INFORMATION MANAGEMENT AND BUSINESS REVIEW

Vol. 16 No. 2 ISSN 2220-3796

Editorial

Information Management and Business Review (IMBR) provides a digital forum for researchers to share their knowledge and publish research work in the fields of information management, business, management and related disciplines. The work submitted for publication consideration in IMBR should address empirical and theoretical developments in the subjects related to the scope of the journal in particular and allied theories and practices in general. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal and that all listed authors approve its submission to IMBR. It is IMBR policy to welcome submissions for consideration, which are original, and not under consideration for publication by another journal at the same time. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. The current issue of IMBR is comprises papers of scholars from different universities of Malaysia and Indonesia. Institutions and Sustainability Entrepreneurship in SMEs, Preferences of Learning Styles among Non-Accounting Students, Young People's Involvement in Reused Cooking Oil, Financial Distress Prediction of Islamic Banks in Top Sukuk-Issuing Countries, Understanding Innovative Work Behavior, Academic Performance (CGPA) Influences Mental Health, Factors influencing patients' intention to use the Health Clinic Online Appointment System and Conundrum, Considerations in Cognitive Diagnostic Assessment for Language Proficiency Evaluation, Factors Influencing Changes in Consumer Behavior amidst Post COVID-19 Pandemic, Analyzing the Research Landscape on Digital Tax, Analyzing Consumers Online Shopping Behavior Using Different Online Shopping Platforms, Social Networking and Technological Entrepreneurial Intention, Evaluating Audit Oversight Board's Regulatory Impact, Assessing the Impact of Public Accounts Committee (PAC) Reports on Government Accountability and Assessing, Modelling Domestic Water Consumption Behavior, Exploring Sustainability Development Goals (SDGs) Influence on Market Returns, Youth Satisfaction in Online Shopping, Online Student Engagement, Entrepreneurial Intention and Evaluating the Impact of Usability Components on User Satisfaction in Educational Board Games and Collaborative Teaching in Strategic Management Courses are some of the major practices and concepts examined in these studies. All the submitted papers were first assessed by the journal committee and then the external editorial team for relevance and originality of the work and then blindly peer-reviewed by external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance, and clarity of the purpose. The special issue will therefore be a unique proposition, where scholars will be able to appreciate the latest results in their field of expertise and to acquire additional knowledge in other relevant fields.

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PAPERS

Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Institutions and Sustainability Entrepreneurship in SMEs: A Conceptual Model

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Abstract: The government has integrated sustainability management into its agenda to rectify environmental degradation. A new study called "sustainability entrepreneurship", which relates sustainability management with entrepreneurial endeavors has also been established. Sustainability management is crucial because it allows small and medium enterprises (SMEs) to develop competitive advantages by fulfilling customers' demand for sustainable products. However, the participation of SMEs in sustainability management is low and many of them fail to disclose their environmental information. This phenomenon has caused problems in encouraging sustainability management commitment among SMEs and failure in achieving 17 Sustainable Development Goals (SDGs). Therefore, this paper aims to unravel the relationships of institutional elements on proclivity on sustainability entrepreneurship among SMEs. Based on a review of existing literature on Institutional factors, a proposed model was developed to assess proclivity towards sustainability entrepreneurship among SMEs. The result of this study would be useful to create the knowledge of institutional theory and the actual behavior of proclivity of sustainability entrepreneurship, to create new knowledge in the future. This research contributes to universities, policymakers and business practitioners. As for universities, it helps to develop a new model to enrich the literature in entrepreneurship studies. In terms of policymakers and business practitioners, it helps to identify important factors in developing true sustainability entrepreneurs among SMEs.

Keywords: *Proclivity, Sustainability, Social Norms, Time-Orientation, Government Actions.*

1. Introduction

Ecosystems are currently subjected to tremendous environmental, economic, and social pressures. Plans for sustainable development address economic crises, inequality of opportunity, unemployment, conflict, disease, climate change, and poverty. Research on sustainable entrepreneurship that incorporates the environmental, social, and economic triads, particularly among SMEs, is scarce (Binder and Belz, 2015). Recent articles on research conditions in the field of sustainable entrepreneurship (Sarango-Lalangui, Santos and Hormiga, 2018; Gast, Gundolf, and Cesinger, 2017) demonstrate that there are still numerous research gaps. As stated in the Eleventh Malaysia Plan (2016) from 2016 to 2020, the Malaysian government is committed to giving top priority to the welfare of its citizens in all development endeavors and carrying out initiatives for economic progress to improve the overall standard of living. In line with the 2030 Sustainable Development Agenda, the government is now conducting a mid-term assessment and incorporating the 17 Sustainable Development Goals (SDGs) into its six main initiatives, which are of utmost importance. In addition, the government has indicated the Shared Prosperity Vision 2030 (SPV 2030) to implement economic inequalities and guarantee a decent quality of life for every Malaysian citizen. As per SME Magazine Asia (2021), Malaysian businesses are under pressure from rivals, the government, and investors to embrace more sustainable practices. With sustainable measures, Malaysian organizations can attain three primary results: heightened operational efficiency, enhanced transparency and traceability, and augmented sales. Sengupta (2021) states that SDGs facilitate the alignment of company strategies with current societal needs. Nevertheless, a significant number of business owners and executives fail to embrace or fully recognize the imperative nature of sustainable development in their economic endeavors.

In this context, there is a focus on the requirements of future entrepreneurs through the creation of value for people, planets, and profits stated by Tilley and Young, (2009). According to the New Straits Times (2019, July 11), the National Entrepreneurship Policy (NEP) is intended to initiate a culture of entrepreneurship in the country and to establish a holistic and conducive entrepreneurial ecosystem to support a comprehensive, balanced, and sustainable socioeconomic agenda. According to Haigh and Hoffman (2014), entrepreneurs' motivations are influenced by sustainability concerns. Therefore, more effort is required from researchers to

progress away from the current context of entrepreneurship to include topics such as continuity stated by Zachary and Mishra (2011), which concentrate on major business contributors such as SMEs. Meanwhile, researchers have neglected the psychological or cognitive domain for decades (Casrud and Brannback, 2011). Motivation, inclinations, and tendencies have not been thoroughly investigated. As stated by Schwarz (2009), it is necessary to comprehend the factors that influence entrepreneurial tendencies. Consequently, investigating the determinants of entrepreneurial tendencies, particularly sustainability entrepreneurship, is a crucial stage in determining how to cultivate competitive sustainable entrepreneurs. It is widely accepted that the institutional environment is capable of influencing businesses of all sizes; however, studies on the effect of the institutional environment on small and medium-sized enterprises (SMEs) remain scarce. This has led to a dearth of comprehension of business practitioners' propensity to continue entrepreneurial behavior. A lack of conceptual understanding can result in improper planning for sustainable entrepreneurial development, thereby discouraging business owners from participating. Thus, this study is necessary to enhance the productivity of SMEs in Malaysia by providing them with comprehensive insights and practical guidelines on sustainable entrepreneurship. By focusing on the principles of sustainability, the study objective is to equip SMEs with the knowledge and tools required to implement environmentally friendly, socially responsible, and economically viable business practices. This will help SMEs to improve their operational efficiency and market competitiveness and also contribute positively to Malaysia's overall sustainable development goals.

2. Literature Review

Sustainability Entrepreneurship

Entrepreneurship is the act of insightful individuals identifying a gap in the market or desire and taking benefit of the chance by transforming their ideas into a profitable reality (Schaper, 2002). Sustainable entrepreneurship is an issue of research and practice that focuses on the integration of sustainable development and entrepreneurship (Cohen and Winn, 2007). This concept aligns perfectly with the explanation presented by Dean and McMullen (2007), who define sustainable entrepreneurship as the systematic exploration, assessment, and exploitation of economic possibilities that result from market failures that affect sustainability, primarily issues related to the environment. Despite the definition of a sustainability entrepreneur has evolved, Schlange (2006) made the effort to describe it as "someone who emphasizes ecological views in their business vision rather than traditional entrepreneurial goals." Entrepreneurs are required to balance the goals of sustainable development and wealth growth considering the growing recognition of environmental and social issues (Tilley and Young, 2009). Sustainability entrepreneurship, defined by O'Neill et al. (2009), refers to the development of forming ventures that connect the actions of entrepreneurs to the formation of firms that strive to contribute to the sustainable development of the social-ecological system.

The sustainable entrepreneurship model developed by Tilley, F. et.al in 2003 proposes for integration of twelve factors, such as environmental stability, social responsibility, ecological equity, economic equality, sufficiency, futurity, socio-effectiveness, socio-efficiency, and others. This concept integrates both environmental and social entrepreneurship to establish future sources of wealth creation. Therefore, sustainable entrepreneurship has emerged as an essential zone of research on entrepreneurship. According to Graham (2010), sustainability management developed in the 1970s and has significantly influenced people's perspectives on environmental resource challenges. Sustainability refers to an organization's ability to sustain its business operations without causing harm to social or ecological systems. This can be achieved by voluntary actions or actions imposed by law (Smith and Sharicz, 2011). Gray et al. (2014) argue that sustainable entrepreneurship provides a sustainable result for social, economic, and ecological issues. Belz and Binder (2015) identified sustainable entrepreneurship as a beneficial interdisciplinary topic of research that brings together sustainable management and entrepreneurship. According to Dorado-Mayorga (2020) states that to achieve sustainable entrepreneurship, enterprises must not only provide economic viability but also make important contributions to social development and environmental sustainability.

Institutional Theory

Institutional theory is often regarded as a superficial and unsubstantial critique. This model lacks an emancipatory aim, and most institutional studies possess the ability to aggregate power over hegemony. When interacting with institutional 'great challenge', theorists often overlook the broader system of control in favor of smaller, more controllable problems (Munir, 2019). Currently, there is no singular and universally

acknowledged delineation of institutions. However, institutional theory refers to the underlying and enduring components of social organization (Scott, 2004). The author specified that the elements of social structure include cultural cognitive, normative, regulative, and so on. According to Bjorck (2004) developed that the social structure is established and maintained by individuals through the process of socialization or internalization. Put simply, institutions or social structures have the power to shape an entity's choices and determine whether they will exhibit a particular behavior or not. The literature demonstrates that institutional theory has been widely employed in exploring information systems and marketing. Many scholars have utilized institutional theory to study entrepreneurship, in response to the increasing interest in promoting entrepreneurial activities based on Zhai and Su (2019). This study specifically examines three components of institutional theory: governmental, social, and cultural. It analyses how these factors impact the inclination of small and medium-sized enterprises (SMEs) towards sustainability entrepreneurship.

Cultural Dimension: Time Orientation

Hofstede (1980) showed that culture exhibits a direct impact on behavior among people. The values and beliefs of an entrepreneur can either support or hinder their desire to be an entrepreneur (Hayton, et.al, 2002). Culture can be described as the level to which societies perceive entrepreneurship as exciting and beneficial stated by Zhao, Li, & Rauch (2012). Various institutional theories have been studied on this issue (Koe & Majid, 2014). Institutional theory features the impact of cultural forces on managerial decision-making, which subsequently shapes the operation of organizations, including the implementation of sustainable practices. Cultural level issues are rarely analyzed and discussed in the present literature. Majid & Koe (2012) argue that to attain sustainable development, culture must be recognized as a fourth fundamental element. O'Neill et al. (2009) argue that culture has a pervasive impact on every aspect of an organization, including management, leadership, decision-making, and the pursuit of sustainability entrepreneurship. It is necessary to specifically address the task of empirically examining the correlation between culture and sustainable development. The Cultural Dimension Hofstede's (1980) concept of time orientation consists of two components: short-term orientation and long-term orientation. The performance and decision-making of firms are affected by long-term orientation (Mosakowsky & Early, 2000). Prior scholars have examined the correlation between time orientation and entrepreneurial activity (Dantas, Moreira, & Valente, 2015).

Time orientation refers to an entity's connection with a fact temporal environment or point in time (Saji, 2004). (Hofstede, 1991) Nations with a long-term focus, such as South Korea, China, Hong Kong, Taiwan, and Japan, have experienced the most rapid economic expansion worldwide. Furthermore, individuals from cultures that emphasize long-term goals tend to engage in higher levels of entrepreneurial behavior compared to individuals from other cultures. More precisely, these individuals exhibit traits such as determination, thriftiness, consistent dedication to achieving long-term results, and an ability to prioritize their goals over personal desires (Dantas, Moreira, & Valente, 2015). Trompenaar (1993) further discusses how people possess an inclination to focus on the past, present, or future. Given that sustainable management is a task that spans over a long period, individuals with varied perspectives on time may respond in diverse ways to it. Nevertheless, this assumption has not been proven thus far. One other element of Trompenaars' (1993) Seven Dimensions of Culture is the human-nature interaction orientation, which efforts on the utilization of natural resources. According to his perspective, some people advocate for compromise and maintaining an understanding relationship with nature, but others argue that it is essential to control and manage nature. According to Yoon and Tello (2009) provide evidence that businesses that prioritize corporate social responsibility (CSR) are more committed to sustainable innovation compared to other enterprises. Trompenaars (1993) has not provided an in-depth analysis of how this attitude influences individuals' business conduct. Hence, it indicates that individuals' background in culture influences their company's operations. Schick et al. (2002) examine the impact of ecological orientation on the initiation of a sustainable business. Additionally, Kuckertz and Wagner (2010) also found a positive association between a focus on sustainability and the intention to engage in entrepreneurial activities.

Social Dimension: Social Norms

Ajzen & Fishbein (1975) and Ajzen (1991) confirmed the influence of social norms on individuals' behaviors. A social norm is "perceived social pressure to perform or refrain from performing a certain behavior" (Ajzen, 1991). It is social pressure that motivates individuals to alter their behavior and has a direct impact on the efficiency of social norms. Similarly, Lipset (2000) asserted that social norms exist at the group level, indicating

that a group holds a particular value in high regard. This is supported by Tankard and Paluck (2016), who states, "Humans are especially motivated to understand and follow the patterns of groups to which they belong and to which they feel a strong attachment". Influences from others should not be overlooked in the study of sustainability intentions. Researchers have demonstrated that social pressure, such as the views or perceptions of positioned persons, family, friends, colleagues, or business partners, is a significant influencer of sustainable behavioral intention and ecological behavioral intention (Vermeir & Verbeke, 2008)

Meek et al. (2010) explain that social norms play a significant role in influencing the environmental entrepreneurial behavior of individuals. Cialdini (2003) and Ostrom (2000) have demonstrated that the natural environment influences the effectiveness of social norms in altering the behavior of individuals. According to Yaacob (2010), entrepreneurs engaged in green enterprises were significantly influenced by their spouses and other close relatives. De Clercq and Voronov (2011) also explain that the beliefs and preferences of industry participants may influence entrepreneurs' decisions regarding the balance between sustainability and profitability. This implies that changes in the behavior of entrepreneurs will enhance the environmental and social sustainability of businesses and their respective industries. Spence et al. (2010) argue that social variables should not be ignored when attempting to influence individuals toward sustainability.

Governmental Dimension: Governmental Actions

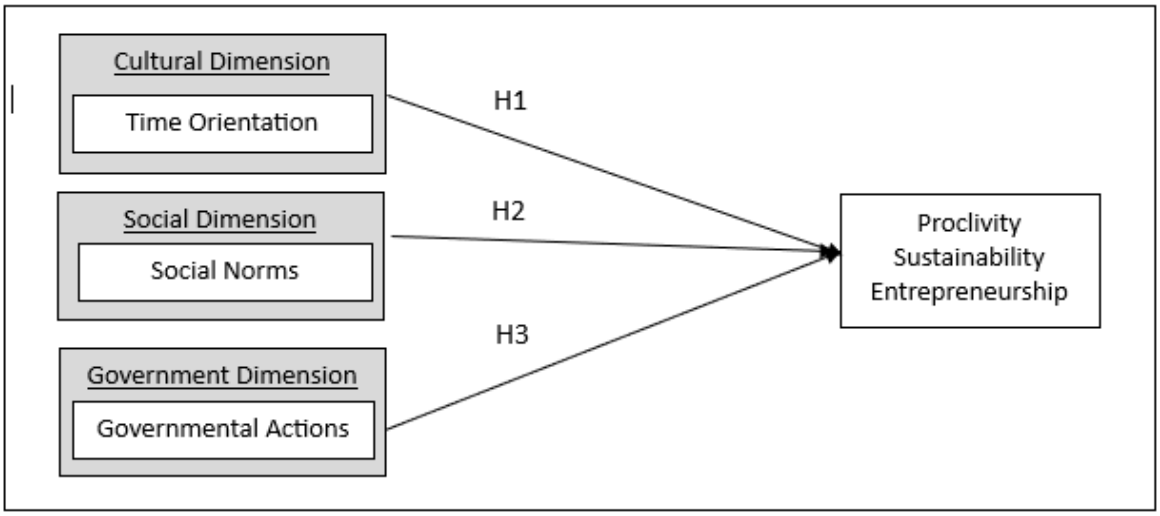
The committed engagement of political leaders and the intervention of the government are crucial in attaining the sustainability goals of a country and fostering the growth of sustainable entrepreneurship (Kuckertz and Wagner, 2010). When a government includes environmental preservation measures as part of its objectives, it will encourage entrepreneurs to integrate environmental principles into their businesses. According to Schlange (2006), a sustainability strategy or plan can serve as a framework for entrepreneurs to effectively balance their environmental and business goals. While many businesses may not view the legislation as the sole means of promoting environmental concerns, it is important to recognize the government's role in enhancing environmental initiatives among businesses through the implementation of suitable rules and regulations (Rasi et al., 2010). Governmental rules and regulations might be seen as the primary incentive for firms to participate in environmental activities. However, small and medium-sized enterprises (SMEs) are typically exempted from these restrictions.

Jennings and Zandbergen (1995) have shown that rules and the enforcement of regulations are the primary factors that drive enterprises to adopt environmental management practices. Albrecht (2002) has also validated the notion that environmental entrepreneurship developed because of the implementation of environmental protection laws and regulations. As countries prioritize both economic development and environmental conservation, they aim to create a sustainable society (Zhang et al, 2019). The impact of governmental entities is the most prominent factor in the acceptance of environmental applications by enterprises (Delmas & Toffel 2004). These programs have dual objectives: to promote environmental benefits through sustainability entrepreneurship and to have a good economic impact on the sustainable economy. According to ONeill and Gibbs (2014), a sustainable economy can be achieved through green entrepreneurship that integrates environmental, social, and economic goals. Kotabe et al. (2017) state that government policies, support, and regulation of industrial development are crucial for promoting entrepreneurial activity (Minniti, 2008). Undoubtedly, legislation and incentives are consistently effective in motivating individuals to adopt specific behaviors.

3. Conceptual Framework

Figure 1 depicts the conceptualizing framework that was developed for this study. The framework is constructed and founded on a thorough evaluation of the literature to examine the proclivity towards sustainability entrepreneurship. The framework incorporated the extended Institutional Theory comprised of time orientation, social norms and governmental actions.

Figure 1: Proposed Conceptual Framework (Developed by authors)



4. Hypotheses of the Study

The research aims to identify the relationship between time orientation, social norms, governmental actions, and the proclivity of sustainability entrepreneurship among SMEs.

