which may ultimately result in a bigger demand for life insurance products (Browne and Kim, 1993; Hammond et al., 1967; Dash, 2018). By using a Tobit analysis, Shower and Shotick (1994) discovered that there is a positive correlation between income and the consumption of life insurance. The investigation revealed a significant positive association between income and life insurance premium spending. Similarly, Gandolfi and Miners (1996), and Razak et al. (2014), discovered that income is the primary determinant of life insurance demand. Emamgholipour et al. (2017) have recently highlighted how purchasing power affects the demand for life insurance.

**Savings:** Haeden and Lee (1974) and Beck and Webb (1976) have examined the connection between savings rates and the need for life insurance. They proposed that life insurance would appear more alluring to potential savers if the effective return within a policy compared favorably with the return of alternative savings tools. The substitute for competing life insurance policies is savings instruments. If savings and life insurance products were sold, the need for life insurance might rise (Sen, 2008). There has previously been research on how savings affect the demand for life insurance (Headen and Lee, 1974; Chang, 1995; Beck and Webb, 2002; Sen and Madheswaran, 2007; Sen, 2008; Ibiwoye et al., 2010). The literature demonstrates that the savings rate has an adverse effect on the demand for life insurance (Beck and Webb, 2002. Consumers prefer to consider other savings options when an insurance policy's effective return is less than savings.

**Unemployment:** According to Bhatia and Jain (2018), the insurance business is expanding due to a variety of factors. Their study, which was based on data from India, revealed that the growth in demand for life insurance is negatively correlated to variables: unemployment and inflation. A negative relationship was also found in several other studies (Sliwinski, et al., 2013; Liebenberg, et al., 2012). Similarly, a study on demand insurance employing data from 1983 to 1989 by Liebenberg, et al. (2012) has confirmed these findings. A study on demand insurance employing data from 1983 to 1989 by Liebenberg, et al. (2012) has confirmed these findings. Additionally, this study discovered that households frequently cancel their whole life insurance policies as a result of job loss or other major life events like a spouse's death, divorce, or retirement.

## 3. Research Methodology

This study used a statistical model using Vector Error Correction Model (VECM) to estimate to capture the relationship between multiple quantities that change over time. Based on previous studies (Najla et al., 2020; Alzyadat et al., 2020), an econometric model will estimate the macroeconomic factors influencing the demand

for life insurance. To estimate and analyzed the relationship between macroeconomic variables (Income, savings, and unemployment) on demand for life Insurance in Malaysia during the period of 1987 - 2021 based on annual data series. By using the Maximum Likelihood Procedure, a co-integration test is performed to determine the nature of the equilibrium relationship between variables over the long term. Johansen and Juselius (1990). The Johansen test is used in this study because there are more than two variables because multiple joint integrations may occur. The unit root needs to be tested in time series data before performing the Johansen test.

## 4. Results

**Table 1: Phillip-Perron Test (Stationary test)**

| Variable | Level | | | 1st difference | | |
|---|---|---|---|---|---|---|
| | None | Intercept | Trend and Intercept | None | Intercept | Trend and Intercept |
| Demand | 3.869891 | -24.39306* | -3.772881 | -2.302240* | -3.607249* | -9.871399* |
| Income | 5.739508 | -0.376222 | -2.823802 | -4.735320* | -6.984790* | -6.809720* |
| Savings | -1.294845 | 0.431595 | -2.2149614 | -4.361627* | -4.878415* | -4.991505* |
| Unemployment | -1.097015 | -4.015845 | -0.3629488 | -4.85337* | -4.772296* | -7.089390* |

(*p<0.05; **p<0.001)

**Phillip-Perron Test:** After performing the stationary test, the result in Table 1 shows all the series are integrated of order I (1), which is stationary after the first difference. The null hypothesis was rejected by the presence of the unit root of the first difference of time series at a significant level of 5%. The series are drifting apart or trending.

**Table 2: Co-Integration Test**

| Hypothesized No of CE(s) | | | Critical Value at 5% | |
|---|---|---|---|---|
| | Trace | Max-Eigen | Trace | Max-Eigen |
| r =0 | 54.56186* | 23.71254 | 47.85613 | 27.58434 |
| r ≤ 1 | 30.84932* | 15.95271 | 29.79707 | 21.13162 |
| r ≤ 2 | 14.89662 | 10.22498 | 15.49471 | 14.26460 |
| r ≤ 3 | 4.671632* | 4.671632* | 3.841466 | 3.841466 |

(*p<0.05; **p<0.001)

**Co-Integration Test:** Optimum lag time is necessary for the model since the Johansen co-integration test determines the number of integral vectors which is very sensitive to the lag length time. The result of the Joint Integration Test is based on the Trace and Maximum Eigenvalue. Therefore, there are three (3) long-run co-integration relationships at 5% significant levels. Thus, the time series variables in this model are considered integrated. This indicates that over time, the variables stay quite close to one another. This signifies the existence of a long-run equilibrium relationship between the variables during the period of study.

**Vector Error Correction Model (VECM)**: The existence of the long-run relationship between variables indicates that if there is a co-integration relation between two variables, there is unidirectional causality Granger at least (Granger, 1988). If the model contains a co-integration relationship among variables the next to proceed to VECM, where the existence of a long-run relationship can be verified through the significance and sign of error correction term (Rosilawati et al., 2007). Therefore, a long-run relationship can be verified through the significance and sign of error correlation term (Rosilawati et al., 2007).

**Long Run Equation:** Demand t-1 =13.22734 + 0.378008 Income t-1 – 01.806856 Savings t-2 – 5.012047 Unemployment t-3

(0.63280) (0.79168) (0.94358)
[0.59736] [-2.28232] [-5.31174]

The result of VECM showed that income positively affects demand in the long run while the other two variables; savings and unemployment negatively affect demand in the long run.