H1: There is a positive relationship between time orientation and proclivity sustainability entrepreneurship among SMEs.
H2: There is a positive relationship between social norms and the proclivity of sustainability entrepreneurship among SMEs.
H3: There is a positive relationship between governmental actions and proclivity sustainability entrepreneurship among SMEs.

The independent variables contribute to the proclivity towards sustainable entrepreneurship as an intervening variable, while actual use serves as the dependent variable. Hypotheses H1, H2, and H3 will be examined using these variables to ascertain if there is a positive correlation between time orientation, societal norms, governmental actions, and the proclivity towards sustainability entrepreneurship. The suggested model aims to assess the influence of institutional environments on the proclivity towards sustainability entrepreneurship.

5. Potential Outcome and Direction for the Future Research

Our future study will concentrate mainly on small and medium-sized firms (SMEs) in Malaysia. This analysis will use an exploratory sequential mixed-method research design, which entails integrating qualitative and quantitative data. This study concentrates on small and medium-sized firms (SMEs) operating in the manufacturing sector in Malaysia. The study will focus on the demographic breakdown of small and medium-sized manufacturing businesses (SMEs) registered in the directory of the Federation of Malaysian Manufacturers (FMM). Data will be gathered using a questionnaire that individuals will complete on their own. This study gathered data from owner-managers of small and medium-sized firms (SMEs) as the unit of analysis. The data was acquired once using a cross-sectional time frame. The data will be analyzed via the Partial Least Squares Structural Equation Modelling (PLS-SEM) methodology. The first stage of data analysis included purification of data and descriptive analysis. In the second phase, the emphasis is primarily on conducting statistical analyses, especially evaluating the measurement model and structural model, as well as conducting testing of hypotheses.

Conclusion

The study will utilize the proposed model to examine the relationship between time orientation, social norms governmental actions and proclivity of sustainability entrepreneurship. The hypotheses of this study are based on Institutional Theory to investigate the proclivity of sustainability entrepreneurship. Then, to prove these hypotheses, several measures have been proposed to support a model of factors influencing the proclivity of sustainability entrepreneurship among SMEs and to provide an overview of future research. Furthermore, this research also can help to identify whether SMEs that establish a large distribution of business behaviors in the country intend to engage in sustainability practices. This research will contribute to the cultivating body of knowledge on sustainability entrepreneurship by providing insights into practice in a developing country such as Malaysia. It will offer valuable lessons for policymakers, practitioners and researchers interested in harnessing sustainability entrepreneurship for future practices.

Acknowledgment: The authors express their sincere appreciation to the Ministry of Higher Education (MOHE) Malaysia for funding this research project through the Fundamentals Research Grant Scheme (FRGS) with the code [FRGS/1/2021/ss01/UITM/03/7], as well as to Universiti Teknologi MARA (UiTM) [600-RMC/FRGS 5/3 (127/2021)].

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Preferences of Learning Styles among Non-Accounting Students in Accounting Subject

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Abstract: Learning style is a crucial component in encouraging quality teaching and promoting effective learning. Every student possesses distinct learning objectives, prior knowledge, cognitive ability, and cognitive style. Therefore, it is essential to understand students' learning style preferences for high-quality and effective teaching and learning methods. This paper aims to examine the variation of learning styles among non-accounting students from one of the higher learning institutions in Melaka, Malaysia. Data were gathered from self-administered questionnaires given to students enrolled in diploma courses during financial accounting class sessions. The survey received a response from a total of 398 students. This study discovered that most students use an unimodal learning style in their studies, regardless of whether the subject is theoretical or calculative. However, the distribution of learning style modalities is significantly different between male and female respondents. Overall, the visual learning style was discovered as the most dominant among male and female students in learning accounting subjects through seeing or observing visual materials. Hence, it is vital to understand how students' learning style affects their acquisition of knowledge, which could provide useful insights into designing teaching strategies concerning the profiles of the students and enhancing the teaching-learning process.

Keywords: *Learning Preferences, Learning Styles, Non-accounting students, VARK model, VARK Learning Styles.*

1. Introduction

Students' interaction with information reflects their preferred learning styles. Each student is unique in their learning objectives, past knowledge, thinking abilities, and cognitive style (Graf et al., 2009). Hence, learning styles are closely related to how teachers and students interact in a teaching-learning process as well as how they both learn and teach (Viloria et al., 2018). Consequently, recognizing students' learning styles is pivotal for fostering high-quality teaching. Understanding these styles can facilitate the creation of environments conducive to effective learning, given the significant correlation between learning styles and students' academic performance (Rezaeinejad et al., 2015). In relation to accounting, the basic accounting course is now a mandatory subject for nearly all diploma courses at Universiti Teknologi MARA (UiTM), providing students with essential knowledge in accounting. As the field of accounting is one of the most competitive disciplines, hence students should prioritize entrepreneurship over traditional employment, especially given the current high unemployment rate in Malaysia. Nonetheless, numerous students lacking an accounting background encounter challenges in excelling in accounting subjects. They often perceive these subjects as irrelevant to their field and struggle with comprehension due to their technical complexity (Muda et al., 2013).

Conversely, students with prior knowledge of accounting tend to perform better and have a higher chance of success in introductory accounting courses, as noted by Mohd Pauzi et al. (2021). The difficulties in grasping accounting concepts stem from various factors. These include the subject's heavy reliance on mathematics, emphasis on rote learning, and insufficient integration of case studies (Ay, 2012). Additionally, there exists a disparity between theoretical teachings and practical applications, coupled with issues such as irrelevant textbooks, examination formats, and language proficiency barriers, all contributing to students' negative perceptions toward accounting courses and subsequently affecting their academic achievements (Tailab, 2013). Although accounting is perceived as challenging, non-accounting students must learn accounting, as the knowledge and skills are essential for lifelong learning (Jones & Fields, 2001). Fostering student interest in accounting is crucial for nurturing the skills essential for success in both accounting and non-accounting professions (Geiger & Ogilby, 2000). However, generating such interest may require educational reforms that emphasize not just memorization but also the ability to synthesize and apply information from diverse sources.

Educators have a plethora of instructional and assessment methods at their disposal. Therefore, it becomes imperative to tailor these approaches considering factors like students' gender and pre-existing levels of interest to enhance both academic engagement and performance (Lee & Boo, 2022). Students with appropriate study skills, teaching, and learning approaches will better understand subjects in any discipline. According to Alvis-Arrieta et al. (2023), students who favor a reflective learning style are more likely to witness enhancements in their academic performance compared to those inclined towards an active learning style. The quality of undergraduate education is crucial. Utilizing the most suitable teaching method for each subject is essential for enhancing students' competence and qualities. By employing diverse teaching methodologies, lecturers can facilitate better comprehension among students, provided they align their delivery approach with the student's preferred learning styles (Boyd et al., 2000). Thus, this paper aims to discover and better understand the learning styles among non-accounting students in one of the higher learning institutions in Melaka, Malaysia, to improve the quality of teaching and learning experiences to support effective learning. Additionally, this study examines the dominant learning styles of students, providing useful insights into designing teaching strategies tailored to students' profiles and ultimately enhancing the teaching-learning process. This research article is structured as follows: the subsequent section explores pertinent literature, followed by an elucidation of the methodology utilized in this study. The findings and ensuing discussion section offer a comprehensive analysis of the results. Finally, the paper concludes by delineating its limitations and suggesting avenues for future research.

2. Literature Review

Learning Styles or Preferences: Learning preferences refer to the general approaches individuals adopt when engaging with a particular subject. As asserted by Sadeghi et al. (2012), these preferences significantly influence both the learning journey and the unique ways individuals engage with material based on their preferred styles. A learning preference can also be described as a predisposition towards a particular learning strategy. While many students have a preferred style, some may adapt their approach depending on the task at hand (Poon Teng Fatt, 2000). Various typologies have been devised to categorize learners, facilitating the provision of appropriate materials and enhancing their overall learning experience (Peter et al., 2010). Education recognizes four primary learning styles: visual, auditory, reading/writing, and kinaesthetic. Visual learners excel in interpreting visual aids like charts and diagrams. Auditory learners thrive on lectures and discussions. Kinaesthetic learners prefer hands-on experiences while reading/writing learners process information best through written text (source: https://bau.edu/blog/types-of-learning-styles/).

Surveys of first-year undergraduate language students at Chiang Rai Rajabhat University, Thailand, using the VARK questionnaire, revealed that most learners (64.0%) have multimodal preferences, with kinaesthetic being the most popular (Payaprom & Payaprom, 2020). In contrast, a study by Boland et al. (2011) comparing learning styles across student groups in Australia, Belgium, and Japan found that Australian and Belgian students tended to favor individualistic and hands-on learning, while Japanese students preferred observational learning. Thus, educators should accommodate students' preferred styles to facilitate more effective learning (Poon Teng Fatt, 2000). Moreover, research in Indonesia by Asgafi et al. (2023) found a link between students' learning preferences and their mathematical communication skills, highlighting the importance of well-designed learning processes. Similarly, a study by Mardi et al. (2024) in an Indonesian Vocational High School demonstrated that using innovative teaching materials like Accounting UNO Cards increased student motivation and participation in learning accounting. This emphasizes the significance of dynamic teaching methods in fostering an engaging learning environment.

Learning Styles Versus Gender: Students exhibit varied learning preferences, which may differ based on gender. Considering a student's favored learning style is crucial in planning classroom instruction. An important educational disparity between genders concerns the subjects they opt to study (Severiens & Dam, 1997). Philbin et al. (1995) conducted research emphasizing distinctions in learning styles between men and women. Men often associate their preferred learning style with traditional education, whereas women may not share this correlation. Conversely, an analysis using Kolb's instrument suggested that men lean more toward abstract conceptualization in learning (Severiens & Dam, 1997). In Science, Technology, Engineering, and Mathematics Education (known as STEM), Kulturel-Konak et al. (2011) noted that women frequently favor hands-on learning experiences, make intuitive judgments, are more people-oriented, and are comfortable with

ambiguity. In contrast, men typically adopt an analytical approach, engaging in logical thinking and enjoying working with symbols and structures.

Additionally, a study by Slater et al. (2007) among first-year medical students, utilizing VARK (Visual, Auditory, Reading/Writing, Kinaesthetic) learning preference questionnaires, revealed that both male and female students prefer various modes of information presentation, with no significant differences between genders in the quantity and types of modalities used. Although not statistically significant, female students exhibited greater diversity than males, encompassing a wider range of sensory modality combinations in their preference profiles. Conversely, a survey of first-year undergraduate students at Chiang Rai Rajabhat University, Thailand, found no link between gender and students' learning style preferences (Payaprom & Payaprom, 2020). Thus, gender, alongside other factors such as cultural influences, exhibits some correlation with students' learning styles. Lecturers or instructors should adapt their course assessments and teaching methods to accommodate the various styles of learning among students (Corbin, 2017). Meanwhile, in a study among senior high school students in Ghana, Amoah (2024) discovered significant differences in mathematical performance between male and female students. Meanwhile, Laoli et al. (2023) presented substantial evidence suggesting that gender differences contribute to enhancing college students' English proficiency through inquiry-based learning.

VARK Learning Style Model: The VARK model assists students in recognizing their preferred learning style, which is determined by how individuals perceive and process information (Duff, 2000). Othman and Amiruddin (2010) view the VARK learning style as a distinctive approach to acquiring knowledge, abilities, and attitudes. Initially devised by Neil Fleming in 1987 and subsequently updated in 2006, the VARK model categorizes students' senses into four main types: visual, auditory, reading/writing, and kinaesthetic. Each student possesses a unique learning style, and comprehending these styles is pivotal in assessing the efficacy of the educational process (Ismail, 2010). Thomas et al. (2002) assert that learning style is crucial for enhancing comprehension and performance in any subject. Therefore, the VARK learning style has the potential to create an engaging classroom environment for learners and stimulate their senses during learning activities (Othman & Amiruddin, 2010). According to Fleming and Baume (2006), students inclined toward the visual mode prefer learning through visual representations such as diagrams, charts, graphs, and pictures. Those favoring the aural mode learn best through auditory means, such as lectures and discussions. In contrast, students with a reading or writing preference excel in comprehending and interpreting printed information, such as textbooks and notes. Conversely, the kinaesthetic mode caters to students who prefer learning through physical experiences, such as hands-on activities, experiments, and role-playing.

Furthermore, Fleming (1995) found in a study that the most frequently utilized mode in the learning process is the speech mode or aural mode in the VARK model. Moreover, the study by Khongpit et al. (2018) which looked at the VARK learning styles of 145 computer course students at Sripatum University-Chonburi Campus and Burapha University revealed that students selected visual and kinaesthetic learning at the same percentage (27%), and aural and reading/writing at the same percentage (23%). Additionally, kinaesthetic (69.2%) and auditory (55.9%) learning modes were the most favored among unimodal learning preferences, according to a study done with medical students by Shakeri et al. (2022). Research by Iyer and Sethuraman (2024) found that the majority of students favored the kinaesthetic approach. According to the findings of Nguyen et al. (2024), students who took theory-oriented courses favored visual learning. Students, however, favored the kinaesthetic approach in practice-oriented courses. As a result, course types have a big impact on how students choose their learning styles. Therefore, it is crucial to identify students' learning styles to ensure the effectiveness and acceptance of the teaching and learning process. In the growing digital world, teaching and learning processes have shifted online, and students need to be creative in selecting their learning styles to prevent boredom during the learning process, as success in e-learning depends on the student's learning style (Byrne, 2002).

Different Sensory Modalities (Unimodal & Bimodal): Learning style denotes an individual's preferred method of acquiring knowledge and processing information, encompassing cognitive, affective, and psychological factors that govern how individuals interact with and respond to the learning environment (Duff, 2000). The learning styles of students are dynamic and subject to change. Certain students have a preference for one or more of the four modes—quadrimodal, trimodal, bimodal, or unimodal the VARK learning style. A moderately favorable link between students' academic performance and their bimodal learning style was

discovered by Javed et al. (2023), indicating that learning style had to be taken into account throughout both the instructional and evaluation phases. As a result, knowing the preferred learning styles of their students can assist lecturers or teachers in modifying their delivery style to enhance student engagement improve students' understanding, and prevent boredom. According to numerous studies, students prefer to use a variety of styles, depending on the context and subject matter being learned. Students' preferences for multimodal (bimodal) learning styles ranged from 13.2% (Saudi Arabia) to 87% (Iran) in global research (Shakeri et al., 2022). Chakravarty et al. (2022) found that 68.2% of students chose multimodal learning techniques, with 28.2% of students preferred quadrimodal learning, 28.2% preferred bimodal learning, and 11.7% favored trimodal learning. Additionally, the study revealed that 31.7% of participants exhibited single learning preferences, with 20% favoring kinaesthetic learning, 7.05% preferring visual learning, and 4.7% leaning towards auditory learning. Moreover, Mon et al. (2014) discovered that 61 students (62.2%) preferred multimodal learning, while the remaining 37 students (37.8%) preferred unimodal learning. Conversely, in a study conducted by Jailani et al. (2023), the majority of pharmacy students were identified as unimodal learners, with the most prevalent learning style being kinaesthetic, whereas reading and writing were the least preferred options.

3. Methodology

Questionnaires were distributed to non-accounting students in one of the higher learning institutions in Melaka, Malaysia. The study aims to determine students' preferred learning styles, whether unimodal or bimodal, for the financial accounting subject. A total of 398 students returned the questionnaires. The questionnaires were based on the VARK Learning Styles Questionnaire: excerpted from Enid (2005). It consists of three learning styles: visual, auditory, and kinaesthetic. The questionnaires were distributed to students during financial accounting class sessions. Students took approximately ten minutes to answer the questions. The questionnaire consisted of two sections: Section A contained demographic questions, and Section B contained thirty (30) questions regarding learning style preferences. Ten (10) items for each style, where respondents were required to select 'YES' or 'NO' to the statements provided in the questionnaire. The "YES" answer was then totalled up for the three categories. The highest score indicates the student's learning style. If a high score is more than one area, students are using additional modalities. The learning style and the modalities are presented in the table below:

Modalities	Learning styles
Unimodal	Visual Kinaesthetic Auditory
Bimodal	Visual + Kinaesthetic Visual + Auditory Auditory + Kinaesthetic

Descriptive statistics were used to determine the learning styles that students preferred, whether they were unimodal or bimodal. Subsequently, the data were analyzed using DataTab software to perform Chi-Square tests and establish any potential connection between gender and unimodal or bimodal learning preferences.

4. Findings and Discussion

Results of Learning Style Modal

Figure 1: Percentages of Students Who Preferred Unimodal and Multimodal Learning Styles Based on Gender

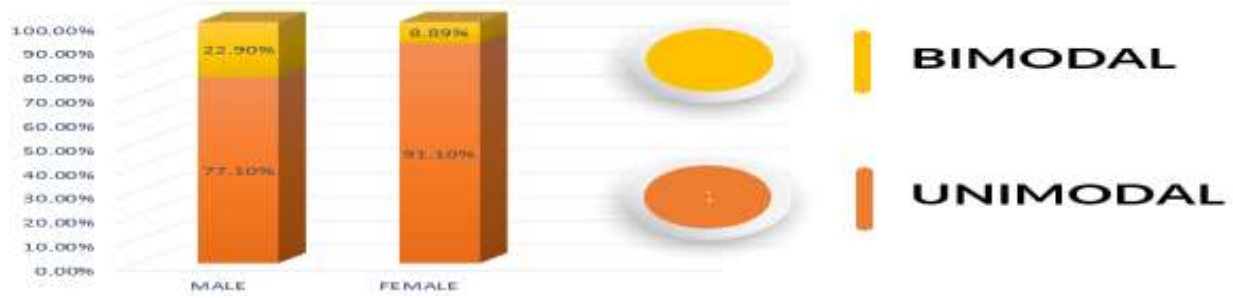

Figure 1 depicts the composition of non-accounting students' learning styles when studying the accounting subject, categorized as either unimodal or bimodal, based on gender (male or female). The majority of male students (77.1% of the overall population) exhibit unimodal learning styles, with only 22.9% demonstrating multimodal learning styles. Conversely, 91.1% of female students exhibit unimodal learning styles, with only 8.89% displaying bimodal learning styles. Students with unimodal learning styles employ tend to rely on one specific approach, such as visual, auditory, or kinaesthetic. In contrast, bimodal learning styles involve the combination of two types of learning styles, such as visual and auditory, visual and kinaesthetic, or auditory and kinaesthetic. The findings suggest that most students tend to have an unimodal learning style, whether they are studying theoretical or computational subjects.

Table 1: Distribution of Respondents Based on Learning Style Modal Across Different Genders Based on the Total Population

Learning Style Modal	Gender					
	Female		Male		Total	
	N	%	n	%	n	%
Unimodal	164	41.21%	168	42.21%	332	83.42%
Bimodal	16	4.02%	50	12.56%	66	16.58%
Total	180	45.23%	218	54.77%	398	100%

The distribution of learning style modalities is further examined in more detail. Table 1 displays the distribution of respondents based on learning style modality across different genders. The total number of respondents involved was 398, consisting of 218 males (54.77%) and 180 females (45.23%). Among the total population, 332 students (83.42%) represent those with unimodal learning styles, while 66 students (16.58%) represent those with bimodal learning styles. The data underwent further scrutiny through a Chi-Square Test, specifically between gender and learning style modality. This analysis aimed to ascertain whether there exists a noteworthy disparity between male and female genders concerning their respective learning style modalities, be it unimodal or bimodal. Table 2 delineates the outcomes of the Chi-Square Test between gender and learning style modality. The results reveal a chi-square value $\chi^2(1) = 14.06$, $p < .001$, with Cramér's V = 0.19. The p-value of < .001 obtained falls below the predetermined significance level of 5%, thus establishing the statistical significance of the Chi-Square test and leading to the null hypothesis's rejection. Additionally, Cramér's V coefficient of 0.19 signifies a weak correlation between gender and learning style modality. This indicates that while the two variables exhibit a statistically significant relationship, the effect size remains relatively modest.

To summarise, the findings from the Chi-Square Test suggest a noteworthy variance in the distribution of learning style modalities among male and female respondents.

Table 2: Chi-Square Test between Gender and Learning Style Modal

Chi^2	14.06
df	1
p	<.001
Cramér's V	0.19

Results of Learning Style Preferences

Figure 2: Percentages of Students' Learning Styles According to Their Respective Genders

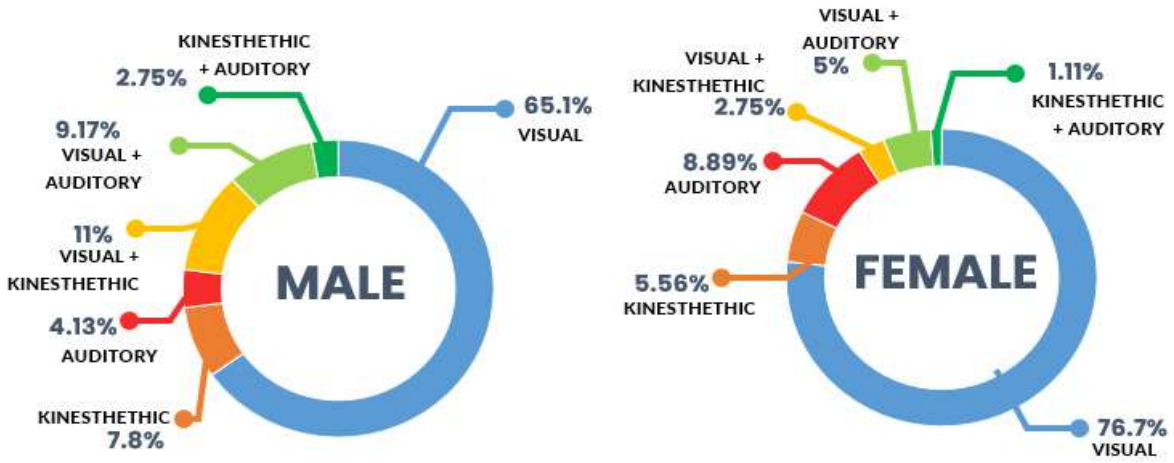

Figure 2 illustrates the breakdown of learning style preferences among male and female students, respectively. Most male and female students tend to have an unimodal visual learning style, comprising 65.1% of males and 76.7% of females. This suggests that students are utilizing a visual learning approach when studying accounting subjects, relying on visual materials for comprehension. In our context, educators have provided students with a resource called an 'accounting map'. This map encapsulates the entire process, beginning with comprehensive dummy transactions, double entries, journals, ledgers (t-accounts), trial balances, financial statements, year-end adjustments such as depreciation, accruals, bad debts, allowance for doubtful debts, and culminating in financial statement analysis using financial ratios. We hypothesize that students adopt a visual learning style as they heavily rely on this accounting map as their primary study material for accounting subjects.

The second most popular learning style preference among males is represented by bimodal (visual and kinaesthetic), accounting for 11% of the total male population. This finding suggests that some male students prefer learning using the visual style but also find it beneficial to combine it with the kinaesthetic method. Moreover, it indicates that these students may benefit from additional tutorials and hands-on practice to enhance their understanding of the accounting subject. Bimodal study strategies (visual and auditory) rank as the third most popular among male students, representing 9.17% of the total male population. Some of these students extensively utilize the accounting map while engaging in class discussions with lecturers, as they prefer detailed explanations from their instructors. They rely on lecture content to achieve a comprehensive understanding of the accounting subject. Overall, in learning accounting subjects, the visual learning style appears to be the most dominant among male students. Conversely, bimodal (kinaesthetic and auditory) learning styles are the least popular among male students, accounting for only 2.75% of the entire male population.

The findings for female students revealed that, in addition to the most popular learning style, which was unimodal-visual (76.7%), the second and third most popular learning styles among female students were unimodal-auditory (8.89%) and unimodal-kinaesthetic (5.56%), respectively. Female students predominantly preferred unimodal styles and did not combine different types of learning styles. These results suggest that female students are inclined to fully utilize the accounting map materials provided in the classroom. Those with an unimodal auditory learning style tend to possess strong listening skills, enabling them to discern subtle differences in tone or pitch during lectures. However, they may encounter challenges with written communication or visual aids (such as the accounting map in this research context), as they may find it difficult to process information presented in these formats. Unfortunately, this group represented only a small fraction of the overall female student population. A small subset of female students also prefers unimodal kinaesthetic learning, indicating difficulty with learning through reading, visualization, or attending lectures, as these methods do not provide the physical stimulation they require for successful learning. Overall, female students tend to favor unimodal learning styles such as visual, auditory, or kinaesthetic, rather than bimodal learning styles.

Table 3: Distribution of Respondents Based on Learning Style Preferences Across Different Genders Based on Total Population

		GENDER					
		FEMALE		**MALE**		**Total**	
		n	**%**	**n**	**%**	**n**	**%**
LEARNING STYLE	**AUDITORY**	**16**	**4.02%**	**9**	**2.26%**	**25**	**6.28%**
	AUDITORY+KINESTHETIC	2	0.5%	6	1.51%	8	2.01%
	KINESTHETIC	10	2.51%	17	4.27%	27	6.78%
	VISUAL	138	34.67%	142	35.68%	280	70.35%
	VISUAL+AUDITORY	9	2.26%	20	5.03%	29	7.29%
	VISUAL+KINESTHETIC	5	1.26%	24	6.03%	29	7.29%
	Total	180	45.23%	218	54.77%	398	100%

Table 4: Chi-Square Test between Gender and Learning Style Preferences

Chi^2	**19**
df	5
p	.002
Cramér's V	0.22

The analysis is further scrutinized by comparing the details between the two groups, males and females, across different learning styles. Table 2 displays the results of this analysis. For both males and females, the most

preferred learning style when studying accounting is unimodal-visual, representing 70.35% (280 students) of the total population. Conversely, the least preferred learning style is bimodal-auditory and kinaesthetic, accounting for only 2.01% (8 students) of the total sample population. Subsequent to the Chi-Square Test, an analysis was conducted to assess whether a significant difference exists between male and female groups across various learning style types. The outcomes of this analysis are presented in Tables 3 and 4. The results unveil a statistically significant distinction between Gender and Learning Style, with $\chi^2(5) = 19$, $p = .002$, and Cramér's V = 0.22. The p-value of .002 falls below the predetermined significance level of 5%, thereby indicating a substantial finding that warrants the null hypothesis's rejection.

5. Conclusion

In conclusion, this study aimed to describe the variation of learning styles among undergraduate non-accounting students. Previous research suggested that adopting various learning styles could assist both male and female students in improving their accounting performance. Overall, students tended to prefer unimodal learning styles over bimodal ones. Additionally, there were statistically significant differences in students' learning styles based on gender. Both male and female students predominantly favored the unimodal visual learning style, while kinaesthetic and auditory styles were less preferred. Notably, this study did not encompass reading and writing learning styles, which are typically considered fundamental educational skills. This omission may stem from the lack of emphasis placed on enhancing students' reading and writing abilities in many schools and universities, making these skills less prioritized. Many students find reading challenging, which in turn affects their proficiency in writing.

To improve student performance, it is imperative to consider additional contributing factors beyond learning styles. Consequently, this study has several limitations. Firstly, the research sample consisted solely of non-accounting students from two faculties, potentially limiting its representativeness of all non-accounting students. To address this limitation in future research, it is recommended to employ a larger and more diverse sample, encompassing students from various faculties and institutions. This approach would augment the generalisability of the findings. Additionally, the data collection for this study was conducted exclusively during face-to-face class sessions. Given the ongoing evolution of teaching and learning methods, including a transition to online platforms, it would be valuable to compare data from both environments. Such a comparison could shed light on whether the learning platform influences students' learning styles and academic performance differently.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Young People's Involvement in Reused Cooking Oil

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Abstract: Uncontrolled recycling practices have led to increased waste disposal in landfills over the past ten years, especially using cooking oil. If more young folks choose to recycle their wasted cooking oil and turn it into more affordable biodiesel fuel, this issue may be avoided. Thus, to better understand young adults' intentions to recycle, this study looks at the relationships between attitude, subjective norms, perceived behavioral control, environmental values, and moral standards. A survey was created and disseminated online to reach university students in Peninsular Malaysia. The investigation results demonstrated a significant association between the influence of perceived behavioral control, environmental values, and subjective norms on young adults. Moral standards and attitude, however, did not significantly correlate. While businesses can enhance their marketing strategies, policymakers should concentrate on recycling measures. Outreach efforts in the form of education and community initiatives can help to encourage sustainable behaviors. This will make it easier to optimize the procedures involved in resource recovery and lessen environmental damage.

Keywords: *Young Adults, Recycling Intention, Malaysia, Used Cooking Oil*

1. Introduction and Background

The escalating disposal of household waste into landfills globally has prompted stakeholders, particularly in developed and developing nations, to focus intently on identifying effective waste management solutions (Salvia, Zimmermann, Willan, Hale, Gitau, Muindi & Davies, 2021). This increased attention has enhanced the visibility of recycling and promoted good recycling habits. As a result, society is increasingly concerned about maintaining a clean environment and striving for a higher quality of life due to its significant impact on living conditions.

This current trend has prompted many stakeholders to seize the opportunity to promote the concept of good recycling habits (Van Langen, Vassillo, Ghisellini, Restaino, Passaro & Ulgiati, 2021). Concurrently, shifts in recycling practices for various items are accelerating worldwide, including in Malaysia (Chen, Bodirsky, Krueger, Mishra & Popp, 2020). Environmental NGOs have praised the Malaysian government's commitment to sustainable municipal waste management through separation and recycling at the source (Shaharudin, Fernando, Ahmed & Shahudin, 2020). However, a study by Tiew, Basri, Watanabe, Zain & Wang (2019) reveals that solid waste recycling in developing countries like Malaysia remains challenging compared to other developing nations. Despite twenty-four years of government efforts, the national recycling rate only rose 24.6 percent in 2017. This finding indicates that the majority of Malaysians have yet to adopt recycling habits. Although local governments in Malaysia have been proactive in raising recycling awareness, the public's behavioral change toward recycling remains uncertain (Tiew, Basri, Deng, Watanabe, Zain & Wang, 2019).

Household waste encompasses a variety of materials, including plastic bags, paper bags, electronic waste, glass bottles, metal, aluminum cans, and food waste. One significant type of household food waste is cooking oil, which, like other waste, is crucial to recycle. The increasing population has led to a higher demand for edible oils, which provide essential nutrients and energy. However, used cooking oil contains harmful substances that pose health risks when consumed or processed. Consuming repeatedly heated cooking oils can lead to various cancers (Ganesan, Sukalingam & Xu, 2019). Additionally, pouring used oils down drains can clog pipes, produce foul odors from bacterial growth, and disrupt wastewater treatment services (Ahmad, Abdullah, Koji, Yuzir, Mohammad, Show & Khoo, 2022). Furthermore, improperly disposed materials often end up in the ground, rivers, and oceans, causing significant environmental pollution.

In Malaysia, the company Alam Flora is tasked with household waste disposal and has initiated a separate waste

collection system. Alam Flora's buy-back recycling centers offer RM 4.40 for every 4 kilograms of used cooking oil, incentivizing households to earn money through recycling. This initiative aims to motivate environmentally conscious Malaysians to maintain and enhance their recycling habits.

The activities of separating waste and recycling used oil are still in their early stages in Malaysia, requiring further efforts to advance these initiatives. Focusing on young adults is crucial as their behaviors and lifestyles significantly impact future pollution levels (Piscitelli & D'Uggento, 2022). Due to the increasing daily demand for energy, the current trend aims to encourage young adults to recycle waste materials and convert them into useful resources.

Research on waste materials and the shift towards recyclable materials has been actively conducted and appears to be accelerating in many regions, including Malaysia (Ayub, Othman, Khan, Hubaidillah, Kuniawan, Ismail & Jaafar, 2021). Social psychology has made significant advances in understanding the mechanisms underlying pro-environmental behavior (PEB), such as waste separation, commonly referred to as trash classification or waste segregation. These studies aim to explain human behavior related to environmental conservation. According to Kollmuss and Agyeman (2002), PEB is defined as actions that intentionally attempt to reduce the adverse impact of one's activities on the built and natural environments. Prominent research in human behavior studies includes the Norm Activation Model and the Theory of Planned Behavior, which have been used to clarify many PEBs.

The Theory of Planned Behavior, an extension of the Theory of Reasoned Action, postulates that people make decisions based on their intended behavior. According to this theory, behavioral intention is influenced by attitude (AT), perceived behavioral control (PBC), and social norm (SN) (Ajzen, 1991). AT is based on the anticipated consequences of an action and the evaluation of these outcomes. SN reflects the standard expectations of behavior and adherence to these standards. PBC refers to the degree to which the behavior is controllable by the individual, often assessed by the perceived ease or difficulty of performing the behavior (Ajzen, 2020; Ajzen, 1991). The Norm Activation Model explains human behavior in terms of individual norms (Schwartz, 1977).

Recent studies have focused on understanding customer participation in solid food waste collection (Lee, Sakamoto, & Yoshizawa, 2023) and applying the Theory of Planned Behavior to comprehend recycling behavior (Ayob, Sheau Ting, Abdul Jalil & Chin, 2017). Additionally, several studies have explored the use of waste cooking oil to produce sustainable biodiesel, creating value-added products (Goh, Chong, Ge, Ong, Ng, Tian & Józsa, 2020; Zheng, Wang, Rajaeifar, Heidrich, Zheng, Liang & Zhang, 2020).

However, there is limited knowledge about the intention to recycle waste cooking oil, particularly among young adults in Malaysia (Law, Lye & Ng, 2023; De Feo, Di Domenico, Ferrara, Abate & Sesti Osseo, 2020; Farid, Roslan, Hasan, Othman, & Shirai, 2020). Understanding young adults' intentions and actual practices regarding recycling waste cooking oil is essential for improving separation and recycling behaviors. Young adults significantly impact sustainability as they are future change agents. They are also more technologically savvy and globally connected, staying informed about the latest environmental trends (Law, Lye & Ng, 2023). Thus, this study aims to identify the factors influencing young adults' intentions to recycle waste cooking oil in Malaysia.

Research objectives: The following were the objectives of this study.

- To examine if there is a significant relationship between young adults' attitudes and their intention to recycle used cooking oil
- To examine whether young adults' subjective norms significantly influence their intention to recycle used cooking oil.
- To examine whether perceived behavioral control among young adults is significantly related to their intention to recycle used cooking oil.
- To examine whether young adults' environmental values have a significant impact on their intention to recycle used cooking oil.
- To examine if there is a significant relationship between young adults' moral norms and their intention to recycle used cooking oil.

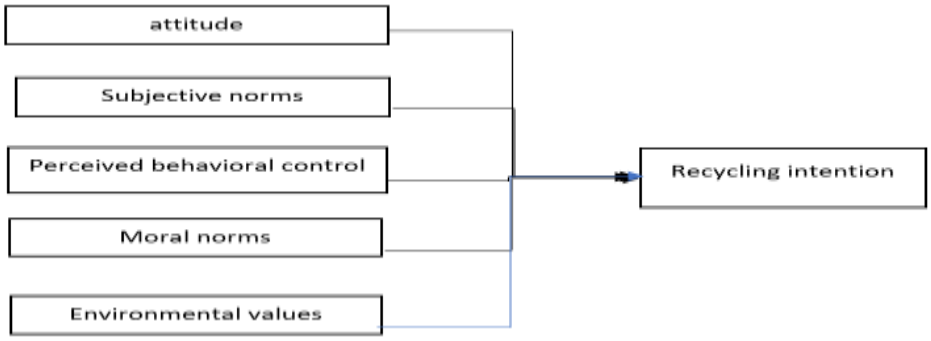
Based on the research background and problem statement, this study seeks to address the following research questions.

Research Question: The following were the questions of this study.

- Does the young adult attitude have a significant relationship with the recycling intention of used cooking oil?
- Do the young adult subjective norms have a significant relationship with the recycling intention of used cooking oil?
- Does the young adult's perceived behavioral control have a significant relationship with the recycling intention of used cooking oil?
- Do young adult environmental values have a significant relationship with the recycling intention of used cooking oil?
- Does the young adult moral norm have a significant relationship with the recycling intention of used cooking oil?

Conceptual framework and hypotheses Development

Figure 1: The Conceptual Framework



2. Literature Review

The research framework indicated that there were three independent variables: attitude, subjective norms, perceived behavioral control, environmental values, and moral norms.

Attitude: Research on household recycling intentions indicates that people's recycling behaviors are heavily influenced by their attitudes (Al Mamun, Mohiuddin, Ahmad, Thurasamy & Fazal, 2018). The level of these attitudes varies across different countries and cultures (Oztekin, Teksoz, Pamuk, Sahin & Kilic, 2017; Zhang, Lai, Wang & Wang, 2019; Xu, Ling, Lu & Shen, 2017). These studies show that individuals' surroundings impact their decision to develop a positive attitude. People with positive attitudes generally strive to maintain clean and hygienic environments and contribute to a better environment (Escario, Rodriguez-Sanchez & Casalo, 2020).

Based on this discussion, the following hypotheses are proposed:
H1: The young adult attitude has a significant relationship with the recycling intention of using cooking oil.

Subjective Norms: Interest in recycling behavior is often driven by perceived social pressure to engage in recycling activities. Subjective norms describe how social influence affects an individual's behavior. The intention to perform a behavior is perceived to be influenced by significant people in one's life. Individuals are likely to be influenced by others' opinions about the appropriateness of a particular behavior, seeking reinforcement or validation when making decisions. The greater the support from social norms, the more likely individuals are to choose to recycle (Czajkowski, Zagorska, & Hanley, 2019; Czajkowski, Hanley, & Nyborg, 2017). This indicates that individuals with supportive surroundings are more likely to continue recycling (Knickmeyer, 2020). Previous studies have shown the impact of subjective norms on intentions for pro-

environmental behavior, including recycling plastic waste (Aikowe & Mazancova, 2021), agricultural waste (Zeng, Tian, He & Zhang, 2019), and e-waste (Ang, Mohammad & Shobri, 2023).
Therefore, the following hypothesis is investigated in this study:
H2: Subjective Norm has a significant relationship with the recycling intention of used cooking oil.