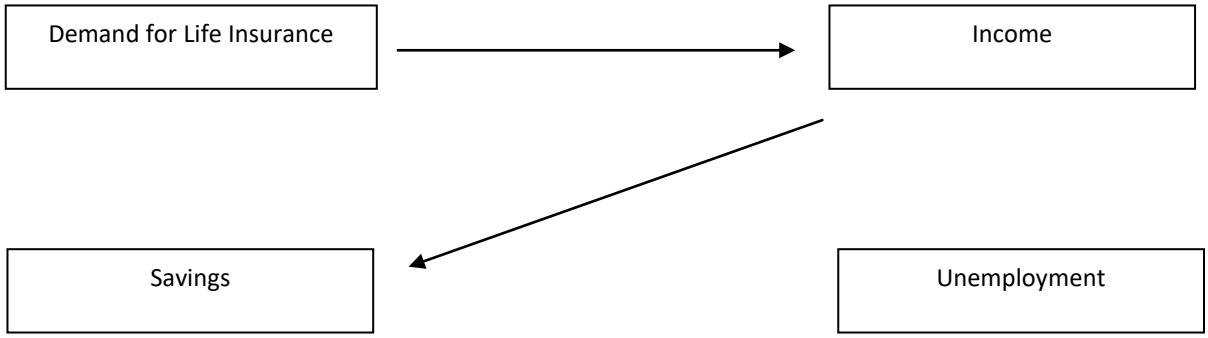
**Table 3: Granger Causality Test to the Variables**

| Null Hypothesis: | Observation | F-Statistic | Probability |
|---|---|---|---|
| Income does not Granger Cause Demand | 33 | 0.04064 | 0.8416 |
| Demand does not Granger Cause Income | | 4.17389 | 0.0499 |
| Savings does not Granger Cause Demand | 33 | 0.32657 | 0.5719 |
| Demand does not Granger Cause Savings | | 2.79157 | 0.1052 |
| Unemployment does not Granger Cause Demand | 33 | 0.37147 | 0.5468 |
| Demand does not Granger Cause Unemployment | | 1.32625 | 0.2586 |
| Savings does not Granger Cause Income | 33 | 4.00010 | 0.0546 |
| Income does not Granger Cause Savings | | 4.30269 | 0.0467 |
| Unemployment does not Granger Cause Income | 33 | 0.15156 | 0.6998 |
| Income does not Granger Cause Unemployment | | 2.06696 | 0.1609 |
| Unemployment does not Granger Cause Savings | 33 | 0.02155 | 0.8843 |
| Savings do not Granger Cause Unemployment | | 0.91403 | 0.3467 |

(*p<0.05; **p<0.001)

**The Causal Channels:** Figure 1 shows the results of the unidirectional causality relationship between demand for insurance, income, and savings. The Granger Causality test does not indicate causality relationships between savings, unemployment, and demand for life insurance.

**Figure 1: The Causal Channels of VECM Granger Causality Approach**




**Discussion**

In the long run, there is a positive correlation between the demand for life insurance and income, as determined by GDP per capita. This has shown an advantageous connection that explains how rising individual income encourages savings that result in life insurance subscriptions. Meanwhile, savings and unemployment, on the other hand, are proven to have adverse connections over time. The amount that a person contributes to a life insurance policy depends on their savings and their income. When an insurance policy has a lower effective rate of return, customers usually choose savings as a replacement. In lieu of unemployment, households frequently cancel their entire life insurance plans. The results imply that income has a significant impact on the cointegration of the demand for life insurance.

**Implications and Recommendations:** Various macroeconomic variables such as income, savings, and unemployment, have a significant impact on the power of demand for life insurance policies in Malaysia. Due to the size of the Malaysian population and the vast number of uninsured or underinsured Malaysians, the insurance sector is thought to have a very substantial potential to market life insurance products. Malaysian insurance businesses, particularly those that specialize in life insurance, need to be more creative in creating new products. They should place more emphasis on items that highlight the saving component of their life insurance policies rather than emphasizing on life protection aspect. This is supported by the research's findings indicating that the most significant factors influencing Malaysian individuals' desire for insurance are their income and savings.

## 5. Conclusion

The results of this study show that the demand for life insurance and income as the independent variable in the long run, as measured by GDP per capita has a positive relationship. It demonstrates a beneficial link that explains how increased individual income stimulates savings that lead to life insurance subscriptions. On the other hand, savings and unemployment are found to display a negative relationship in the long run. Savings influence an individual's income to determine the subscriptions to a life insurance policy. In the event that an insurance policy offers a lower effective rate of return, consumers frequently opt for savings as a substitute. In relation to unemployment, households tend to cancel their whole life insurance policies as a result of job loss. In conclusion, the findings suggest that income has a strong influence on the cointegration of the demand for life insurance.

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# What have we Learned from Firm Efficiency Research for the Past 35 Years? A Bibliometric Analysis

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**Abstract:** The increasing publication and citation performances of Firm Efficiency research for the past 35 years have attracted scholars to further embark on this area. Hence, the main objective of this study is to explore what scholars have learned from Firm Efficiency research over the past 35 years. This study uses bibliometric analysis to analyze top productive countries, top 10 journals, top 10 prominent authors, top 20 cited articles, and emerging themes. Selected findings indicated that the United States, China and Taiwan are the top three most productive countries in Firm Efficiency research. In addition, five emerging themes were highlighted in Firm Efficiency research for the past 35 years. The five themes were: 1) Stochastic Frontier Analysis in measuring firm productivity and size, 2) Bootstrapping DEA and SFA in measuring firm efficiency, 3) Corporate Governance and Technical Efficiency, 4) DEA as benchmarking in Firm Efficiency, and 5) Capital Structure and Ownership Structure. This study provides three contributions – 1) encourage scholars to observe the trends in publication and citation performances. 2) Allow scholars and authors to collaborate with an expert in Firm Efficiency research in the future, and 3) inspire the authors to look at the potential research gap and future directions in Firm Efficiency research.