Perceived Behavioral Control: Perceived behavioral control refers to the anticipation of barriers and reflects prior experiences, describing how easy or difficult behavior is perceived to be (Rodrigues, Figueiredo, Jacinto, Monteiro & Morouco, 2023). The perceived ease or difficulty of performing an activity can be seen as perceived control (Ajzen, 2020). Therefore, people who understand how to recycle are more likely to do so. Previous research has shown that perceived behavioral control can influence behavioral intention (Arli, Badejo, Carlini, France, Jebarajakirthy, Knox & Wright, 2020), including intentions to recycle used cooking oil (Lee, Sakamoto & Yoshizawa, 2023), and engage in pro-environmental behavior (Vicente, Marques & Reis, 2021). Procedural knowledge of recycling has been proven to influence recycling behavior (Wang, Long, Wang, Ding & Cai, 2021). Thus, perceived behavioral control significantly impacts recycling rates (Pamuk & Kahriman, 2019).
Based on this discussion, the following hypothesis is proposed:
H3: Perceived Behavioural Control has a significant relationship with the recycling intention of used cooking oil.

Environmental Values: Values play a significant role in explaining pro-environmental behaviors (Primc, Ogorevc, Slabe Erker, Bartoli & Murovec, 2021). They shape a person's identity and personality, driving their behavior (de Groot & Thogersen, 2018). People's intentions to engage in certain actions can be influenced by their values. According to Tamar, Mirawan, Arfah & Putri (2021), values can predict pro-environmental behaviors such as driving electric cars (Lee, Kim & Roh, 2023) and staying in green hotels (Rahman & Reynolds, 2019). Consumers' activities are influenced by their values, and they consider how well a particular behavior aligns with their values, past experiences, current beliefs, and established needs when making decisions (Chan, 2020). Numerous studies have shown that environmental values impact pro-environmental behaviors like recycling (Tonglet, Philips & Bates, 2004; Nordlund & Garvill, 2002). Based on this discussion, the following hypothesis is proposed:
H4: Environmental values have a significant relationship with the recycling intention of used cooking oil.

Moral Norms: While there is growing evidence that "moral norms" (MN) significantly explain the variation in pro-environmental behaviors, there is still debate about how MN fits within the Theory of Planned Behavior (TPB) framework. Beyond considering values and preferences, it is important to define how they relate to norms in an abstract sense (Serramia, Lopez-Sanchez, Rodriguez, Morales & Ansotegui, 2018; Schwartz, 1968). Based on this discussion, the following hypothesis is proposed:
H5: Moral Norm has a significant relationship with the recycling intention of used cooking oil.

Thus, the objectives of this study are to determine factors like attitude, subjective norm, perceived behavior, moral norm, and environmental values in influencing young adult intention in Malaysia.

3. Methodology

A quantitative research study was conducted to identify the factors influencing young adults' motivation to recycle. An online survey was administered to a sample size of 280 respondents, primarily targeting young adults, especially university students across different universities and regions. This group was chosen due to their high homogeneity, such as similar age and education levels. Additionally, they are active in both society and online, making them more likely to be aware of recycling activities. The total population for this study was considered to be the university student population in Malaysia, which numbers approximately 1.2 million.

Respondents received a self-administered questionnaire via email and WhatsApp. The questionnaire was designed to measure dependent and independent variables and also collected demographic information such as gender, age, race, and education level. The measurement scales for the constructs were adapted and modified from previous studies (Wan et al., 2017) and analyzed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). After performing a descriptive analysis of the demographic profiles, multiple

regression was conducted using SPSS, and Cronbach's alpha was used to test the normality and reliability of the data.

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4. Results and Findings

Based on the demographic profiles, the study revealed that the majority of respondents were female, accounting for 68.6%. The predominant age group among respondents was 20-24 years old (55.5%), followed by 25-29 years old (12.1%), and those below 20 years old (11.4%). Notably, most respondents were Malays, comprising 78.3% of the sample, while 10.7% were Bumiputra Sabah and 9% were Bumiputra Sarawak.

The reliability of the measurement items for all variables, and the values of Cronbach Alpha obtained from the test were between 0.848 and 0.957. Therefore, the instrument used in the study was consistent and highly reliable (Table 1).

Table 1: Reliability Test of The Measurement Item

No.	No of items	Cronbach's Alpha
1 ATTITUDE	6	0.957
2 SUBJECTIVE NORM	5	0.923
3 PERCEIVED BEHAVIOURAL CONTROL	6	0.906
4 ENVIRONMENTAL VALUES	10	0.964
5. MORAL NORM	4	0.848

Multiple regression in Table 2 shows an F value of 143.167 and all the independent variables used in this research were significant and the p-value obtained was less than 0.05 ($p<0.05$), hence the hypothesis can be tested. Then, Table 3 summarizes the hypothesis' results. Based on the multiple regression coefficients, only H2, H3 and H4 have a significant relationship ($p<0.05$), while H1 and H5 are not.

Table 2: Multiple Regression - Annova

Model	Sum of Squares	df	Mean square	F	Sig.
Regression	361.692	5	72.338	143.167	<.001
Residual	143.497	284	.505		
Total	505.189	289			

a. Predictors: (Constant), ATTITUDE, SUBJECTIVE NORM, PERCEIVED BEHAVIOURAL CONTROL, MORAL NORMS, ENVIRONMENTAL VALUES
b. Dependent variable: INTENTION

Table 3: Coefficients of The Regression Model

		Unstandardized coefficients	Standardized coefficients			Result
Variable	B	Standard Error	Beta	*t*	Sig.	
(Constant)	-.231	.228		-1.013	.312	
ATTITUDE	.053	.036	.057	1.463	.144	**REJECT**
SUBJECTIVE NORM	.467	.047	.489	9.984	<.000	**SUPPORT**
PERCEIVED BEHAVIOURAL CONTROL	.093	.40	.096	2.300	.022	**SUPPORT**

ENVIRONMENTAL VALUES	357	0.045	.323	7.912	<.001	**SUPPORT**
MORAL NORMS	.064	0.57	.060	1.126	.261	**REJECT**

a. Dependent variable: INTENTION

Multiple regression analysis in Table 4 indicates an R-squared value of 0.716, signifying that 71.6% of the variance in the dependent variable, which represents the factors influencing young adults to engage in recycling behavior, can be explained by changes in the selected independent variables: attitude, subjective norm, perceived behavior control, moral norm, and environmental values. The remaining percentage is attributed to other factors not included in the model.

Table 4: Multiple Regression -Model Summary

Model	R	R Square	Adjusted R Square	Std Error of the estimate
1	.846[a]	.716	.711	.71082

a. Predictors: (Constant), ATTITUDE, SUBJECTIVE NORM, PERCEIVED BEHAVIOURAL CONTROL, MORAL NORMS, ENVIRONMENTAL VALUES
b. Dependent variable: INTENTION

Discussion

This study examines the relationship between attitude, subjective norm, perceived behavioral control, moral norm, and environmental values in influencing young adults' recycling intentions among university students. The study successfully achieved its objective of understanding these relationships. However, the findings indicate that attitude and moral norms were not significant factors influencing young adults' recycling intentions. This indicated that the way individuals feel about recycling (whether good or bad) does not have a strong influence on their intention to recycle. In contrast, subjective norms, perceived behavioral control, and environmental values were significant factors.

This study is aligning with Kumar's (2019) research, which found that subjective norms positively impact adult recycling intentions. Similarly, a study by Arli, Badejo, Carlini, Jabarajakrithy, Knox, and Wright (2020) showed that perceived behavioral control positively explains adult recycling intentions. Many adults believe that friends and family will approve of their recycling actions, especially when announced on social media.

Young people find recycling cooking oil convenient and have ample opportunities to engage in recycling activities in their living areas. They are more likely to begin recycling if their subjective norms and perceived behavioral control are both high (Soomro, Hameed, Bhutto, Waris, Baeshen & Al Batati, 2022). Environmental values also significantly influence young adults' recycling behavior (Balunde, Perlaviciute, Truskauskaite-Kuneviciene, 2020). This study implies that environmental values are crucial for young adults. A country's commitment to environmental values is a good indicator of its progress toward a better environment and higher living standards, contributing to sustainability (Boca & Saracli, 2019; Diddi, Yan, Bloodhart, Bajtelsmit & McShane, 2019).

The study also found that attitude is not a significant factor in recycling behavior for used cooking oil. A study by Thoo, Tee, Huam & Mas'od (2022) similarly demonstrated that attitude has little impact on actual recycling behaviors. Since attitude is not significant, universities have a role in changing students' attitudes by creating awareness about recycling activities. Additionally, moral norms were found to be insignificant to young adults' recycling intentions, consistent with a study by Khan, Ahmed & Najmi (2019), which showed that moral norms had little influence on recycling behaviors.

5. Conclusion and Recommendations

These young adults understand the benefits of recycling for society and academia. To enhance young adults' attitudes and moral norms towards recycling, universities can raise awareness by conducting hands-on workshops that demonstrate how to properly collect and store used cooking oil for recycling purposes. Implementing rewards or incentives, such as offering discounts at local campus shops for active recycling participants, can also be effective. Universities could collaborate with campus cafes to set up collection points for used cooking oil and provide clear guidelines and easy access for disposal, ensuring recycling bins are strategically placed in convenient locations.

Promoting knowledge about recyclable and reusable cooking oil can contribute to environmental sustainability. Basic tips or simplified infographics in multiple languages displayed on posters around campus can appeal to young adults from various backgrounds. This approach can help young adults become more ambitious and understand the impact of the unconscious mind on environmental consciousness, equipping them with information to make the world a cleaner, more beautiful place.

Engaging young adults in recycling initiatives can enhance their sense of responsibility, motivating them to encourage friends, neighbors and family to recycle. Universities should develop educational campaigns to explain the environmental impact of improper disposal of used cooking oil. Inviting speakers or experts in the field to share success stories of individuals and communities that have successfully implemented used cooking oil recycling programs can also be beneficial. These programs can provide information and facts to increase awareness and highlight places where used cooking oil can be properly disposed of for waste separation and recycling. Future studies could focus on other factors that might influence the decision to reuse cooking oil.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Financial Distress Prediction of Islamic Banks in Top Sukuk-Issuing Countries: An Application of Altman's Z-Score Model

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Abstract: Financial stability and solvency are essential for manufacturing and service businesses driven by profit, especially the banking sector. As a service sector organization, the banking industry is vital to economic growth. Along with the financial market, both achieved significant progression, particularly in the sukuk market. Despite the possibility of complementary interaction between the sukuk market and Islamic banking institutions, there are also concerns about competitive likelihood. Thus, the study of the finance scope of these Islamic banks in top sukuk issuing countries is crucial. This study applies the Altman Z-score model to measure private-sector banks' financial health from 2018 to 2022. The sample comprises of Islamic banks in the top sukuk-issuing countries (i.e. Malaysia, Saudi Arabia, Indonesia, Turkiye, United Arab Emirates, Bahrain, and Pakistan). It concludes that UAE, Indonesia, and Saudi Arabia are experiencing financial distress since these banks fall into the "Distress Zone" according to Z-score criteria. Meanwhile, Turkiye, Bahrain, and Pakistan are categorized under the "Grey Zone" and require further improvement on specific financial ratios. Lastly, Malaysia is the only country under the top sukuk-issuing countries that merely achieved the "Safe Zone" criteria, implying that the Islamic banks in this country have greater financial stability rather than others.

Keywords: *Financial Stability, Islamic Banks, Sukuk, Altman Z-Score, Financial Distress.*

1. Introduction

Islamic banking is a component of the worldwide financial system that serves in compliance with Shariah principles, which are based on Islamic law. The principles encompass restrictions on usury (interest), prohibitions on gambling, speculative activities, and behaviors that contravene Islamic ethical and moral standards (Prima Sakti & Mohamad, 2018). The primary objective of Islamic banking is to offer financial services that align with these principles and assist the Muslim community in attaining their financial objectives while upholding Islamic values. The performance of Islamic banking has seen substantial growth and a rising level of global awareness since its inception. This is the outcome of endeavors to enhance the conception of Islamic banking, heighten public consciousness, as well as offer pertinent products and services to consumers who adhere to Shariah principles. The Islamic financial market is seeing an increased maturity due to the establishment of more Islamic banking institutions and also the expansion of product and service offerings. With the growth of Islamic financial institutions, sukuk (Islamic bonds) have emerged as a widely used financing tool for Shariah-compliant development and business initiatives. Nevertheless, in contrast to Islamic banking, the Islamic capital market sector, which includes Sukuk as a primary element, viewed a deceleration in its growth rates compared to the previous years. Islamic banking maintained its position of dominance, with total assets amounting to USD 2.25 trillion, or 69.3% of the global assets in the Islamic Financial Services Industry (IFSI) as reported by the IFSB Stability Report in 2023.

Sukuk is an Islamic financial instrument generally employed to generate funds for investment activities that hold to Shariah principles or Islamic law. It diverges from customary responsibilities that yield interest (riba), a practice that is forbidden in Islam (Smaoui, 2017). As per Shariah regulation, Sukuk must stick to the Shariah guidelines established by the Islamic regulatory authority or the designated Shariah expert. This entails ensuring that initiatives financed by Sukuk adhere to Islamic principles by abstaining from acts that are forbidden in Islam, such as the consumption of alcohol, participation in gambling, or the practice of usury. In contrast, Sukuk holders are entitled to the portion of the earnings or profits created by the assets or projects

that are funded by the Sukuk. This market urges foreign investors seeking a Shariah-compliant investment option to diversify their portfolios. Hence, Sukuk enables investors to reduce the risk of their investment portfolios while adhering to Islamic rules and provides a return on investments. This instrument has accelerated the growth of the Islamic financial market.

The key features of Sukuk can be seen from its diverse range of structures, with Mudarabah and Ijarah structures being the most predominant. In the Mudarabah structure, Sukuk investors provide capital to the fund management (mudarib) to invest in a specific project. Sukuk, within the framework of Ijarah, indicates the privileges of sukuk holders to tangible assets or services that Sukuk issuers lease. Generally, Sukuk is utilized by corporate and government entities where seeking funding for projects that adhere to Shariah rules. These projects may include investments in the housing sector, infrastructure development, and lawful companies from an Islamic perspective. It can facilitate infrastructure finance and eventually foster economic development without resorting to usury.

Islamic banks contribute to the growth of Sukuk by acting as either a sukuk holder (investor) or being active in the issuance process as the Sukuk issuer. Nevertheless, the involvement of Islamic banks in the Sukuk market remains underdeveloped. There are only a few Islamic banks that opt to act as Sukuk issuers. The majority of participants in the Sukuk market are purchasers rather than issuers. However, it is necessary to note that the Sukuk market is a highly active and favorable sector within Islamic finance. Table 1 indicates that Islamic banks in Turkiye do not demonstrate any tendency towards issuing Sukuk. However, there is a lack of data regarding this activity in Pakistan and Bahrain. This table also reveals that Islamic banks in the leading Sukuk-issuing countries possess a large amount of Sukuk rather than actively engaging in the issuance of Sukuk. Table 1 presents the average value of Sukuk holdings and Sukuk issuance by Islamic banks in leading Sukuk-issuing countries from 2018 to 2022.

Table 1: Total average value of Sukuk holdings and Sukuk issued by Islamic banks in top Sukuk-issuing countries from 2018 to 2022

Country	Saudi Arabia		Indonesia		UAE		Turkiye		Pakistan		Malaysia		Bahrain	
Indicator	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued	*Sukūk* holdings	*Sukūk* issued
Currency	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	USD	USD
Units	M	M	B	B	M	M	M	M	M	M	M	M	M	M
2018	56337.24	4007.75	36452.41	525.00	47000.98	28080.68	12167.99	0.00	200888.08	...	101918.13	2337.40	...	...
2019	69268.22	4008.18	41124.36	1600.00	50951.65	27684.75	31573.16	0.00	315107.79	...	124669.24	3177.28	...	...
2020	81649.37	4020.50	44999.45	1773.08	52194.03	29961.85	76754.66	0.00	459914.61	...	141119.19	4095.35	...	...
2021	112440.61	4032.27	65432.86	2508.92	52687.15	29095.75	96903.61	0.00	711487.24	...	160169.02	4162.46	...	...
2022	147035.91	14035.54	91924.91	4519.77	65431.23	29330.33	188301.27	0.00	1494714.40	...	170026.25	3332.78	...	...

Source: Prudential and Structural Islamic Financial Indicators (PSIFIs)
(....) Indicates the data is not available
M Indicates Millions
B Indicates Billions
NC Indicates National Currency

Islamic banking and Sukuk are primary elements of the Islamic financial environment. Therefore, they both experienced remarkable growth. There is an ongoing debate among scholars over the impact of Sukuk markets on the Islamic banking industry, as evidenced by the interaction between these two entities. This issue remains unclear, as indicated by studies conducted by Mimouni et al. (2019), Smaoui & Ghouma (2020), Smaoui et al. (2020), and Ledhem (2022). Islamic banking offers a means of financing and investing that adheres to Shariah standards. Sukuk, on the other hand, is a financial instrument that enables organizations to raise cash lawfully according to Islamic principles. They complement each other to assist the growth and development of the Islamic economy and also the Islamic financial market as a whole. Furthermore, Sukuk plays a crucial role in Islamic banks by serving as a viable solution to address the challenges of saving mobilization and liquidity management. It is essential for Islamic banks to actively engage in the growth of the Sukuk market to reap their advantages. The study conducted by Ledhem (2022) focused on several countries, namely Malaysia, Saudi Arabia, Indonesia, Turkiye, and Brunei. The study found that the expansion of the Sukuk market has a favorable impact on the financial stability of these institutions. This can be achieved by enhancing the mutual support and cooperation amongst Islamic banks.

Nevertheless, the expansion of Sukuk can potentially undermine the stability of Islamic banking, as both Sukuk and Islamic banking sometimes compete for the same clientele and investors. Given its appeal as a Shariah-compliant investment option, Sukuk has the potential to compete with Islamic banking directly to obtain consumer funds. The study shown by Mimouni et al. (2019), Smaoui and Ghouma (2020), and Smaoui et al. (2020) demonstrate that the growth of the Sukuk market has a detrimental impact on Islamic banks, as it intensifies rivalry among them. According to Mimouni et al. (2019), the Sukuk market development adversely affected Islamic banks' profitability but did not affect conventional banks. Parallelly operating in the financial market, both Sukuk and Islamic banks compete to attract investors and borrowers who are willing to use Sharia-compliant financial instruments. To obtain Islamic financing, a deficit company can issue Sukuk or borrow from an Islamic bank. In the same vein, a surplus company can invest in Sukuk or choose from various Islamic banking products when selecting investment options. As a result, Sukuk expansion deprives profit directly against Islamic banks. Similarly, Smaoui and Ghouma (2020) discovered that the Sukuk market's expansion has negatively impacted Islamic banks' capitalization since its growth encourages competition among market participants and influences them to maintain lower capital ratios. Expanding Sukuk markets has the potential to reduce banks' market share and increase competition among them. On the other hand, Smaoui et al. (2020) found that the expansion of the Sukuk market hurts the stability of Islamic banks, where the growth of the Sukuk market increases the insolvency risk of Islamic banks, while conventional banks are unaffected. As the Sukuk market becomes more competitive, Islamic banks need to assume greater risk and reduce their margins.