**Keywords**: *Firm Efficiency, Data Envelopment Analysis, Bibliometrics, Network Analysis, Research Trend*

## 1. Introduction and Background

Edgeworth (1881) introduced the formulation of efficiency concepts applicable to all companies. It was continued by Pareto (1927), which Shephard (1953) documented in the book. There are numerous definitions of efficiency notions among academics. In economics, efficiency is the utilization of existing resources in a manner consistent with the company's goals while also taking into account the relevance of those resources to the company's customers (Peterson et al., 2003). The concept of efficiency as a broad performance measure for all types of organizations was originally established in the early writings of Edgeworth (1881) and Pareto (1927), and its practical application was documented in Shephard's book (1953). In economics, efficiency is defined as the highest potential ratio between the output and input of the product development process. It demonstrates the ideal allocation of available resources that would permit realizing the maximum potential (Cvilikas & Jurkonyte-Dumbliauskiene, 2016). Both efficiency and effectiveness are used to describe the performance of an entity. Still, according to Jaouadi & Zorgui (2014), efficiency summarizes the concept of producing in the best way, which means that efficiency is centered on using minimum inputs to produce the best output or the optimized use of resources to generate the best products at the lowest costs.

In management, efficiency is the study of the optimal utilization of an organization's internal elements. On the other hand, the effectiveness idea summarizes the yield of elements and the achievement of a goal without considering the optimal use of methods and resources. On the other hand, Lopez (2005) states that efficiency contributes to the success of implemented macroeconomic policies, which generate sustainable development, economic growth, and social welfare. McKinley & Banaian (2005) state the same thing, defining efficiency as the minimization of costs and maximization of profits. Efficiency is a term commonly used to measure the outcome of outputs from selected inputs. The use of inputs is expected to produce maximum outputs or at least optimize certain inputs (Aigner & Chu, 1968). Firms commonly use this measurement in managing their operating activities to ensure they can reduce the risk and expenses involved. Firms seek to improve their operations, value the shareholders, and be competitive in the market (Jones & Ville, 1996). Whose can compete in the market and sustain long-term with strong management internal and external sources will be the winner in the particular industry.

Hence, the firm must sustain and continuously demonstrate good performance and comprehend environmental changes (Epstein & Roy, 2001). Specifically, environmental change could be the main focus of scholars and practitioners in determining the efficiency or the concept of performance. In this regard, studies on a firm's efficiency performance are continuously emerging, followed by the current economic and environmental atmosphere. The firm efficiency research is broad in context because Firm Efficiency can fall into finance and other non-finance-related areas. There were several bibliometric analyses on efficiencies, such as Innovation Efficiency (Zeng et al., 2021) and Islamic Banking Efficiency (Ikra et al., 2021). However, Firms' Efficiency in Finance is still less attentive, and hence the authors fulfill the opportunity to conduct the bibliometric analysis on Firm Efficiency. The increasing trend in Firm Efficiency research puts light on the development of the literature with the following research questions:
RQ 1 – What are the publication and citation performances concerning Firm Efficiency research?
RQ 2 – What are the top productive countries affiliated with Firm Efficiency research?
RQ 3 – Which top 10 journals are the most influential with high citation impact in Firm Efficiency research?
RQ 4 – Who are the top 10 prominent authors in Firm Efficiency research?
RQ 5 – What are the top 20 cited articles on Firm Efficiency research?
RQ 6 – What are the emerging themes in Firm Efficiency research?

The presented findings in the later section will provide three contributions. First, the presented findings will encourage scholars to observe the trends in publication and citation performances. Second, it will allow scholars and authors to collaborate with an expert in Firm Efficiency research in the future. Third, the emerging themes will inspire the authors to look at the potential research gap and future directions in Firm Efficiency research. The paper is structured as follows. The second section explains the bibliometric steps and analysis used to run bibliometric results. Then, the third section presents and explains the descriptive findings of firm efficiency research. The fourth section discussed the emerging themes in Firm Efficiency research. Next, the fifth section provides the direction for future scholars to embark on Firm Efficiency research. The sixth and final sections are concluding remarks.

## 2. Method

The bibliometric analysis has been increasingly significant in recent years because it allows for obtaining extensive information regarding a subject or topic (Van Eck & Waltman, 2010). This helpful method was brought to people's attention claimed by Garfield (1955), who stated that it accumulates various mathematical tools and statistical techniques to examine and scan publications, such as articles, various books, book chapters, and so on. Garfield is credited with being the first person to bring this method to scholars' attention. It is the process in which statistical tools are utilized to describe a topic subject to a specific investigation, bringing attention to trends within the field (Bouyssou & Marchant, 2011). In contrast to the traditional framework method, this approach is fresh and cutting-edge. As a result, the bibliometric analysis makes it possible for scholars and readers to learn about previous tendencies in the subject area, shed light on recent developments in the subject area, and provide some room for suggesting and providing future research direction (Durieux & Gevenois, 2010).

**Choosing the Database:** The first phase that has to be done to get started with the bibliometric analysis is to search for databases that will help achieve the desired objective of the study. Consequently, the data sources must be credible and relevant to conduct the analysis and make appropriate decisions (Rueda et al., 2007). The databases maintained by ISI, Google Scholar, WoS, and Scopus are trusted resources that are also kept current. The study was carried out using the Scopus database, one of the most well-known databases in the world that researchers refer to.

**Scope of Search:** Only research on Firm Efficiency in finance related will be considered within the scope of this bibliometric analysis. Therefore, only studies focusing on Firm Efficiency received the authors' attention. Studies that addressed other than finance-related Firm Efficiency were not taken into consideration. Hence, the authors intend to include Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA) as supporting the scope of the study. There are some justifications for including DEA and SFA in the search string. Generally, both terms need to be included because the Firm Efficiency terms itself not only in Finance but also in other fields. DEA and SFA approaches are non-parametric techniques commonly used to measure efficiency. It was developed by Charnes et al. (1978), whereby this approach uses multiple inputs and outputs

of the Decision-Making Units (DMUs) to measure the efficiency frontiers. Then, both methods will generate a score between zero (0) to show the inefficiency level and one (1), which indicates the full efficiency level or optimum level. This non-parametric technique is widely employed as it is a relatively simple fractional programming formulation consisting of inputs, outputs and DMUs. In addition, this method can work with a small sample and assorted size of firms and does not involve any assumption on the inefficiency distribution. Several studies suggested that both do not require a preconceived structure or specific functional form to be imposed on the data in identifying and determining the efficient frontier, error and inefficiency structure of the DMUs as suggested by Bauer et al. (1998), Evanoff & Israilevich (1991), and Grifell-Tatje & Lovell (1997). Hence, both should be included in the scope of research.

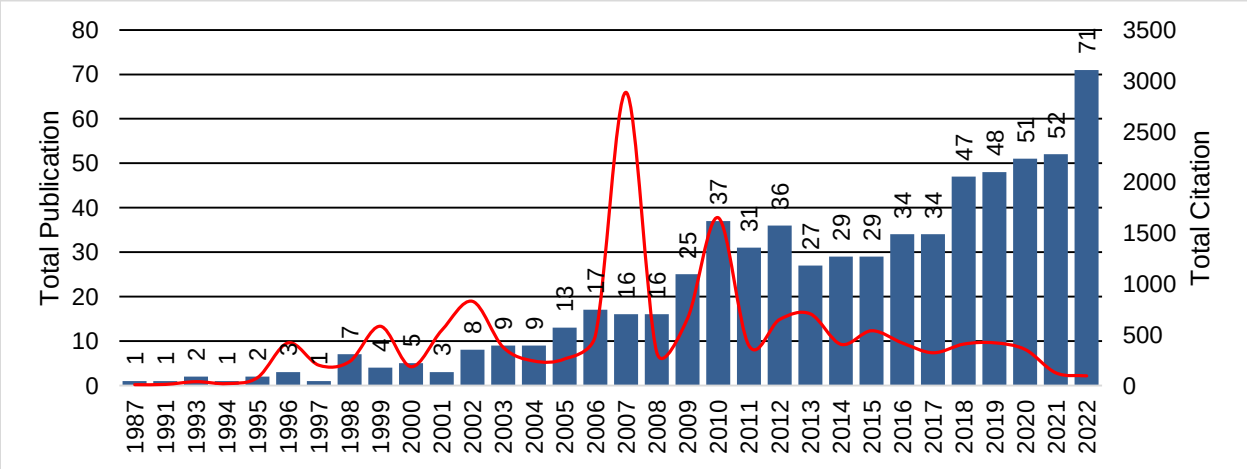
**Search Criteria:** The authors used two groups of keywords. The first group is on Firm Efficiency, while the second group is on the supporting scope. By using six different permutations in the first keyword group and six different permutations in the second keyword group, papers pertaining exclusively to finance-related Firm Efficiency were located using a search for documents in the Scopus database. Hence, the search string in the Scopus database in this study is ((TITLE-ABS-KEY ("firm* efficien*" OR "compan* effien*" OR "firm* performance*" OR "compan* performance*" OR "firm* productivity" OR "compan* productivity") AND TITLE-ABS-KEY ("data envelopment analysis" OR "DEA" OR "DEA model" OR "stochastic frontier analys*s" OR "SFA" OR "stochastic" ))). Upon entering this search string, the system showed 677 documents related to finance-related Firm Efficiency. Following this phase, the authors only eliminate eight documents in the 2023 record since 2023 is still ongoing and concurrent. Hence, the final count was 669.

**Measurement/Analysis:** VosViewer and Excel were utilized in this study to perform bibliometric analysis. Authors used Excel to analyze the metadata and present the publication and citation performances, productive countries with affiliations, top 10 most productive and impactful journals, top 10 prominent authors and top 20 cited articles. On the other hand, VosViewer was utilized to analyze network and cluster analysis by depicting the geographical network using authors' keyword occurrences (Van Eck & Waltman, 2010).

## 3. Results

**Publication and Citation Performances:** Figure 7 shows the publication and citation performances of Firm Efficiency research for the past 35 years. Since 1987, the publication has shown a growing trend, and 2005 is a breakthrough year, publishing more than 10 articles. In addition, the Year 2010 shows another breakthrough by publishing more than 30 documents. Hence it shows that since 2010, Firm Efficiency research has been a hot topic to debate. In terms of citation performance, it shows an average fluctuation only. However, the documents published in 2007 received the most citation compared to the other years. The trend presented indicated that Firm Efficiency is still a developing concept because of a sudden increase in the literature.

**Figure 7: Publication and Citation on Firm Efficiency Research in Scopus from 1987 to 2022**



**Top Productive Countries affiliated with Firm Efficiency Research:** The heat map in

Figure **8** shows that the knowledge generated in the Firm Efficiency study is dominated by the United States (137), China (72), Taiwan (64), Spain (51), United Kingdom (47), Malaysia (43), Italy (35), Iran (32), Vietnam (26), India (24), and South Korea (24) in terms of the number of articles produced. Based on the heat map, Asia dominated this research by producing 40.73% of 669 documents, followed by Europe (33.94%), North America (16.92%), Oceania (3.23%), Africa (2.80%), and South America (2.37%). Hence, it shows that the Firm Efficiency research was less attentive in Oceania, Africa and South America.

**Analysis of the Top 10 Most Influential Journals with High Citation Impact:** One of the objectives was to identify the top 10 most influential journals with high citation impact. The top 10 journals produced a total of 94 documents, which is equivalent to 14.05% of the metadata. **Error! Reference source not found.** shows that the European Journal of Operation Research produces the highest number of documents by 14. The Journal of Productivity Analysis then follows them with 10 documents. Applied Economics and the International Journal of Production Economics shared the same spot by producing 10 documents each. On the other hand, in terms of citation impact, the European Journal of Operation Research received the highest citation, 851. Journal of Productivity Analysis then followed them by 534 and Applied Economics by 260. Another interesting point to highlight is that, even though Benchmarking was at eight due to producing eight articles, they were considered good. It is because they were second in citation per paper by 49.20. It means the article receives an average of 49.20 for one paper published in Benchmarking. In conclusion, the European Journal of Operation Research is the most productive because the journal was the highest of all three criteria – number of documents, citation impact, and citation per paper.