Despite diverse impacts discussed in empirical studies on Sukuk market expansion on Islamic banks' performance, Sukuk markets have experienced remarkable development globally. Given the expanding Sukuk market and the rising need for Shariah-compliant financial instruments, a profound comprehension of Sukuk has become imperative. Sukuk plays a pivotal role in the Islamic financial ecology, offering miscellaneous prospects and obstacles. However, as discussed previously, the growth of the Sukuk market may have an impact on the stability of the bank. To assess the stability of banks in the leading countries for issuing Sukuk, this study utilized the Z-score ratio, which was developed by Edward Altman and is known as Altman's Z-score model. This model quantifies and assesses the financial stability, robustness, likelihood of bankruptcy, and ability to meet the financial obligations of the banking sector. Auditors, financial managers, investors, and lenders should utilize this tool to make informed judgments in the event of financial distress or failure of this institution.

Several empirical research has used the Altman Z-score as a tool for forecasting the occurrence of financial distress in banks (Singh & Singla, 2023; Ntawumenyumunsi & Maringa, 2022; Elia et al., 2021; Ullah et al., 2021; Saputri & Krisnawati, 2020; Joshi, 2020). Consequently, banks will steer clear of financial turmoil. This work contributes to the existing body of study by identifying a unique method for assessing a bank's stability in countries where its Sukuk markets are most prominent. The influence of Sukuk in the financial industry is a newly emerging area of study. Hence, analyzing the financial vulnerability of Islamic banks will offer valuable perspectives within the framework of leading Sukuk-issuing countries.

2. Literature Review

Previous debates have demonstrated that numerous studies have provided support for the notion that Altman's model exhibits more classification capability and remains successful in predicting financial difficulty or business failure. According to Singh & Singla (2023), various models have been periodically developed to forecast the likelihood of failure, and among these models, Altman's Z-score model is widely utilized in practical applications. Companies use these models to predict whether they will face financial difficulties and insolvency shortly. Thus, a financial distress prediction model serves the purpose of not only determining the likelihood of a company's failure but also acting as an early indicator to prevent bankruptcy. Several studies have been undertaken to create financial distress prediction models following the development of Altman's model. These studies provide empirical evidence that the Altman Z-score was implemented to assess institutions' financial stability.

Joshi (2020) applied Altman's Z-Score model to forecast financial distress in a sample of twenty public sector banks in India. Upon analyzing the data collected during ten years from 2009-2010 to 2018-2019, it was discovered that all of the chosen banks were deemed to be in a secure financial position. This conclusion was

based on the fact that the average Altman's Z-Score value exceeded the recommended threshold of 2.9, which indicates a safe zone.

Meanwhile, Elia et al. (2021) utilized the Altman Z-score model to demonstrate its effectiveness in forecasting the financial distress of Lebanese Alpha banks from 2009 to 2018. The study used the Altman Z-score to assess the financial health of non-manufacturing enterprises operating in emerging regions. According to the estimated value, most of the ten Alpha Banks had values lower than the threshold of 1.1, demonstrating that they were in a state of distress throughout the specified period.

Moreover, in the context of Islamic banking institutions, a comparative analysis study was conducted by Sabir et al. (2018) to evaluate the stability performance of Islamic banks in Pakistan and Malaysia using Altman's Z-score. The study covered 8 Islamic banks in Pakistan and 12 Islamic banks in Malaysia from 2011 until 2015. The research results propose that Malaysia's Islamic banking industry is classified in a state of distress, while Pakistani Islamic banks are operating in a "safe zone." In comparison to Islamic banks in Pakistan, Malaysian banks exhibit a higher degree of instability during the study period.

On the other hand, in consideration of all banking sectors in Pakistan, Ullah et al. (2021) assessed the financial well-being of Pakistan banks' performance using the Altman Z-score methodology. Banking data was collected through the Pakistan Stock Exchange (PSX) from 2013 to 2017, and it was determined that the local banking industry had positive forecasts. However, it was seen that most of the foreign Pakistani banks faced bankruptcy, as their Z-scores fell below 1.1. According to the Z-score study, all banking facilities are viewed to be financially stable as they acquire adequate bankruptcy control capabilities. Concurrently, foreign banks experienced financial failure and could not sustain themselves in the future due to their inability to meet both short-term and long-term loan obligations.

Furthermore, Ntawumenyumunsi and Maringa (2022) performed a study on the impact of financial distress indicators on the financial performance of commercial banks listed on the Rwanda Stock Exchange between 2015 and 2019. They utilized the Altman Z-score failure prediction model for their analysis. They focused exclusively on three banks within this stock exchange and discovered a strong probability of bankruptcy because all three banks had a Z-Score below 1.8 over five years. They are currently in a state of ambiguity, which is referred to as the 'Grey Zone', and require thorough monitoring and corrective measures in their daily operations to mitigate uncertainty and improve their financial standings in the long term.

3. Methodology

The study is focused on Islamic banks in top-issuing Sukuk countries, including Malaysia, Indonesia, Saudi Arabia, the United Arab Emirates (UAE), Pakistan, Turkiye, and Bahrain. All the banks' data were extracted from the IFSB's Prudential and Structural Islamic Financial Indicators (PSIFIs) database from 2018 to 2022. The database is used as key information for predicting the stability of these Islamic banks.

All the data was analyzed using Altman's Z-score model. This measurement model is considered a reliable method for evaluating a bank's financial health, particularly in times of economic volatility. It assists in the identification of institutions that are very vulnerable to bankruptcy, enabling management to implement several actions to reduce these risks proactively. In this study, Altman's Z-score model 1993 is more practical rather than the original Z-score model (Altman's 1968). The Altman's (1993) Z-score model initially comprised of two versions. The first version was designed for privately owned non-manufacturing enterprises, while the second version was customized to cater to emerging markets. The second version covered an additional constant term of +3.25, in addition to the four variables present in both versions. The original model (Altman's 1968) comprised five variables, which were modified to measure the Z-score model (used for companies in the manufacturing sector). The main model adjustment made from the original model was the fourth variable (X4), namely the book value of equity, while the fifth variable (X5) was eliminated from the model. Thus, the Z_-score model applied in this study is as follows:

$$Z = 3.25 + 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4) \quad (1)$$

Whereby Z stands for the Altman's Z-score of Islamic banks in top Sukuk-issuer countries; X1 denotes the working capital as per total assets; X2 is the retained earnings as per total assets; X3 is the earnings before interest and taxes divided by total assets, and X4 is the book value of equity as per book value of total liabilities.

If the result of the score for private and non-manufacturing companies is interpreted as above 2.6, it is considered that the company is in a 'Safe' Zone. Meanwhile, if the score is less than 2.6 but above 1.1, the company is considered in the 'Grey' Zone. However, if the score is less than 1.1, the company is considered in the 'Distress' Zone based on the financial figures.

For this study, as classified above, the revised Z-score with four variables and a constant term is used to measure the Z-score of financial institutions in emerging markets. This model is a robust method for assessing the distress potential of like-industry firms (Yohannes, 2021).

4. Data Analysis

This study was conducted using the Z-score method to analyze the financial health of Islamic banks in emerging markets about the core issue discussed. Various ratios, including the working capital to total assets ratio, retained profits to total assets ratio, operating income to total assets ratio, and book value of equity to book value of debt ratio, were computed for T1, T2, T3, and T4. This study extracted the data from the Prudential and Structural Islamic Financial Indicators (PSIFIs), respectively, and needed to rearrange them to calculate the ratios.

Working Capital to Total Asset Ratio

The working capital to total asset ratio in Table 2 indicates the liquidity situation relative to the total capitalization of the banks. It assesses the bank's capacity to fulfil its immediate financial responsibilities. According to Table 2, the Islamic banks in the UAE have the most negative average working capital to total assets ratio (-0.64716). Islamic banks in Malaysia posit the highest average ratio of working capital to total assets (0.04803) compared to other banks.

Table 2: T1 is a Working Capital/Total Assets of Islamic Banks (in USD)

Period/Country	Malaysia	UAE	Turkiye	Indonesia	Bahrain	Pakistan	Saudi Arabia
2018	0.0460	-0.6438	-0.2755	-0.6413	-0.1460	-0.2354	-0.5480
2019	0.0568	-0.6442	-0.2302	-0.6269	-0.1375	-0.2331	-0.4778
2020	0.0397	-0.6413	-0.3110	-0.5819	-0.1145	-0.1772	-0.5005
2021	0.0528	-0.6403	-0.1507	-0.5520	-0.1019	-0.1163	-0.5462
2022	0.0450	-0.6663	-0.1807	-0.7041	-0.0951	-0.0292	-0.5071
Average	0.0480	-0.6472	-0.2296	-0.6212	-0.1190	-0.1582	-0.5159

The working capital of a bank generally refers to the amount of liquid assets readily accessible for the bank's day-to-day operations. The presence of negative working capital in the aforementioned Islamic banks (except Malaysia) suggests an inability to fulfil their immediate financial obligations. Furthermore, it is important to note that an extremely raised level of working capital may not necessarily be beneficial for the bank. This is due to the potential drawback of lost investment prospects arising from allocating a significant portion of its cash resources. The primary source of liquidity risk in Islamic banks is inadequate availability of liquid products that adhere to Shari'ah principles. Islamic banks lack the range of funding choices that conventional banks have within the interbank market. In contrast, there is a significant likelihood of the Islamic bank encountering a liquidity deficit if there is a sudden rise in the withdrawal of deposits by borrowers.

Retained Earnings/Total Assets

The ratio of a company's retained earnings to its total assets is presented in Table 2. It indicates the proportion of the total assets that retained earnings have funded. The ratio should be as high as possible because it indicates the degree to which a bank is financially stable, even when the profits are low. It also shows that banks relied on internal financing based on their earnings as a source of funding rather than debt financing due to a more cost-effective choice. It was found that all of these banks' retained earnings financed an average of two to three percent of their overall assets.

The study's findings indicate that the banks included in the sample have employed a higher proportion of debt rather than retained earnings. The study shows a decrease in the ratio of banks in Turkiye, Bahrain, and Saudi Arabia. At the same time, an increase is observed in the ratio of banks in Malaysia, the UAE, Indonesia, and Pakistan in December 2022, implying a fluctuating trend in using retained earnings throughout the study.

Table 3: T2 is a Retained Earnings over the Total Assets (in USD)

Period	Malaysia	UAE	Turkiye	Indonesia	Bahrain	Pakistan	Saudi Arabia
2018	0.0233	0.0092	0.0221	0.0080	0.0042	0.0076	0.0149
2019	0.0238	0.0212	0.0222	0.0099	0.0062	0.0116	0.0161
2020	0.0276	0.0201	0.0191	0.0085	-0.0002	0.0165	0.0127
2021	0.0278	0.0178	0.0205	0.0102	0.0044	0.0184	0.0147
2022	0.0289	0.0215	0.0164	0.0119	0.0032	0.0214	0.0141
Average	0.0263	0.0179	0.0201	0.0097	0.0036	0.0151	0.0145

Earnings Before Interest and Taxes (EBIT) over Total Assets

This ratio exhibits a bank's operational efficiency, whereby the profits generated after operating expenses are deducted from revenue. Therefore, it also indicates the bank's profitability, which is how the bank successfully generates earnings before interest and taxes from its assets. The greater the bank's earnings from its assets, the more effectively the assets are used to generate income.

Table 4: T3 is an Earnings Before Interest and Taxes as per Total Assets (in USD)

Period	Malaysia	UAE	Turkiye	Indonesia	Bahrain	Pakistan	Saudi Arabia
2018	0.0101	0.0169	0.0148	0.0129	0.0074	0.0069	0.0246
2019	0.0109	0.0126	0.0117	0.0157	0.0055	0.0115	0.0257
2020	0.0068	0.0101	0.0116	0.0143	0.0024	0.0141	0.0210
2021	0.0111	0.0132	0.0102	0.0169	0.0058	0.0125	0.0246
2022	0.0116	0.0174	0.0347	0.0224	0.0068	0.0161	0.0237
Average	0.0101	0.0140	0.0166	0.0164	0.0056	0.0122	0.0239

According to Table 4, the ratios are not too far apart from the others. It can be seen that the average EBIT to Total Assets ratio of Islamic banks in Saudi Arabia is 0.0239, which demonstrates that these banks have made a substantial operating profit in proportion to their assets when compared to the other financial institutions. The average ratios of Islamic banks in Bahrain and Malaysia are just 0.0056 and 0.0101, respectively, which illustrates that these banks have poor profitability in the amount of their assets.

Book Value of Equity to Book Value of Total Liabilities

The book value of equity, or net worth, signifies the total capital invested by ordinary and preferred shareholders. In the financial statement, the share capital, general reserves, retained earnings, and revaluation reserves generally characterize the ownership of the company's shareholders. Furthermore, excessive debt will often lead to insolvency. Debt generally pays a fixed interest rate, while equity pays a variable dividend. If a bank's debt exceeds its equity, it will increase its financial leverage and eventually affect the profitability as well as the company's performance.

Meanwhile, the book value of equity to book value of liability ratio measures a business entity's long-term financial stability without relying on borrowed capital. Having a 1:1 equity-debt mix in banks is considered highly favorable. Therefore, companies with high market capitalizations and low debt levels are often considered to be more stable and less susceptible to risk. A higher ratio indicates that the company has a significant market capitalization compared to its debt, which signals a stronger financial position. Meanwhile, a low ratio indicates that the company's obligations are significant compared to its equity market value, representing increased financial and insolvency risks.

Table 5 shows the Islamic banks' book value of equity to book value of debt ratios, which provides insight into the degree to which a bank's market value of stock is adequate to meet its whole commitments. Concerning the result above, all the ratios are relatively lower than 1, except for Bahrain. It can be concluded that regarding these ratios, the financial health of all Islamic banks under this study is relatively poor, and instability and the likelihood of bankruptcy are higher since the banks rely more on debt financing. Most Islamic banks under this study must improve these ratios either by increasing the book value of their equity (i.e. asset-backed sukuk issuance) or by retiring some of their book value of debt funds to achieve financial stability, as a ratio of more than 1 is considered less risky. In other words, Islamic banks should ensure that the book value of equity is maximized and total liabilities are minimized so that the component of X4 can have a positive effect on the overall Z-score ratios model.

Table 5: T4 is a Book value of equity as per Book value of debt of Islamic Banks (in USD)

Period	Malaysia	UAE	Turkiye	Indonesia	Bahrain	Pakistan	Saudi Arabia
2018	0.0739	0.1484	0.0885	0.1098	1.8284	0.0618	0.1748
2019	0.0752	0.1565	0.0866	0.1163	1.2863	0.0573	0.1642
2020	0.0769	0.1602	0.0727	0.1170	1.5281	0.0601	0.1522
2021	0.0747	0.1515	0.0644	0.1162	1.5618	0.0560	0.1364
2022	0.0743	0.1551	0.0700	0.1204	1.6964	0.0488	0.1280
Average	0.0750	0.1543	0.0765	0.1160	1.5802	0.0568	0.1511

Z-score value

The computation of the Z-score value of all Islamic banks in top Sukuk issuing countries is done by applying the formula as follows:

$$Z = 3.25 + 6.56\ (X1) + 3.26\ (X2) + 6.72\ (X3) + 1.05\ (X4) \quad (2)$$

This model is used to determine the Z-score in emerging markets, showing the non-manufacturing company's financial stability and probability of bankruptcy. Generally, the lower the Z-score, the higher the possibility that a company will become insolvent and go for bankruptcy. Table 5 shows the result of the Z-score of all Islamic banks in the top Sukuk-issuing countries from 2018 to 2022, which reveals that Malaysia's Z-score value of Islamic banks was 3.7975 within that period. Based on the score, this country falls in the 'Safe' Zone, which implies the probability of financial catastrophe is low.

Meanwhile, there are three countries where their Islamic banks are classified under the 'Grey Zone'. This zone is an unfavorable area of financial health based on Altman's 1993 model since it shows the uncertainty of their financial conditions. It signals the possibility of bankruptcy if the bank does not properly manage its financial activities. As per the table below, from 2018 to 2022, the Z-score values of Islamic banks in Turkiye, Bahrain, and Pakistan are 2.2510, 2.3223, and 2.4023, respectively. They fall in the 'Grey' Zone ($1.1<Z<2.6$), which indicates the probability of financial catastrophe is average and considered as a moderate risk of bankruptcy. In this case, the banks are required to improve their financial performances; otherwise, they may go into a distress zone.

On the other hand, the table below also shows that the Z-score of Islamic banks from 2018 to 2022 in UAE, Indonesia, and Saudi Arabia are -0.4306, -0.5615, and 0.2323, respectively. They suppose comparatively the lowest Z-score amongst all the top Sukuk-issuing countries. Their discriminant zones are placed in the distress zone ($Z<1.1$), the worst of all discriminate zones; at the same time, it can also be considered a danger zone with a high risk of bankruptcy. The Islamic banks in these three countries display a quite low value compared to other top Sukuk issuing countries and probably go for bankruptcy in subsequent years. Thus, these banks should take prompt action to have stable financial conditions.

Table 6: Z-score of Islamic Banks in Top Sukuk-Issuing Countries

Country	Z-score Component	Z-score Multiple	Z-score Value	Total Z-score Value
Malaysia	Constant	3.25	3.25	3.7975
	T1	6.56*0.0480	0.3151	

	T2	3.26*0.0263	0.0857	
	T3	6.72*0.0101	0.0680	
	T4	1.05*0.0750	0.0787	
Turkiye	Constant	3.25	3.25	2.2510
	T1	6.56*-0.2296	-1.5063	
	T2	3.26*0.0201	0.0654	
	T3	6.72*0.0166	0.1116	
	T4	1.05*0.0765	0.0803	
Bahrain	Constant	3.25	3.25	2.3223
	T1	6.56*-0.1190	-0.7807	
	T2	3.26*0.0036	0.0116	
	T3	6.72*0.0056	0.0376	
	T4	1.05*1.5802	1.6592	
Pakistan	Constant	3.25	3.25	2.4023
	T1	6.56*-0.1582	-1.0381	
	T2	3.26*0.0139	0.0452	
	T3	6.72*0.0122	0.0821	
	T4	1.05*0.0600	0.0630	
UAE	Constant	3.25	3.25	-0.4306
	T1	6.56*-0.6472	-4.2454	
	T2	3.26*0.0179	0.0585	
	T3	6.72*0.0140	0.0943	
	T4	1.05*0.1543	0.1621	
Indonesia	Constant	3.25	3.25	-0.5615
	T1	6.56*-0.6212	-4.0754	
	T2	3.26*0.0097	0.0316	
	T3	6.72*0.0164	0.1104	
	T4	1.05*0.1160	0.1218	
Saudi Arabia	Constant	3.25	3.25	0.2323
	T1	6.56*-0.5159	-3.3844	
	T2	3.26*0.0145	0.0473	
	T3	6.72*0.0239	0.1608	
	T4	1.05*0.1511	0.1587	

5. Conclusion and Recommendations

This study aims to predict the Islamic bank's stability in top Sukuk-issuing countries measured using the Z-score ratio of emerging countries, which is commonly referred to as Altman's 1993 Z-score model. The results from the scores can be used by investors, financial managers, and analysts to make financial decisions. Therefore, the study consistently identified the Islamic banks in Malaysia as the top performers. Conversely, the Islamic banks in Indonesia have the weakest financial condition compared to those in other leading countries that issue Sukuk. Hence, most Islamic banks in leading Sukuk-issuing countries must enhance their financial performances to prevent bankruptcy. Even though the Altman Z-score is not the only model for forecasting banks' financial distress, banks can improve their financial performances (Z-score) by improving working capital, increasing internal capital and EBIT, and also optimizing the debt side.