**Figure 8: Global Distribution in Firm Efficiency Research Publication, Scopus Database**

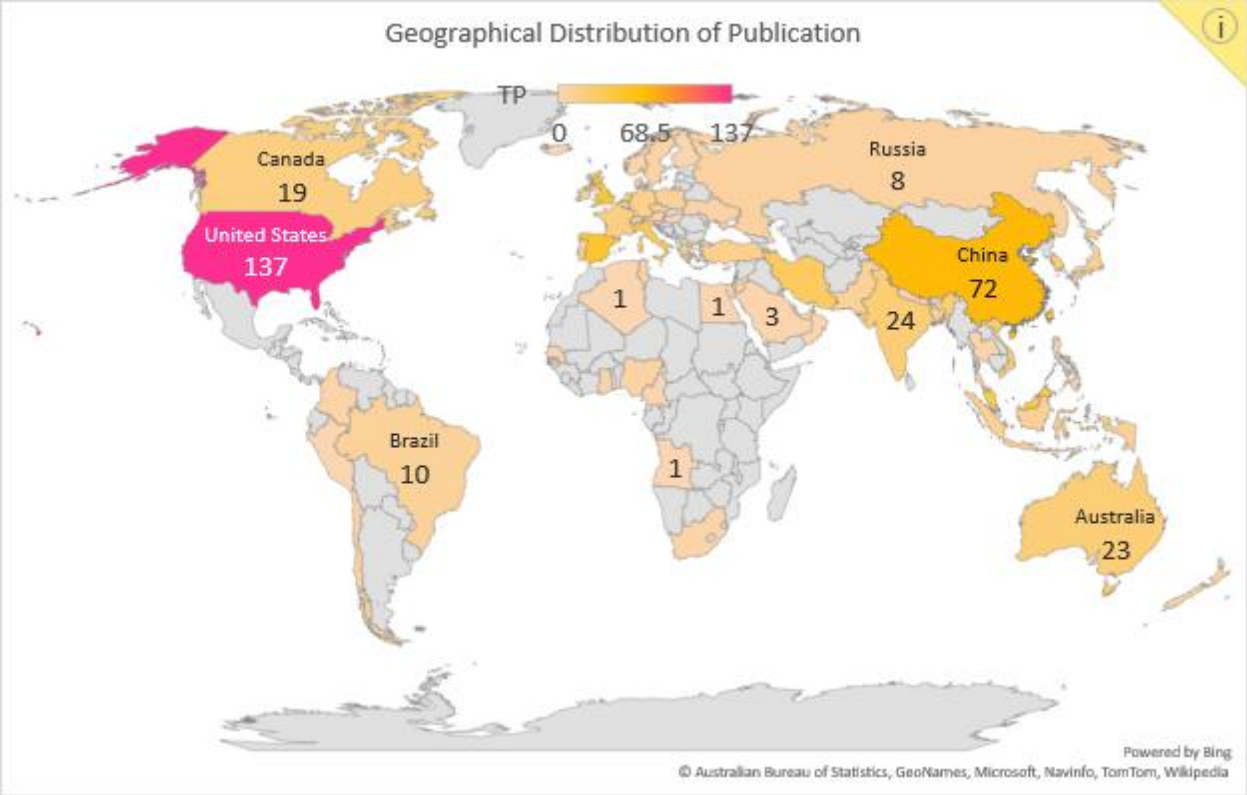


**Table 1: Top 10 Journals Publishing Firm Efficiency Research Ranked by Scopus**

| Ranking | Journal Name | Total no of documents | Citation Impact | C/P |
|---|---|---|---|---|
| 1 | European Journal of Operational Research | 14 | 851 | 60.79 |
| 2 | Journal of Productivity Analysis | 13 | 534 | 41.08 |
| 3 | Applied Economics | 10 | 260 | 26.00 |
| 4 | International Journal of Production Economics | 10 | 200 | 22.22 |
| 5 | Sustainability Switzerland | 9 | 29 | 4.14 |
| 6 | Annals of Operations Research | 8 | 51 | 6.38 |
| 7 | Benchmarking | 8 | 246 | 49.20 |
| 8 | Journal of The Operational Research Society | 8 | 142 | 17.75 |
| 9 | Applied Economics Letters | 7 | 56 | 9.33 |
| 10 | Journal of Cleaner Production | 7 | 147 | 21.00 |

**Top 10 Prominent Authors in Firm Efficiency Research:** Error! Reference source not found. shows the top 10 prominent authors in Firm Efficiency research ranked by Scopus. The table shows Lu is the most prominent, with the highest number of cited publications, 13, followed by Wang (7) and Kweh (6). However, in terms of individual performances in their research career, Lu still has the most citations in Scopus, with 263, followed by Wang (235) and Maziotis and Molinos-Senante (144). One of the interesting points to highlight is, Maziotis and Molinos-Senante shared the same number of cited publications (4), Scopus citations (144) and citations per cited paper (36.00). It is because, in this Firm Efficiency research, both were co-authors and worked together in publishing documents related to this research, even though they have different nationalities. Hence, it shows that even collaborating, authors can still become prominent in their respective research.

**Table 2: Top 10 Prominent Authors on Firm Efficiency Research Ranked by Scopus**

| Ranking | Name of prominent authors | Authors' affiliated country | Numbers of Cited Publications | Scopus Citations | C/CP |
|---|---|---|---|---|---|
| 1 | Lu, W.M. | Taiwan | 13 | 263 | 20.23 |
| 2 | Wang, W.K. | Taiwan | 7 | 235 | 33.57 |
| 3 | Kweh, Q.L. | UAE | 6 | 53 | 8.83 |
| 4 | Amirteimoori, A. | Iran | 4 | 84 | 21.00 |
| 5 | Kamarudin, F. | Malaysia | 5 | 15 | 3.00 |
| 6 | Ting, I.W.K. | Malaysia | 5 | 30 | 6.00 |
| 7 | Kapelko, M. | Poland | 6 | 51 | 8.50 |
| 8 | Maziotis, A. | Chile | 4 | 144 | 36.00 |
| 9 | Molinos-Senante, M. | Spain | 4 | 144 | 36.00 |
| 10 | Tan, K.M. | China | 5 | 15 | 3.00 |

**Top 20 Cited Articles:** Error! Reference source not found. displays the top 20 cited articles about Firm Efficiency. Based on the table, Simar & Wilson (2007) received the highest number of citations by 2027, titled "Estimation and inference in two-stage, semi-parametric models of production processes". The second most cited article belongs to Dutta et al. (1999), with 482 total citations, with the title "Success in high-technology markets: Is marketing capability critical?". Finally, the third most cited article belongs to Tyteca (1996) with 408 citations, with the title "On the measurement of the environmental performance of firms - A literature review and a productive efficiency perspective". In terms of citations per year, Simar & Wilson (2007) still lead the line by 126.69 average citations per year. However, Margaritis & Psillaki (2010), with the title "Capital structure, equity ownership and firm performance", receives the second most citations per year by 25.77. Then followed by Cruz-Cázares et al. (2013) with the title "You can't manage right what you can't measure well: Technological innovation efficiency" by receiving the third most citations per year by 20.8.