In addition, although external events can influence the Z-score, they can help to provide a quick analysis of where a company stands compared to competitors and track the risk of insolvency over time. Therefore, this study exhibits that banks need to have significant involvement in the Sukuk markets, particularly in Sukuk issuance on asset-backed Sukuk, which is more likely equity-based financing. Besides enhancing its function as an Islamic intermediation, the Islamic bank's involvement in Sukuk issuance allows it to overcome various problems related to saving mobilization, bank liquidity management, risk-taking, and long-term investment, which can boost stability performance.

Acknowledgment: The authors express their gratitude to Universiti Teknologi MARA, Melaka, for providing support for this article.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Understanding Innovative Work Behaviour: A Proposed Framework For University Lecturers in Malaysia

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Abstract: This paper aims to explore the relationship between knowledge sharing, rewards, and charismatic leadership with innovative work behavior among university lecturers in Malaysia. This paper discusses the importance of innovation and innovative work behavior in organizations, particularly in the context of higher education institutions. It highlights the role of academics in generating new knowledge and the need to examine the impact of innovative work behavior on academics. This study proposed quantitative research that involves public university lecturers as respondents and implementing purposive sampling. Later, this study also proposes to analyze the data using Smart Partial Least Squares (SmartPLS) to test the hypothesis development. According to the discussions, universities play an important role in encouraging innovative performance, and knowledge sharing among academicians promotes collective learning and stimulates innovation. Overall, the discussion emphasizes the urgency of conducting a study on the influence of innovative work behavior on academics and the importance of developing a structured framework to enhance innovative work behavior among university lecturers.

Key Words: *Innovative Work Behavior; Knowledge Sharing; Rewards; Charismatic Leadership; University Lecturers*

1. Introduction

In light of the expanding global market, organizations must prioritize innovation to generate novel ideas and expertise to navigate the volatile internal and external environment effectively. According to Salem (2014), it has been considered a fundamental component of entrepreneurship to boost economic development. In addition to participating in the global economy, developing nations must guarantee that their higher education system contributes to the formation of a proficient workforce capable of adapting to the evolving demands of the modern knowledge-driven economy. Education is a crucial source of information that helps improve human talents and attitudes, ultimately creating knowledgeable workers (Mohd Zain, Aspah, Mohmud, Abdullah & Ebrahimi, 2018). The contribution of academics is significant in developing and formulating new knowledge, theories, models, practices, systems, technologies, tools, and methodologies. These advancements are only accomplished via innovative behavior.

In dynamic and complex environments, it is critical for leaders to proactively seek out innovative approaches for their businesses to ensure the sustained success and viability of an organization (Salam & Senin, 2022). Furthermore, in light of the ever-changing business environment, the importance of an employee's innovative work conduct is progressively being acknowledged as a critical factor in enhancing the competitiveness and efficiency of an organization (Afsar & Umrani, 2020). Additionally, according to Wissmann (2021), employees are a critical asset within an organization and possess considerable value; neglecting to utilize their innovative potential would result in a substantial detriment to the organization. Therefore, organizations must understand how to motivate and support the innovative work behavior of their employees. Therefore, it is critical to develop a structured framework to enhance innovative work behavior (Ranihusna et al., 2021).

Problem Statement and Urgency To Conduct the Study

Over the last ten years, globalization has presented institutions in numerous sectors with obstacles, such as increased performance expectations (Mohd Rasdi et al., 2022). This assertion holds particular validity within the realm of higher education, given the global emphasis that governments place on university-level instruction (Chankseliani et al., 2021). Universities are integral components of the wider academic delivery system, which serves essential roles in education and research (Janib et al., 2021). They are vital and dynamic contributors to

the expansion of a nation's economy and society, serving as scientific and academic institutions that propel progress (Bayuo et al., 2020).

According to Brekke (2021), professors play a crucial role in a university's success and growth via their innovative ideas. Teaching, supervising, publishing, competing in research, seeking research funding, and administrative work are only a few of the many responsibilities placed on academic staff in public universities (Janib et al., 2021). Cremin and Chappell (2019) note that their main role is to develop and execute innovative pedagogy.

Therefore, it is critical to examine the impact of innovative work behavior on academics to enhance the capacity of universities to generate new knowledge (Yean, Johari & Yahya, 2016). Furthermore, previous research on the factors that influence innovative work behavior primarily concentrated on Western nations (Zhou & Velamuri, 2018), with comparatively less emphasis placed on service-oriented sectors, especially among university lecturers (Daud, Rahim, Abdullah, Sehat, Sarkam, Abas & Suhaime, 2024; Abdullah, 2019; Javed, Raza, Khan, Arjoon & Tayyeb 2017).

2. Literature Review and Hypothesis Development

Innovative Work Behavior

Innovative work behavior (IWB) is the multifaceted behavior of workers that produces, presents and implements novel ideas. Three essential aspects of this multifaceted behavior are idea generation—the capacity to generate fresh and original ideas; idea promotion—the capacity to explain and promote new ideas to others; and idea realization—the capacity to take fresh ideas and make them a reality. Organizations hoping to stay ahead of the competition must exhibit innovative work behavior. Organizations can foster an innovative culture that will support their success by understanding the elements that affect IWB and acting to promote it.

Initially, Farr and Ford (1990) were the originators of the concept of innovative approaches to workplace practices. "Innovative work behavior" pertains to individuals who proactively produce and apply novel and valuable ideas, processes, items, or procedures. Scott and Bruce (1994) later described innovative work behavior as a sequence of behaviors to identify, nurture, alter, accept, and implement ideas. Innovative work behavior refers to the systematic process of identifying, promoting, implementing, and executing an idea inside a particular operation of an organization, resulting in improved performance at the individual, group, and organizational levels (West & Farr, 1990). This procedure is commonly known as the method of inventive work behavior. De Jong and Hartog (2010) define innovative work behavior as intentional actions undertaken by individuals to suggest or implement original ideas, products, processes, and procedures within their specific work roles, departments, or organizations. This term is derived from the authors' definition of innovative work behavior. According to Yuan and Woodman (2010), creative work behavior refers to the act of starting, cultivating, achieving, and executing new ideas that can improve goods, services, processes, and work methods. To clarify, innovative work behavior can be described as follows. Xerri & Brunetto (2013) described innovative work behavior as a process that seeks to improve the efficiency and effectiveness of problem-solving in the workplace. In a recent study, Farrukh et al. (2022) defined creative work behavior as the actions taken by people and teams in an organization to develop and implement distinctive services, products, tasks, or ideas that enhance the overall performance of the organization.

Innovative work behavior refers to the deliberate introduction of novel ideas, processes, items, or procedures into a particular organizational unit to improve the organization or the community as a whole (Odoardi, 2018). Innovative work behavior refers to the deliberate efforts made by employees to generate, oversee, and implement novel ideas that enhance the organization's competitive advantage and ensure its long-term stability (Bawuro et al., 2018). Qi et al. (2019) found that workers demonstrate innovative work behavior when they give more importance to the process of innovation, such as participating in creative tasks, rather than focusing solely on the outcomes, such as generating new items that lack originality. Innovative work behavior encompasses a variety of acts that empower employees to engage in creative thinking, hence improving their job performance and optimizing procedures and tasks (Samma et al., 2020). Innovative work behavior is the term used to describe employee behavior that affects employee performance (Groselj et al., 2020). Innovative work behavior is a multidimensional concept that includes all employee actions that lead to the creation of

innovative processes (Saeed et al., 2019). There is no denying that universities play a crucial role in fostering innovative performance.

Knowledge Sharing

Distinguishing between knowledge-sharing behaviors and mindsets is important. Behaviors are tangible expressions of attitudes in motion. According to de Vries et al. (2006), an individual's attitude, namely their inclination to share knowledge, significantly influences their behavior in sharing knowledge. Willingness is a quantifiable assessment of an individual's state of being prepared and eager to share their intellectual assets with others. People who are willing to share their knowledge and skills in a group do so because they believe it is beneficial for the group as a whole and they expect others in the group to do the same in return. De Vries et al. (2006) distinguished between willingness and eagerness to share knowledge. They defined eagerness as an individual's strong internal drive to transfer knowledge without expecting any form of compensation. Enthusiastic individuals have the potential to get peer recognition and an improved reputation (de Vries et al., 2006).

Therefore, the act of sharing knowledge encourages the exchange of specialized knowledge and skills among staff members, enhances collective learning, and stimulates self-reflection on current understanding (Chen et al., 2010; Michna, 2018). Hence, the likelihood of engaging in innovative work behaviors and other non-routine activities is higher due to knowledge exchange (Anser et al., 2020). Knowledge sharing is the process by which individuals share their expertise, abilities, and knowledge through action or method (van den Hooff and de Ridder, 2004; Mirzaee and Ghaffari, 2018). Knowledge sharing within organizations comprises the exchange of useful explicit or implicit knowledge among employees. This process leads to the creation of new knowledge, enhances the overall knowledge of the organization, and brings many benefits to the organization. Knowledge sharing has a crucial role in promoting innovation at both the organizational and individual levels, as supported by studies conducted by Kim and Park (2017), Lin (2007), Michna (2018), and Pittino et al. (2018). Knowledge sharing involves the transfer of information, ideas, skills, and other types of assistance among individuals to help carry out a certain task or role (Wang, Wang, & Liang, 2014). King (2006) defines knowledge sharing in the workplace as the exchange of information between individuals and organizations. Similarly, the distribution of information acts as the basis for intellectual resources, a crucial asset in the field of financial planning.

Relationship Between Knowledge Sharing and Innovative Work Behavior

Prior research has largely established the beneficial association between knowledge sharing and innovative work behavior (Anser et al., 2020; Kim and Park, 2017; Radaelli et al., 2014). Previous studies conducted by Radaelli et al. (2014), Akhavan et al. (2015), Jaberi (2016), Phung et al. (2017), and Akram et al. (2018) have all confirmed the notion that there is a significant association between knowledge sharing and innovative work behavior.

Thus, the hypothesis that can be derived from the above discussion is,
H1: There is a significant relationship between knowledge sharing and innovative work behavior.

Rewards

Mascareno, Rietzschel, and Wisse (2020) investigate the little amount of research conducted on the impact of rewards on promoting creativity and innovation. Zhou et al. (2009) and Ong and Teh (2012) define reward as the monetary compensation that an employee receives from an organization in exchange for their services or as a form of remuneration for completing their job. Ong and Teh (2012) assert that rewards play a pivotal role in motivating workers to participate in innovative work behavior. In addition to that, awards serve as a means of acknowledging and compensating individuals for their contributions to innovation. The Innovation Value Institute (2012) asserts that rewards are necessary and essential for promoting innovation.

Relationship Between Rewards and Innovative Work Behavior

Chandler et al. (2002) assert that reward systems significantly influence innovative activity, either by reinforcing innovative activities or by incentivizing other behaviors to contribute to the task. The rewards enhance the creativity and abilities of the workers. According to Rose, Holzle, and Bjork's (2020) research, it encourages people to work hard and makes a significant contribution to boosting employee dedication and

competency, ultimately increasing IWB. Dong, Bartol, Zhang, and Li (2017) assert that workers' motivation and commitment to their organizations increase when they receive recognition for their efforts.

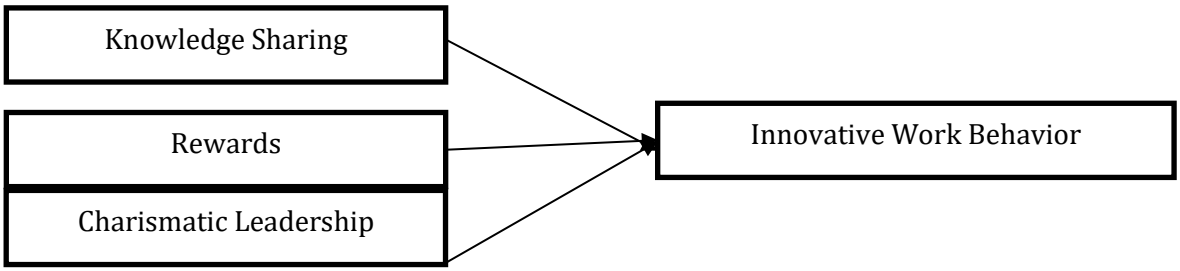
Thus, the hypothesis that can be derived from the above discussion is,
H2: There is a significant relationship between rewards and innovative work behavior.

Charismatic Leadership
Mursaleen, Parveen, and Shahzad (2022) and Higgs (2021) all said that dynamic leadership is a transformational style that focuses on the future and how leaders' vision affects the drive of their followers. Nugraha (2021) says that charismatic leadership is having the power to change other people's thoughts, actions, and feelings because of a unique skill or talent. Additionally, a charismatic style has a big effect on subordinates. Some subordinates believe what the leader says and are ready to follow the leader (Nugraha, 2021). If the favorable impact of these attributes of a charismatic leader on the staff is seen, the organization will probably achieve success in innovation (Adiguzel and Sonmez Cakir, 2020). Thus, academics must possess charismatic leadership qualities to motivate their colleagues to engage in creative work behavior.

Relationship Between Charismatic Leadership And Innovative Work Behavior
Le Blanc (2020) discovered a significant correlation between charismatic leadership and creative work behavior in Spanish banks. Mursaleen, Parveen, and Shahzad, (2022) have conducted quantitative research in Pakistan among manufacturing staff and charismatic leadership has a positive relationship with innovative work behavior. Higgs (2021) also found charismatic leadership has a positive relationship with innovative work behavior among staff in the United States of America.

Thus, the hypothesis that can be derived from the above discussion is, H3: There is a significant relationship between charismatic leadership and innovative work behavior.

Figure 2: Proposed research framework



Underpinning Theory (Social Exchange Theory)
Social exchange theory (SET) pertains to the voluntary behaviors of people that are driven by the anticipated and often realized benefits they get from others. The social exchange theory, proposed by Blau (1964), serves as a suitable theoretical framework for comprehending the connection between servant leadership and charismatic leadership with workers' extra-role behaviors, as discussed by Aboramadan et al (2022). According to Ahmad (2020), employees are more inclined to develop a trusting connection with their leader when they have a favorable impression of their leaders. As a result, workers feel compelled to respond to the charismatic and servant leader's actions by producing favorable work-related results (Aboramadan et al., 2022). Furthermore, personnel who get the requisite training and are paid fair rewards for carrying out creative tasks have the potential to improve the human capital of both individuals and organizations via training methodologies (Zreen et al, 2021). According to Zreen et al. (2021), workers who experience happiness and job satisfaction are more likely to actively contribute their innovative and creative ideas. These three variables could help to enhance the existing idea of theory particularly in SET.

3. Research Methodology

This section explains the use of methodology for this proposed study. Researchers would like to explore the nature of innovative work behavior among lecturers, especially in public universities. This study will be

implementing quantitative research which planning to use purposive sampling. This study also will be using Smart Partial Least Squares (SmartPLS) to analyze the data as well as hypothesis development.

4. Discussion

In the current global market, organizations need to give importance to innovation to create new and original ideas and skills to navigate the unpredictable internal and external environment. Education is an essential means of acquiring knowledge that enhances human skills and attitudes, resulting in the development of competent professionals. Academics have a crucial role in generating novel knowledge, theories, models, practices, systems, technologies, tools, and procedures through inventive behavior. In dynamic and complicated contexts, executives must actively pursue creative strategies for their firms to guarantee the long-term success and sustainability of an organization. Employees are crucial assets in an organization and have significant value. Failing to harness their innovative potential would have a significant negative impact on the organization. Hence, organizations need to comprehend the methods of motivating and facilitating the creative work behavior of their staff.

Institutions have encountered challenges due to globalization, including heightened performance standards, especially in the realm of higher education. Universities are crucial elements of the broader academic system, playing vital roles in teaching and research. Professors are essential contributors to a university's success and expansion through their inventive concepts, which encompass teaching, supervising, publishing, engaging in research competitions, pursuing research funding, and performing administrative tasks.

It is crucial to study the influence of innovative work behavior on academics to boost the ability of institutions to generate new knowledge. Prior research predominantly focused on the characteristics that influence innovative work behavior in Western nations, with relatively less attention given to service-oriented sectors, specifically among university professors.

Innovative work behavior (IWB) refers to the diverse range of actions undertaken by employees to generate, present, and put into practice original ideas. The process encompasses the generation, promotion, and realization of ideas. Organizations can cultivate an inventive culture that will bolster their achievement by comprehending the factors that influence internal work behavior (IWB) and taking steps to encourage it. Innovative work behavior encompasses intentional actions undertaken by individuals to propose or implement distinctive ideas, products, processes, and procedures within their respective work roles, departments, or organizations. Innovation entails introducing novel concepts, procedures, products, or techniques into a particular organizational entity with the deliberate intention of enhancing the organization or community. Workers demonstrate innovative work behavior when they prioritize the process of innovation rather than solely focusing on the outcomes, even if it means generating new goods that lack inventiveness. Universities have a crucial role in promoting and fostering innovative performance.

Knowledge sharing is an essential element for the success of an organization, as it entails the transfer of expertise and skills among employees. It facilitates the process of collaborative learning, self-reflection, and creativity at both the individual and organizational levels. Knowledge sharing entails the transfer of information, ideas, and specialized knowledge among individuals to enhance the performance of particular tasks or functions. Previous studies have established a clear and direct relationship between the act of sharing knowledge and the display of innovative work behavior.

Incentives have a crucial role in promoting creativity and innovation. Rewards can be described as monetary compensation that an employee receives from an organization in exchange for their services or as remuneration for the tasks they have accomplished. They are regarded as the primary factor that influences workers to participate in creative work behavior. Reward systems have a substantial impact on innovative activity, either by strengthening it or by providing incentives for other behaviors that contribute to the task. They improve workers' inventiveness and skills, motivating them to work diligently and have a substantial impact on enhancing employee commitment and proficiency, ultimately leading to an increase in IWB.

Charismatic leadership is a transformative approach that emphasizes the future and the impact of leaders' vision on the motivation of their followers. A charismatic leader possesses the ability to influence the thoughts, behaviors, and emotions of others due to their exceptional skill or aptitude. If the charismatic leader's traits have a favorable influence on the workers, the organization will probably attain success in innovation.

The social exchange theory (SET) offers a good theoretical framework for comprehending the correlation between servant leadership, charismatic leadership, and employees' extra-role behaviors. Employees are more likely to establish a trusting relationship with their boss when they hold a positive perception of their leader. In addition, by implementing effective training methods and providing appropriate incentives for innovative work, people and organizations can significantly improve their human capital. Employees who experience feelings of happiness and job satisfaction are more inclined to actively contribute their inventive and creative ideas. These variables have the potential to improve the current theory, especially in the realm of SET.

Therefore, this study aims to investigate the correlation between information sharing, rewards, and charismatic leadership and their impact on innovative work behavior, specifically among university lecturers in Malaysia.

5. Conclusion and Recommendations

This study examines the significance of innovation in organizations and the contribution of academics in producing novel knowledge. It emphasizes the importance for organizations to comprehend how to stimulate and assist the creative work behavior of their staff. The study highlights the difficulties that universities encounter in the globalized environment and underscores the significance of innovative work behavior among academics. This study aims to further investigate the concept of innovative work behavior, encompassing the activities of generating, promoting, and implementing new ideas. The text elucidates that organizations can cultivate an innovative culture by comprehending the elements that influence inventive work behavior and actively encouraging it.

This study also examines the connection between information sharing and innovative work conduct, emphasizing the positive correlation between both. Furthermore, this study examines the impact of incentives on promoting innovative work behavior. The text highlights the significance of rewards in motivating individuals to participate in innovative activities and acknowledging their contributions to innovation. This study also examines the concept of charismatic leadership and its demonstrated favorable influence on innovative work behavior. The input highlights the significance of innovation in organizations and the influence of elements like information exchange, rewards, and leadership in promoting innovative work behavior. It offers a thorough examination of the subject matter and emphasizes the necessity for additional investigation in this field. This study aims to present a framework for innovative work behavior among university teachers in Malaysia.

Acknowledgement: To acknowledge and express gratitude to the Research Management Unit (RMU) of Universiti Teknologi MARA (UiTM) Cawangan Melaka for providing financing for this research endeavor through the Geran Dalaman TEJA 2023 (GDT2023/1-10), the authors would like to express their gratitude.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Academic Performance (CGPA) Influences Mental Health: A Study of Students at Seremban Medical Assistant College (SMCA)

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Abstract: Medical students, especially in Malaysia, face many challenges due to their field of study and expectations of their profession. It is widely acknowledged that medical courses are among the hardest academic pursuits. In Malaysia, medical students must undergo a five-year undergraduate program, continuing with a clinical rotation and practical experience to sharpen their knowledge and skills. Despite the awareness given, the stigma of mental health persists, leading medical students to hesitate in seeking help out of fear of being perceived as weak. The study identifies whether mental health influences academic performance (CGPA) among medical students at Seremban Medical Assistant College (SMCA). This study used a quantitative method, and a questionnaire was distributed to 215 respondents. The data were analyzed using the Statistical Package for Social Science (SPSS). It was found that there were significant areas where CGPA influenced the mental health of SMCA medical students. Specifically, it was observed that as CGPA increased, there was a corresponding decrease in mental health among the students. This shows that the students are experiencing mental health issues due to their responsibility to maintain a good academic performance in their field of study. In addition, this study offers valuable insight to health practitioners and students on the importance of maintaining mental health and helps in raising awareness.

Keywords: *Academic Performance, CGPA, Mental Health, Medical Students*

1. Introduction

The prevalence of mental health issues in Malaysia is increasing over time. University students are not exempt from this trend. In 2019, it was found that medical students enrolled in public universities across Malaysia experienced mild to moderate depression. In 2020, nearly 30% of medical students in Malaysia reported high levels of stress associated with depression and anxiety (Kotera et al., 2020). This alarming increase highlights the urgent need for implementing interventions and support systems to address mental health concerns among university students in Malaysia. Awareness of mental health should be expanded among medical students, particularly those seeking help for mental health, behavioral, and unusual psychological experiences. This underscores the need to emphasize the importance of this matter among medical students in both public and private universities in Malaysia.

Universities are where students seek knowledge, skills, and experience. The curriculum provided by the Ministry of Higher Education (MOHE) serves as a reference for all public and private universities, polytechnics, and community colleges to meet the nation's aspirations to position Malaysia as a hub of excellence in international higher education. In Malaysia, there are 20 public universities divided into several categories: five research universities, four comprehensive universities, and eleven universities focused on and regulated by MOHE (MyGov), along with 50 private universities. The objective is to facilitate knowledge transfer, encompassing communication, critical thinking, teamwork, multitasking, leadership, and creativity. According to Ahmad et al. (2022), these skills are important to enhance employability for fresh graduates to be well-equipped with the competencies that are expected by public and private entities. Employability skills are important qualifications that are needed by a graduate to secure a job or career. Graduates from universities tend to earn 35% more than college leavers (Team, 2021). In addition, the cumulative grade point average (CGPA) is one of the key indicators of an individual's success in securing positions within organizations.

The CGPA often measures students' academic performance (Yogendra & Andrew, 2017). It is used to examine all examination grades across all semesters throughout the university study period. It also serves as a

benchmark for future educational and career prospects (Ali et al., 2009; Ram, 2023). The past researcher revealed the importance of CGPA, which contributes benefits to education institutions, management programs, lecturers, students, and the development of employable graduates (Mutalib et al., 2019). To achieve a good result, practicing a healthy lifestyle is a must. A student needs to balance their life by prioritizing their health, including participating in physical activity, food intake, and stress management.

A healthy lifestyle leads to significant student performance, including mental health and well-being (Hautekiet et al., 2022). Poor mental health has become serious in many countries, especially among university students. Malaysia is one of the countries in Asia-Pacific that experienced these issues in mental health problems, negative mental health attitudes, and lower self-compassion and resilience than UK students (Kotera et al., 2020). Hezmi (2018) found that the rate of Malaysian students who endure this problem doubled in less than a decade, from 10% in 2011 to 20% in 2016. For example, approximately 30% of medical students in Malaysia (n = 761) reported a high prevalence of stress (Yusoff et al., 2010) and a high level of depression, anxiety, and stress. However, it is found that mental health in Malaysia has been increasing, especially among university students (Ministry of Health, 2016). This finding found proof that critical issues happen among university students, especially in mental health, as a result of pressure associated with maintaining academic performance.

Student performance plays a vital role in education. It measured the students' understanding based on the curriculum set up by the MOHE. Conversely, poor performance needed additional support, including lecturing monitoring and some changes in teaching methodologies and motivation. Thus, to measure the effectiveness of curriculum on student performance, the cumulative grade point average (CGPA) and mental health are important factors in ensuring their academic performance.

2. Literature Review

Cumulative Grade Point Average (CGPA)

The CGPA is used as a weighted average of the grades obtained across all courses undertaken in their academic program. In Malaysia, this system accesses student academic performance, including medical students, in public and private universities. The impact of CGPA on students' lives, education, and career development, especially medical students in Malaysia, is significant. Students often perceive their CGPA as a determinant of their future career journey after studying. This thought will lead them to focus on maintaining their academic grades (Sarwar, 2016), including undergraduate medical students (Alam et al., 2023). Many factors can influence CGPA achievement, such as gender, level of family income, social environment, time spent studying, and mental health. Balancing academics and a healthy lifestyle in the context of mental health is needed to ensure student performance.

Mental Health

Mental health remains a significant issue in Malaysia, compounded by prevailing stigmas surrounding attitudes towards mental health issues. The study about mental health from 1996 to 2019 found that this problem always relates to a dominance of supernatural and religious etiologies (Munawar et al., 2021). Other than that, other contributing factors to mental health concerns include social, economic, and educational. Based on Mental Health and Substance Use (MSD), 2014 found that mental health is determined by various factors such as social, economic, and physical environments that operate in different stages of life.

Depression, Anxiety and Stress (DAS)

According to Otte et al. (2016), depression can be categorized as a severe mental health condition that is characterized by a feeling of sadness, loss of interest, impaired cognitive function and physical symptoms that lead to changes in appetite and sleep disorder. In any case, depression is negative because it tends to make the person feel detached from his surroundings (Sazali et al., 2021). A past study found that there is a significant association between depression and self-reported academic performance among medical students in Camerron (Ngasa et al., 2017). This finding has also been supported by Sousa et al. (2018) who found just as anxiety, and depression have potential negative impacts on academic performance among Portuguese medical students. However, previous research by Bi et al. (2022), revealed there is a negative correlation between

depression and academic performance. Similarly, Poudel (2024), accentuates that depression can affect cognitive functioning, attention, memory, and decision-making and influence academic performance.

Anxiety can be defined as a state of excessive worry or fear that an individual feels drains (Howren et al., 2020). Akinsola & Nwajei (2013), highlight the higher level of anxiety associated with the lower of academic performance and effect student's mental health condition. Worry and working factors found as mediating factors that contribute to anxiety and academic performance (Owens et al., 2012). Yet, academic success also can be seen as a protective factor against depression and anxiety. A study by Song (2023) found that failure in academic performance is a risk factor while improvement in academic performance is a protective factor against depression and anxiety.

Araiza and Lobel (2018), explain stress can happen when an individual perceives demand more than available resources. Findings from Kotter et al. (2017), stated unfavorable stress contributes to no negative stress in academic performance among undergraduate medical students. However, to another researcher, stress is acknowledged as one factor that can impact mental health and academic performance. Idaris (2022), indicates stress can lead to impaired academic performance and mental health.

As it relates to mental health, in Malaysia, mental health issues among medical students have been a subject of concern in both public and private universities (Ching et al., 2023). A decade ago, there were findings about the mental health of medical students, such as the prevalence of depression and anxiety among medical students in private universities (Saravanan & Wilks, 2014). Past researchers found that a significant proportion of medical students experienced depression, anxiety, and stress. The prevalence showed 40.5%, 46.0%, and 30.9%, respectively (Ching et al., 2023). This proves that mental health can influence students' CGPA.

Students' undergraduates also experienced higher levels of depression, anxiety and stress which affected their academic performance (Amalina et al., 2018). A study conducted at the University of Cyberjaya revealed stress levels among medical students exhibited an inverse correlation with CGPA (Hamdan et al., 2021). Furthermore, it is proven that depression, anxiety and stress significantly affect academic performance (Widiasari, 2024). Therefore, it is important to monitor the mental health of these students since these groups will lead and be leaders in the future.

3. Methodology

This study aimed to investigate the impact of mental health status on CGPA among students at Seremban Medical Assistant College (SMCA). A cross-sectional study was conducted among 217 undergraduate students aged between 20 and 26 years. A questionnaire consisting of 21 items from The Depression Anxiety Stress Scales (DASS) by Lovibond and Lovibond (1995) was used to measure the mental health status of the respondents. Mental health status was assessed based on levels of stress, anxiety, and depression, while CGPA was used as a measure of academic performance. Responses were evaluated using a four-point Likert scale, where 1 represented "did not apply to me at all" and 4 indicated "applied to me very much or most of the time."

Additionally, a pilot study was conducted to measure the reliability of the instrument, adapting the rule of thumb from Ahady et al. (2017). A total of 30 respondents participated in the pilot study. Based on the findings, Cronbach's alpha was 0.955, which according to Ahady et al. (2017) indicates excellent reliability.

4. Results and Discussion

Table 1: Regression for the CGPA influences the Mental Health

	Unstandardized B	Unstandardized Std. Error	Standardize Beta	t	Significant
Constant	3.740				
CGPA	-0.506	0.136	-0.245	-3.711	0.000
R^2	0.060				
F	13.771				

Significant	0.000

Note: Significance level: 0.05 (2-tailed)
Dependent Variable: Mental Health

Based on the table above, the finding showed the linear model was significant where CGPA had a significant influence on mental health. This is because, it was found that the p-value = 0.000 less than $\alpha = 0.05$, so, the CGPA had a significant influence the mental health ($t(215) = -3.711$, $p < 0.05$). Meanwhile, a 1-unit increase in CGPA would decrease mental health by 0.506. In summary, the result has supported and accepted that CGPA has a significant influence the mental health. The results indicated that the CGPA explained 6 percent of the mental health ($R^2 = 0.060$, $F = 13.771$, $p < 0.05$).

Mental health issues among university students are crucial, as they are related to academic performance, typically measured using the CGPA. Strong academic performance is an indicator of students' success, and it is a pillar of national development. Based on the findings, CGPA was identified as one of the factors contributing to an impact on mental health among students at Seremban Medical Assistant College (SMCA). Past researchers revealed the same results: CGPA can impact overall mental health among undergraduate healthcare students (Tripathi et al., 2022) and indirectly affect their academic performance (Samsudin & Tan, 2016). However, there are findings by Manchri et al. (2017), Mohamad (2018), and Sadry et al. (2022) contrary to these findings, where there is no significant correlation between academic performance (measured by CGPA) and mental health, with conclusions that mental health did not significantly impact their academic performance. Due to this finding of dissimilarity, the researcher found that the student background is a factor that contributes to the different results; in this current study, the sample of the study comprises students with a medical background who face challenges related to mastering medical terms, knowledge, and clinical skills. According to Picton et al. (2022), first-year medical students are juggling mental health issues and acute crises, such as personal and health issues that disturb their studies. In contrast, previous research included a sample drawn from diverse academic programs such as education, business management, accounting, finance, and international business. These students, predominantly from social science disciplines, are frequently engaged in research projects, exams, and coursework (Azim, 2021). Consequently, these differing backgrounds may contribute to variations in results, given the disparity between the sample composition and the focus of the current study.

Moreover, the weighting of the courses and programs also contributes to the disparities, given the focus of the current study on the medical field compared to the previous study's emphasis on social sciences. As noted by Hill et al. (2018) and Picton (2021), medical students often contend with elevated levels of stress, burnout, and a demanding workload due to the rigorous curriculum and clinical training, which are known contributors to mental health challenges (Chang et al., 2018). Nevertheless, social science students typically perceive their courses as less stressful and more relaxed. Taking this factor into account, it is conceivable that the divergence in academic environments and atmospheres may explain the differing findings (Bolinski et al., 2020).

Furthermore, the number of samples and geographical area of the present study and past study contribute to the differences in results. The location of the present study is in Negeri Sembilan, Malaysia, while the past studies in 2017 were conducted in Iran with a sample size of 270 students, more than 50 students compared to the current study. The sample from the past studies in 2022 comprised students from the faculty of medicine and education, which led to the differences in results, whereas in this current study, the sample is totally from students in the medical area. These distinctions of geographical area and the number of samples can affect the results; this is aligned with Robinson et al. (2009), Wang et al. (2012), and Bergsten et al. (2012), who revealed that the distribution of samples geographically and sample size can influence and impact the results observed in studies.

5. Conclusion and Recommendations

Mental health influences the CGPA of medical students. Based on this research, the researcher can conclude that the weight of courses and programs, especially in the medical field, contributes to student mental health since this field is important not only to the country but to society. This medical area produces medical professionals, including doctors, nurses, and researchers, who we as citizens rely on to save lives, improve health outcomes, and advance medical science. Therefore, fostering motivation and understanding toward

these groups is essential to ensure their academic success and completion of studies. More research should be done regarding this issue, especially on how to create a supportive environment, promote mental well-being, and reduce the stigma associated with medical students and mental health issues concerning preventive measures, policies, support systems, and personal consultations.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Factors influencing patients' intention to use the Health Clinic Online Appointment System app

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Abstract: Online mobile appointment systems have become important for the patient and the clinics. This research attempts to look into the variables that influence patients' intentions to use the app "Sistem Janji Temu Klinik KKM' through the development of a research framework according to the Unified Theory of Acceptance and Use of Technology (UTAUT). Information was gathered from 238 patients across Selangor. The results suggest that governments must implement suitable strategies to foster patients' motivation in using the mobile application apps could be raised. In summary, this study concludes that the main results, as determined by the regression analysis, support that subjective norms have a significant influence on individuals' intention to use Health Clinic Online Appointment System apps.

Keywords: *Behavioral intention, social influence, facilitating conditions, mobile appointment, UTAUT*

1. Introduction and Background

Health apps are becoming more vital in patients' lives which has resulted in the creation of online apps for the appointment system. The Ministry of Health of Malaysia (MOH) has given an option for patients to use the Health Clinic Online Appointment System. What influences patients' propensity to utilize this app is debatable. It is essential to comprehend the patients' behavioral intentions to facilitate the improvement and engagement of mobile app usage for appointments. According to Anastasiadou et al. (2019), the adoption of health applications is still low. Furthermore, Latif et al. (2017) added, that mobile health adoption in underdeveloped nations is still falling behind. Hoque & Sorwar (2017) added The Unified Theory of Acceptance and Use of Technology (UTAUT) is commonly applied as the theoretical framework in IT, with applicability to electronic health services. Tavares & Oliveira (2018) emphasized that social influence, effort expectancy, and performance expectancy are the primary factors influencing behavioral intention, as per UTAUT. Moreover, facilitating conditions and behavioral intentions directly influence user behavior.

The Ministry of Health (MOH) must comprehend the elements that influence patients' intent to use the app to enhance its design and encourage its use. On the other hand, it is undetermined which factors influence patients' intent to use apps. Numerous studies used umbrella theoretical models to figure out the factors that influence intentions for using mobile health (mHealth) applications (Deng et al., 2018, and Hoque et. al., 2017) or health information technology (Kijsanayotin et al., 2009). To gain a comprehensive understanding of how technology is adopted, it is necessary to identify and assess a theoretical model that applies to various technologies and user groups. (Venkatesh et al., 2003). The Health Clinic Online Appointment System has unique features for people with special needs. As a result, a unified theoretical framework must be used to investigate the elements impacting the intention to use patient management apps. A pertinent theoretical framework has not been applied to the realm of this appointment system, to our knowledge.

Based on the discussion, this research aims to analyze the factors that influence patients' intention to use Health Clinic Online Appointment System apps. This study embraces UTAUT as its underpinning theory to gauge patient performance expectancy, social influence, effort expectancy, perceived disease threat and perceived privacy risks toward behavioral intention to utilize the online application.

2. Literature Review

The Relationship between Performance Expectancy and behavioral intention of patients to use Health Clinic Online Appointment System apps

Performance expectation, also known as perceived usefulness, relates to the extent to which individuals perceive that the utilization of information technology could enhance their job effectiveness (Venkatesh et. al., 2003). Many scholars have investigated the relationship between performance expectancy with users' behavioral intention regarding various forms of technology. Furthermore, this study was conducted in the context of Health Clinic Online Appointment System app usage. Within this context, according to Lee et al. (2021), patients' intention to use the system apps depends on their satisfaction and how they perceive the effectiveness of the service.

In the work of Lee et al. (2020), performance expectancy exerts the greatest effect on user intention relating to hospital e-appointment systems. The findings in this research suggest that patients claim that scheduling appointments online is more effective and can shorten wait times. Furthermore, patients can expedite the registration process by utilizing an e-appointment system. Patients will use the system continually as a result of this experience (Lee et al., 2020). Similar outcomes in the area of mobile health services that also mark the significant attribute of performance expectancy on users' adoption intention can be found in the studies conducted by Moudud et al. (2021); Almegbel & Aloud (2021); Solangi et al. (2021) and Suroso & Sukmoro (2021). From the above review, the following hypothesis is derived:

H1: *Performance expectancy positively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

The Relationship between effort expectancy and behavioral intention of patients to use Health Clinic Online Appointment System apps.

Effort expectancy pertains to the level of exertion required by an individual to utilize the system. The role of effort expectancy in positively influencing users' behavioral intention is profound in the perspectives of online learning, banking, and shopping. Analogous to mobile health services, a study by Solangi et al. (2021) empirically verified when using IoT-based Smart Healthcare systems. Effort expectancy and behavioral intention to utilize services showed a positive relationship, which means users consider the effort required before and while using mobile health services (Almegbel & Aloud, 2021). Another study also marks the significant attributes of effort expectancy concerning users' willingness to adopt mobile health services (Moudud et. al., 2021). Furthermore, another study identifies the notable characteristics of effort expectancy concerning users' willingness to adopt mobile health services.