**Table 3: Top 20 Cited Articles on Firm Efficiency**

| No. | Author(s) | Title | TC | C/Y |
|---|---|---|---|---|
| 1 | Simar & Wilson (2007) | Estimation and inference in two-stage, semi-parametric models of production processes | 2027 | 126.69 |
| 2 | Dutta et al. (1999) | Success in high-technology markets: Is marketing capability critical? | 482 | 20.08 |
| 3 | Tyteca (1996) | On the measurement of the environmental performance of firms - A literature review and a productive efficiency perspective | 408 | 15.11 |
| 4 | Delgado et al. (2002) | Firm productivity and export markets: A non-parametric approach | 361 | 17.19 |
| 5 | Margaritis & Psillaki (2010) | Capital structure, equity ownership and firm performance | 335 | 25.77 |
| 6 | Sarkis & Cordeiro (2001) | An empirical evaluation of environmental efficiencies and firm performance: Pollution prevention versus end-of-pipe practice | 253 | 11.5 |
| 7 | Kao & Hwang (2010) | Efficiency measurement for network systems: IT impact on firm performance | 236 | 18.15 |
| 8 | Wu (2009) | Supplier selection: A hybrid model using DEA, decision tree and neural network | 212 | 15.14 |
| 9 | Narasimhan et al. (2001) | Supplier Evaluation and Rationalization via Data Envelopment Analysis: An Empirical Examination | 210 | 9.55 |
| 10 | Cruz-Cázares et al. (2013) | You can't manage right what you can't measure well: Technological innovation efficiency | 208 | 20.8 |
| 11 | Wang et al. (1997) | Use of Data Envelopment Analysis in assessing Information Technology impact on firm performance | 199 | 7.65 |
| 12 | Castellani (2002) | Export Behavior and productivity growth: Evidence from Italian manufacturing firms | 167 | 7.95 |
| 13 | Ding et al. (2007) | On the integration of production and financial hedging decisions in global markets | 163 | 10.19 |
| 14 | Krasnikov et al. (2009) | The impact of customer relationship management implementation on cost and profit efficiencies: evidence from the US commercial banking industry | 150 | 10.71 |
| 15 | Margaritis & Psillaki (2007) | Capital structure and firm efficiency | 121 | 7.56 |
| 16 | Durand & Vargas (2003) | Ownership, organization, and private firms' efficient use of resources | 120 | 6 |
| 17 | Chen et al. (2015) | Production frontier methodologies and Efficiency as a performance measure in strategic management research | 119 | 14.88 |
| 18 | Psillaki et al. (2010) | Evaluation of credit risk based on firm performance | 116 | 8.92 |
| 19 | Grewal & Slotegraaf (2007) | Embeddedness of organizational capabilities | 113 | 7.06 |
| 20 | Zelenyuk & Zheka (2006) | Corporate Governance and Firm's Efficiency: The Case of a transitional country, Ukraine | 105 | 6.18 |

**4. Emerging Themes in Firm Efficiency Research:** For the past 35 years, Firm Efficiency research has delivered five themes.

**Theme #1 - The applications of Stochastic Frontier Analysis in measuring firm productivity and firm size:** The findings from the customers' age groups concur with H1 (the different customer age groups experience mobile network operators differently) and are compatible with the study conducted. Respondents aged between 19 and 30 constituted the higher number of customers that experienced network operators differently. About 51.8% experienced the operators similarly.

**Managerial Implications and Recommendations:** The first theme discussed in Firm Efficiency research is the application of Stochastic Frontier Analysis in measuring firm productivity and size. It is clustered by red color as per

Figure 9. The theme was developed based on the combination of keywords of stochastic frontier analysis, firm productivity, and firm size. This cluster was associated with 37 cited documents and received total citations of 690. The most cited article is Krasnikov et al. (2009) 's "The Impact of customer relationship management implementation on cost and profit efficiencies: evidence from the U.S. commercial banking industry", with 150 total citations. In-depth, this cluster discusses the performance comparison between small and large-size SMEs using SFA. In addition, this cluster also discussed in-depth productivity comparisons between different industries using SFA (Chen et al., 2011; Kumbhakar et al., 2012). Furthermore, corporate social responsibility and firm performance have also been discussed in this cluster (Al-Shammari et al., 2022). Finally, this cluster also emphasized innovation mediating firm efficiency (Yoo et al., 2022). Hence, it concludes that SFA is one of the well-known tools for measuring Firm Efficiency.

**Theme #2 - Bootstrapping DEA and SFA in Measuring Firm Efficiency:** The second theme concerning firm efficiency is bootstrapping DEA and SFA as emerging tools in measuring firm efficiency. This cluster represents green color as per Figure 3, combining bootstrap, productivity and performances. 19 cited articles fall into this theme and receive 2488 citations. The most cited article in this cluster belongs to Simar & Wilson (2007) 's "Estimation and inference in two-stage, semi-parametric models of production processes". This cluster discussed using Bootstrap for technological innovation efficiency (Cruz-Cázares et al., 2013), sensitivity analysis of efficiency and productivity (Tortosa-Ausina et al., 2008) and bootstrap procedure (Valiyattoor & Bhandari, 2020). Hence, it concludes that bootstrap DEA and SFA are the advanced methods in measuring firm efficiency compared to the traditional ones.

**Theme #3 – Corporate Governance and Technical Efficiency:** The third theme focuses on Corporate Governance and Technical Efficiency, which represents in blue in

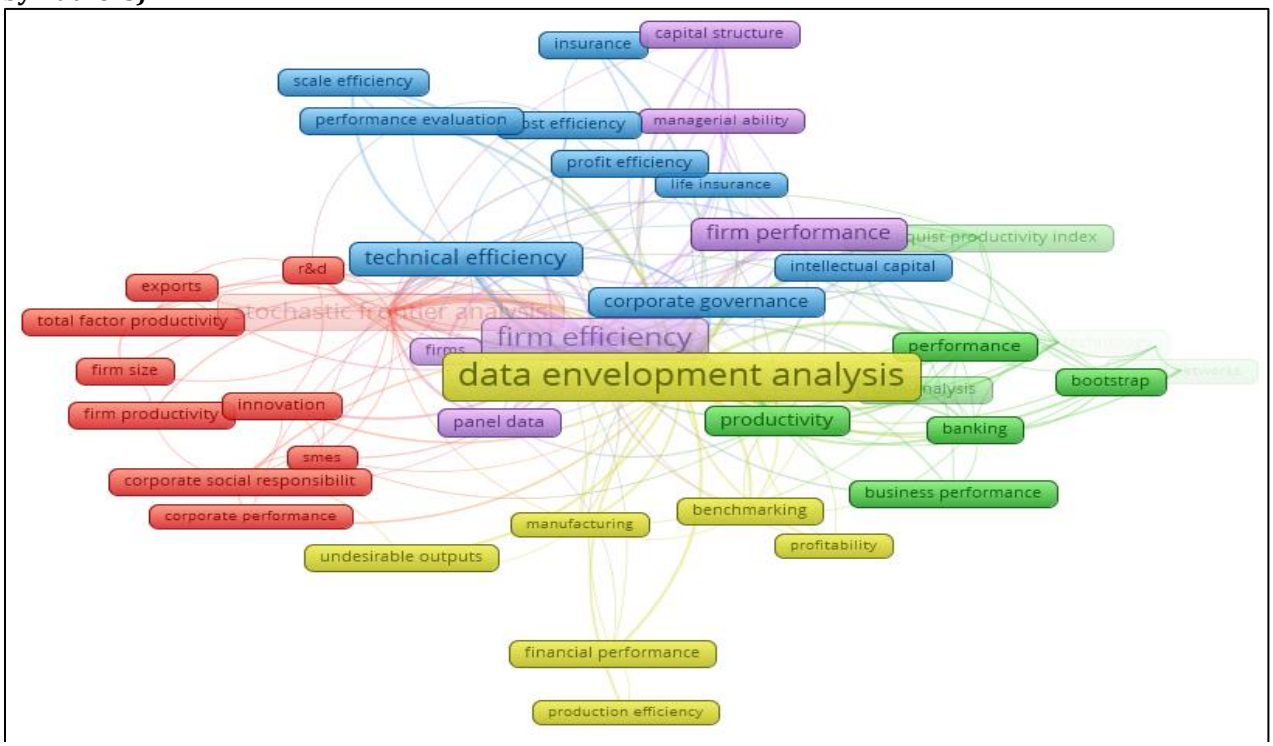
*Figure* 9. Based on VosViewer network analysis, 22 documents are associated with corporate governance, while 59 documents are associated with technical efficiency. Hence, this cluster receives a total citation of 1228. The most cited article is Zelenyuk & Zheka (2006), "Corporate Governance and Firm's Efficiency: The case of a transitional country, Ukraine", with 105 citations. Other notable articles discussing the relationship between corporate governance, technical efficiency, and firm efficiency are Lu et al. (2012), which emphasizes the airline industry and Sueyoshi et al. (2010) on manufacturing. Other than corporate governance and technical efficiency, this cluster also discussed cost efficiency (Ansah-Adu et al., 2011; Tagashira & Minami, 2019), profit efficiency (Akhigbe et al., 2017; Hardwick et al., 2011), and scale efficiency (Jiang et al., 2019). Hence, it concludes that corporate governance is one of the drivers influencing firm efficiency, while technical efficiency is a measurement in evaluating firm efficiency.

**Theme #4 – DEA as Benchmarking in Firm Efficiency:** The fourth theme is Data Envelopment Analysis, which is used as a benchmark in measuring Firm Efficiency. This cluster represents yellow color as per

*Figure* 9. DEA represented the largest link strength in this cluster with 278 articles and received 4712 citations. The most cited article in this cluster is Tyteca (1996) 's "On the measurement of the environmental performance of firms - A literature review and a productive efficiency perspective", with 408 citations. Some in-depth discussions on DEA were highlighted in Firm Efficiency research, such as DEA evaluation and rationalization (Narasimhan et al., 2001), Bilevel DEA programming (Wu, 2010), and route-based DEA analysis (Chiou et al., 2012). Apart from DEA, this cluster has also discussed other keywords, such as performance measurement (Ho, 2007) and undesirable outputs (Wu et al., 2015). Hence, it concludes that DEA is a main benchmarking tool for analyzing Firm Efficiency.

**Theme #5 – Capital Structure and Ownership Structure:** The fifth and final theme discussed Firm Efficiency's capital and ownership structure. This cluster represents the purple color in *Figure* 9. The capital structure has 11 documents, while the ownership structure has 16 documents in this cluster. This cluster receives total citations of 787 citations. The most cited article in this cluster belongs to Margaritis & Psillaki (2010) 's "Capital Structure, equity ownership and firm performance". This cluster notably discussed capital structure in different areas, such as the airline industry (Capobianco & Fernandes, 2004) and the banking industry (Yeh, 2011). In addition, ownership structures are discussed in depth in different countries such as Israel (Lauterbach & Vaninsky, 1999), India (Wanke et al., 2022) and China (Su & He, 2012). Hence, it concludes that capital structure and ownership structure are the indicators for measuring Firm Efficiency.

**Figure 9: Keyword Network Analysis on Emerging Research Trends on Firm Efficiency (Visualization by Authors)**

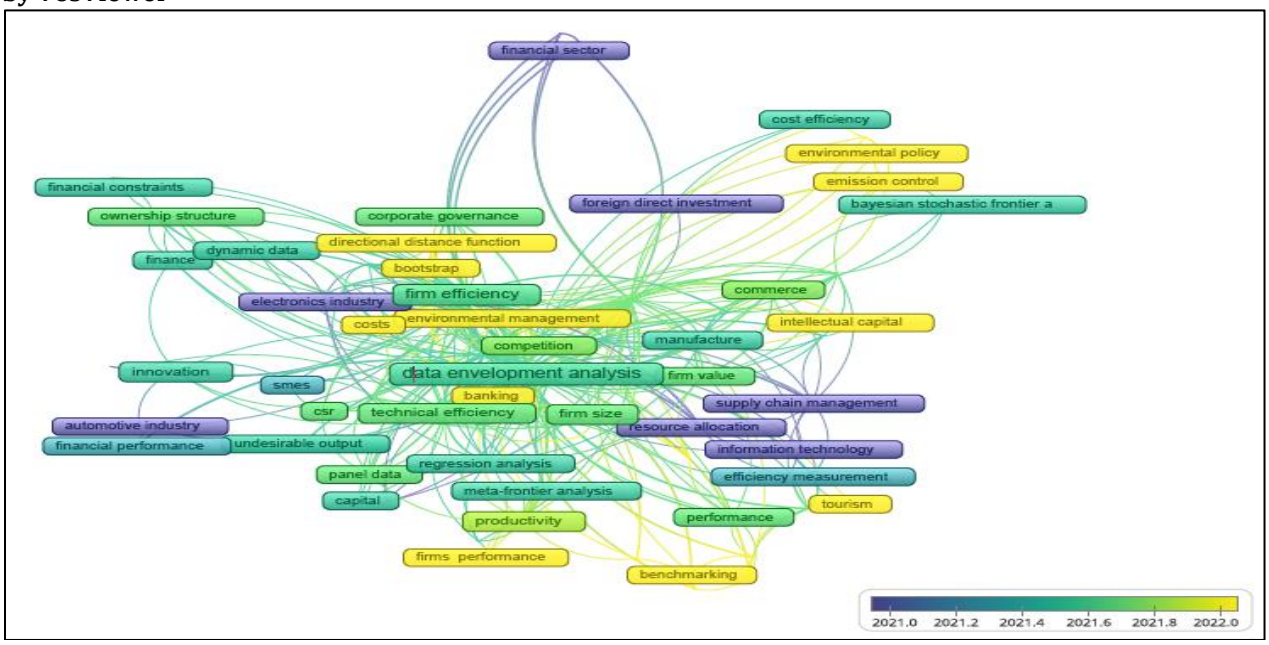



**Moving forward: Future Research Direction on Firm Efficiency Research**

Even though Firm Efficiency is considered a matured study due to 669 documents published since 1987, it still has the potential to embark on and explore potential areas in the future. The authors provide two suggestions for Firm Efficiency's future research direction, based on yellow keywords highlighted in *Figure 10*. First, there is a potential to explore Firm Efficiency in Environmental, Social, and Governance (ESG) related companies. It is because ESG efficiency is not only in Finance but also in other indicators such as

carbon emission and green housing gas emissions. Hence, Firm Efficiency has the potential to explore the relationship between ESG indicators and Firm Efficiency using DEA and SFA. Second, the author suggested looking for directional distance function in Firm Efficiency. It is an alternative to DEA and SFA, whereby it estimates the relative efficiency of a Decision-Making Unit (DMU) along a pre-determined direction vector that is not restricted by the radial direction. Hence, it will determine if Firm Efficiency's direction of DMUs.

**Figure 10: Keyword Network Analysis on Firm Efficiency Research from 2021 to 2022. Visualization by VosViewer**




## 5. Conclusion and Limitations

Firm Efficiency research started in 1987, and for the past 35 years, scholars have received huge attention to embark and conduct research in this area. Hence, this is an opportunity for the authors to conduct a bibliometric to analyze publication and citation performances, top productive countries, top 10 most influential journals, top 10 prominent authors, top 20 cited articles, and emerging themes in Firm Efficiency research. Furthermore, this study presents a direction to those scholars interested in studying Firm Efficiency to develop conceptual or theoretical models and analyze Firm Efficiency using the advance or bootstrap method. The selected findings indicated that for the past 35 years, it shows a growing trend in publication and citations, with the year documents published in 2007 receiving the highest number of citations. In addition, the United States, China and Taiwan are the top three productive countries affiliated with Firm Efficiency research. The main foundation of Firm Efficiency is lying on Finance and Business domains. However, the European Journal of Operational Research, Journal of Productivity Analysis, and Applied Economics dominated the top three most influential journals with high citation impact in Firm Efficiency research. Finally, five emerging themes were discussed in Firm Efficiency research for the past 35 years. First, the application of Stochastic Frontier Analysis in measuring firm productivity and firm size. It's a well-known tool for measuring Firm Efficiency.

Second is bootstrapping DEA and SFA in measuring Firm Efficiency. It is an advanced method of measuring Firm Efficiency compared to the traditional ones. The third theme is the combination between corporate governance and technical efficiency. Corporate Governance is one of the drivers influencing firm efficiency,

while technical efficiency is a measurement in evaluating Firm Efficiency. The fourth theme is DEA as benchmarking in Firm Efficiency. The fifth and final theme is capital structure and ownership structure, a benchmark or indicator for measuring Firm Efficiency. Although scholars have learned much about Firm Efficiency over the past 35 years, the outcomes described are subject to certain limitations. First, the research is based on Scopus-published documents. This methodology's second issue is the problem with researchers with identical names. Thirdly, it is noted that this research was conducted with a specific field in mind: Firm Efficiency. Therefore, other researchers should exercise caution regarding the generalizability of these findings. The authors suggested to the scholars that may wish to do bibliometric analysis utilizing additional databases, such as Google Scholar or Web of Science, which will bring more information to this topic. Finally, additional research should be conducted using sociograms to determine the correlation between different factors in the field of Firm Efficiency.

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