Users are more likely to feel satisfied when they consider mobile health applications as user-friendly during their initial interactions (Lee et al., 2021). Therefore, information technologies tend to be embraced and used only if they possess a well-designed, interactive and easy-to-use, as well as a straightforward operating system (Lee et al., 2020). Therefore, within the context of Health Clinic Online Appointment System apps, we proposed another hypothesis:

H2: *Effort expectancy positively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

The Relationship between facilitating conditions and behavioral intention of patients to use Health Clinic Online Appointment System apps.

In the Theory of Planned Behavior (TPB), facilitating conditions or perceived behavioral control refers to the extent to which an individual perceives support from the organization and technology-related equipment. This includes support for computer hardware and software, as well as assistance in operating the technology or system (Lee et al., 2020). As stated by Venkatesh et al (2003), facilitating conditions may be determined by an individual's perception of the presence of organizational and technological infrastructure support to use the method. This is supported by Suki & Suki (2017) and Suroso & Sukmoro (2021).

Facilitating conditions, in the context of adopting an e-appointment system, pertain to the available resources that users possess, such as internet connectivity and devices that enable them to use the system. Furthermore, the user's inclination toward the e-appointment system may be influenced by the compatibility of their devices

and their computing skills (Lee et al, 2020). Alike studies also concur with this finding (Haron et al., 2021; Janssen et al., 2021; Solangi et. al, 2021; Almegbel & Aloud, 2021).

Thus, the facilitating conditions variable is strongly correlated with behavioral intention. Bamufleh et al. (2021) stated that individuals utilizing e-government health applications hold the belief that the health ministry aids in the event they encounter any difficulties while using the applications. Consequently, they possess a strong inclination to utilize those applications. From the above review, this hypothesis is formulated:
H3: *Facilitating conditions positively influence the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

The Relationship between social influence and behavioral intention of patients to use Health Clinic Online Appointment System apps.
Social influence is about how people perceive others' opinions regarding the utilization of certain technology (Venkatesh et. al., 2012). Mobile technologies and apps in the health industry facilitate illness monitoring and provide consumers with access to their health information. Furthermore, Semiz & Semiz (2021) explanation aligned with the UTAUT model the research found that social influence positively affects people's intentions to use the applications. This indicates that the consumer uses mHealth applications because of the social influence around them. Alam et. al (2020) concurred that a crucial factor that contributes to the use intention of mHealth applications is social influence. Meanwhile, Yu et al. (2021) investigated social influence as the most significant factor in facilitating conditions, habit and performance expectancy towards behavior intention of using apps. It shows that the opinions of the people close to the patients will influence their intention to use mobile education websites. According to Tian & Wu (2022) older people with chronic diseases tend to use mHealth by recommendation of the people around them and the results proved that social influence significantly influences the continuance intention of using the mHealth application system. Therefore, the next hypothesis is proposed:
H4: *Social influence positively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

The Relationship between perceived disease threats positively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.
According to Zhu et al. (2018) in China the user of an application who uses it for chronic disease prevention, perceived disease threat has a positive impact on the intention to use the application. Young people especially realized the importance of the perceived disease threat more than older users. Lee et al. (2017) highlighted that people who have a high perceived health threat will be stimulated to adopt the mHealth application. Moreover, Zhang et al. (2019) discovered the perceived disease threat had a significant impact on behavioral intention about the utilization of diabetes management apps. Furthermore, the study suggests that the level of intention of using the application can be increased if the patient has a high awareness about the disease. Meanwhile, Dou et al. (2017) added that perceived health threats have positively influenced the patient's intention to use smartphone health applications for hypertension management. As a result, the subsequent hypothesis is posited:
H5: *Perceived disease threat influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

The Relationship between perceived privacy risks negatively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps.
According to Deng et. al. (2018), privacy risk refers to the people who might feel that personal information leakage may arise as a result of using the mHealth application system. On top of that, Klaver et al. (2021) attributed privacy risk which involves the confidentiality of personal health information data was negatively associated with participant intention to use mHealth. Meanwhile Akdur et al. (2020) highlighted that there is no correlation between perceived risk and behavioral intention in using dietetic mobile health applications in Turkey. Furthermore, they stated the patient chose to use the application if they discovered it manageable, trustworthy and useful. Hence the hypothesis proposed:
H6: *Perceived privacy risks negatively influence the behavioral intention of patients to use Health Clinic Online Appointment System apps.*

3. Research Methodology

Measures

The research utilized an online self-administered survey to gather the data. Three sections of a closed-ended questionnaire served as the basis for the survey's framework. The demographic characteristics detail of age, gender, income, employment and education were questioned in Section A. The intention to use the appointment system for the health clinic was investigated in Section B. The initial measurements from Zhang et. al. (2019) have undergone several adjustments to suit the current study's setting. Five-point Likert scales, with one denoting "strongly disagree" and five denoting "strongly agree," were used to rate the items.

Data Collection

The survey was posted on social media sites that serve patients throughout Selangor. The patients with prior experience with these online applications were invited to fill out the questionnaires. A total of 238 usable questionnaires were collected over three months from September 2022 to December 2022. The respondents' participation was entirely voluntary, and personal information about them was maintained anonymously. A patient invitation was disseminated to all of Selangor on Facebook. Individuals who offered their time to partake in research were directed to an online survey platform called Google Form.

Data Analysis

The computer software Statistical Package for the Social Sciences (SPSS) version 26 was used to do several empirical analyses. The conducted tests included correlation analysis, reliability test, multiple regression analysis and principal component analysis (PCA).

4. Results

Demographic Profile of Respondents

Table 1 shows the demographic of the participants. The data reveals that the female respondents constituted the majority, accounting for 78.6 percent of the total 238 respondents. Out of the entire sample size of 238 participants, the majority (58.4 percent) were classified as students. The survey participants included individuals who were self-employed (1.3%), public servants (34.9%), and unemployed (2.1%). Most of the respondents had a monthly income below RM 2500, accounting for 60.1 percent. 23.5 percent earned between RM 5001 and RM 10000, while 8 percent had a monthly income of RM 10001 or above. The majority of respondents, namely 60 percent, had completed their college degree. Approximately 34.9 percent of respondents had achieved a postgraduate level of study, while just 2.5 percent had a high school education or below. Finally, most of the 238 participants were between the age range of 21 to 30 years old.

Table 1: Demographic

		Frequency	Per cent
Gender	Female	187	78.6
	Male	51	21.4
Age	≤ 20 years	42	17.6
	21- 30 years	107	45.0
	31 – 40 years	39	16.4
	41 – 50 years	28	11.8
	51 – 60 years	22	9.2
Education	High school	6	2.5
	Degree	147	61.8
	Masters/ PhD	83	34.9
Marital status	Single	159	66.8
	Married	79	33.2
Career	Students	139	58.4

	Unemployed	5	2.1
	Self-employed	3	1.3
	Civil servants	83	34.9
	Others	8	3.4
Monthly income	Less than RM 2,500	143	60.1
	RM 2,501 – RM 5,000	20	8.4
	RM 5,001 – RM 10,000	56	23.5
	RM 10,001 and above/ dan ke atas	19	8.0
Are you suffering from chronic diseases?	No	227	95.4
	Yes	11	4.6
	Total	**238**	**100.0**

Descriptive Analysis of the Variable

Table 2 shows the mean for variables measured by a 5-point Likert scale.

Table 2: Descriptive Analysis

ID	Construct	Mean	Std. Deviation	Level
PE	Performance expectancy	3.91	0.65	High
EE	Effort expectancy	3.84	0.60	High
PEA	Facilitating conditions	3.91	0.53	High
SI	Social influence	3.66	0.68	High
PDT	Perceived disease threat	4.18	0.56	High
PPR	Perceived privacy risk	3.60	0.81	Moderate
BI	Behavioral intention	3.73	0.72	High

In the study, PCA with Varimax rotation was used to identify the shared variance or common factors of the dimensions of each variable under study. Varimax rotation is commonly used in the Orthogonal Rotation Method. The main goal of any rotation method is to assess some theoretically meaningful factors and to gain the simplest factor structure (Hair et. al., 2006). Kaiser's criteria, specifically the eigenvalue > 1 rule, are used to determine factor extraction in this study. The analysis revealed that the component was extracted with Eigenvalues greater than one. As represented in Table 3 and Table 4, all the items remained unchanged because factor loading values, cross-factor loadings, commonalities values, and eigenvalues are fine.

Table 3: KMO and Bartlett's Test

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
PE	0.86	8.44.07	10	0.000
EE	0.78	362.38	6	0.000
PEA	0.83	1305.92	36	0.000
SI	0.82	599.08	6	0.000
PDT	0.67	272.69	3	0.000
PPR	0.72	288.90	3	0.000
BI	0.60	239.00	3	0.000

Table 4: Initial Eigenvalues

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
PE	3.75	74.92	74.92
EE	2.65	66.25	66.25
PEA	4.71	52.29	52.29
SI	3.03	75.66	75.66
PHT	2.19	73.03	73.03
PPR	2.28	75.98	75.98
BI	2.07	68.87	68.87

Analysis of Reliability

The study employed Cronbach's Alpha as a reliability coefficient to precisely assess the consistency of the utilized scales. Table 5 demonstrates that Cronbach's alpha values for variables in the research are at an acceptable level exceeding 0.70. Consequently, all of the items are suitable for measuring the variables of interest.

Table 5: Analysis of reliability

ID	Construct	Cronbach's Alpha
PE	Performance expectancy	0.92
EE	Effort expectancy	0.83
PEA	Facilitating conditions	0.88
SI	Social influence	0.89
PDT	Perceived disease threat	0.81
PPR	Perceived privacy risk	0.84
BI	Behavioral intention	0.77

Correlation Analysis

Table 6 is a representation of the correlation matrix, which is made up of Pearson correlations. These correlations reflect the inter-correlation that exists between the variables that were investigated. It is clear from the table that there is a significant correlation between each of the factors that were investigated in this study. According to these findings, the constructs have a discriminant validity, which means that although they are connected, they do not overlap with one another. Health appointment online clinic system intention is most strongly correlated with facilitating condition ($r = 0.565$, $p < 0.01$), followed by social influence ($r = 0.547$, $p < 0.01$), effort expectancy ($r=0.517$, $p<0.01$) performance expectancy ($r=0.479$, $p<0.01$) and perceived disease threat ($r=.388$, $p<0.01$) and perceived privacy risk ($r=0.029$, $p<0.01$).

Table 6: Pearson Correlation

	Behavioral intention
Performance expectancy	.479**
Effort expectancy	.517**
Facilitating conditions	.565**
Social influence	.547**
Perceived disease threat	.388**
Perceived privacy risk	0.029
Behavioral intention	.668**

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

Regression Analysis

The study employed multiple regression analysis to evaluate the given hypotheses since it enables the investigation of the predictors' impact on the dependent variable. All variables have variance inflation factor (VIF) values below 10 (1.00), and the tolerance values for each variable are above 0.10. This suggests that there is no issue of multicollinearity in the study. Based on the regression analysis shown in Table 5 the analysis shows that Facilitating conditions (β = 0.56) Social influence (β = 0.55) Effort expectancy (β = 0.52) perceived disease threat (β = 0.39), perceived privacy risk (β = 0.03) performance expectancy (β = 0.48) significantly influenced the behavioral intention to use mobile health application system. Hence, HI, H2, H3, H4, H5 and H6 are supported. Table 7 shows the hypothesis testing outcomes.

Table 7: Regression analysis

				95.0% Confidence Interval for B		**Collinearity Statistics**			
Factors	B	Beta	P	Lower Bound	Upper Bound	Tolerance	VIF	R Square	Adjusted R Square
Behavioral intention	0.75	0.67	0.001*	0.64	0.86	1.00	1.00	0.45	0.44
Facilitating conditions	0.77	0.56	0.001*	0.63	0.92	1.00	1.00	0.32	0.32
Social influence	0.58	0.55	0.001*	0.46	0.69	1.00	1.00	0.30	0.30
Effort expectancy	0.62	0.52	0.001*	0.49	0.75	1.00	1.00	0.27	0.26
Perceived disease threat	0.50	0.39	0.001*	0.35	0.65	1.00	1.00	0.15	0.15
Perceived privacy risk	0.03	0.03	0.658	-0.09	0.14	1.00	1.00	0.08	0.08
Performance expectancy	0.53	0.48	0.001*	0.41	0.65	1.00	1.00	0.23	0.23

Discussion

This study investigates the determinants that influence patients' intention to use mobile health application systems. The factors that were examined in evaluating their impact on the intention to utilize the application were derived from UTAUT. The regression analysis conducted on a sample of 238 participants validated that social influence, effort expectancy, facilitating conditions, perceived disease threat and performance expectancy have a significant impact on people's intention to use mobile health application systems. This finding aligns with previous studies by Lee et. al. (2020) and Solangi et. al. (2021) concluded that the expectation of individuals regarding their performance has the greatest influence on their propensity to use hospital e-appointment systems. Research has established that the level of expected performance can directly impact the intention of patients to utilize online appointment system applications for health clinics.

The findings revealed that effort expectancy has a considerable influence on behavioral intention to use mobile health services. This study is in line with Moudud et. al. (2021) stated that the significant attributes of effort expectancy on users' intention to adopt mobile health services. In addition, Lee et. al. (2021) found that users may be satisfied when they consider mobile health applications to be user-friendly during their early encounters.

The study investigates the relationship between facilitating conditions and the behavioral intention of patients to use Health Clinic Online Appointment System apps. The result shows that facilitating conditions are positively associated with the behavioral intention of patients to use Health Clinic Online Appointment System apps. Similarly, previous studies conducted by Bamufleh et. al. (2021) stated that users of e-government health applications have a high intention to use the application because they believe that the health ministry provides support if they face any difficulties using the applications. Facilitating conditions in this study refer to the

resource's user which includes the internet, or gadgets used to access it. Lee et. al. (2021) highlighted that user device compatibility and computing skills have a positive impact on user intention toward the e-appointment system.

The results also show that the relationship between social influence and behavioral intention is consistent with Alam et. al. (2021) conclusion that social influence positively influences the behavioral intention of patients to use Health Clinic Online Appointment System apps. Yu et. al. (2021) added social influence had the largest effect on behavioral intention to use mobile education websites than performance expectancy, facilitating conditions and habit.

The present study also revealed that the effect of perceived disease threat is significant and positive relationship with patient intention to use the health clinic appointment system. The result implied that the more the disease threat patients perceived, the more these patients engaged in behavioral intention to use the system. The findings also concur with Lee et. al. (2017) and Zhu et. al. (2018) emphasized that people who have a high perceived health threat will be stimulated to adopt the mHealth application.

Lastly, based on the regression results, the finding revealed that perceived privacy risks negatively influence the behavioral intention of patients to use Health Clinic Online Appointment System apps. Similarly, Klaver et. al. (2020) demonstrated that attributed privacy risk was significantly and negatively associated with participant intention to use mHealth which involves the confidentiality of personal health information data. Furthermore, according to Akdur et. al. (2020), patients are more likely to utilize a mobile app if they see it as easy to use, reliable, and beneficial.

5. Conclusion, Implications and Future Direction

This article used UTAUT to analyze patients' MOH Appointment system intention. According to the regression study, subjective norms strongly impact people's inclination to use Health Clinic Online Appointment System applications. The findings of this study offer a significant theoretical contribution to the literature**.** The study concluded that facilitating conditions are the most influential factor in determining the intention to use Health Clinic Online Appointment System apps. The result proved that when patients perceive themselves as having resources such as the Internet to use the services and support, they are capable of adopting the appointment system.

The study revealed that social influence was the second most significant factor impacting patients' intention to use Health Clinic Online Appointment System apps. This finding confirms that the opinions of the people close to the patients influence their intention to use mHealth. As a result of this study, it was discovered that patients' intentions to use mobile health care are highly influenced by their expectations regarding performance expectancy, effort expectancy, and perceived disease threat. Based on the findings of the regression analysis, there is no correlation between the patient's perception of the danger to their privacy and their desire to use the online application system provided by the Health Clinic.

Practically, to encourage the adoption of Health Clinic Online Appointment System applications it is important to study the factors that influence individuals' motivation to adopt the system. Promoting the values of the online appointment system through relevant government agencies via different mediums to reach patients will attract the public to use the system.

This study's findings have practical implications for the benefits of improving the implementation of mHealth in Malaysia. The empirical findings we have obtained offer practical guidelines for effectively implementing health services in developing nations. By gaining a deeper understanding of how users perceive mHealth services, developers and providers of mHealth technology can expect to gain insights into the challenges and issues related to designing and implementing successful mHealth services. Moreover, the results of this study can be readily adapted to support the implementation and adoption of mHealth services in other developing nations.

In general, although the research findings indicate certain limits, there is room for development in addressing these constraints. Therefore, we suggest several crucial aspects to consider for future research endeavors. To boost generalizability, future studies should consider expanding the sample size. Researchers might also broaden their research to encompass other national and regional contexts to gain a more comprehensive understanding of the entire phenomenon. Furthermore, due to the exclusive reliance on an online, self-administered survey as the data collection technique for this research, there is no assurance of the respondents' veracity and comprehension in completing the questionnaire. Therefore, exploring other methods of data gathering for future study might improve the data's quality.

Acknowledgment: The authors express their gratitude to Universiti Teknologi MARA (UiTM) for providing financial support through the Geran Dalaman Fakulti Pengurusan Perniagaan, Project File No: 600-TNCPI 5/3/DDF (FPP) (007/2021). In addition, the writers highly appreciate the faculty and team members who provided invaluable assistance in completing this study.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Conundrum and Considerations in Cognitive Diagnostic Assessment for Language Proficiency Evaluation

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Abstract: Since its first appearance in the field of language testing, cognitive diagnostic assessment (CDA) has attracted attention for its ability to extract the intricacies of students' cognitive abilities. However limited research has discussed the issues in the implementation of CDA. Therefore, this article offers an overview of CDA's implementation in language proficiency evaluation. The article also engages in a comprehensive discussion on the conundrum and considerations within CDA, particularly the ongoing debate between distinct classifications of cognitive diagnostic models. It elaborates on the distinctions between the models and their implications for assessment depth and diagnostic insights. Additionally, this article delves into the clash between retrofitting existing items and developing new diagnostic items, highlighting the strategic considerations in each approach. Apart from that, the contentious issue of validating Q-matrices, crucial in CDA, is thoroughly examined, presenting the battle between expert-based and empirical validation methods. The persistent challenges in CDA have profound implications for both theoretical frameworks and practical applications. The theoretical debate not only influences our understanding of cognitive processes but also shapes the conceptualization of diagnostic information extraction. In practical terms, decisions regarding item development, retrofitting strategies, and Q-matrix validation methods directly impact the effectiveness of CDA in providing targeted interventions and personalized learning strategies in real-world educational contexts. Future research directions are also presented, emphasizing the need for more development of entirely new diagnostic items, hybrid CDMs, and adaptive cognitive diagnostic assessments. Practical recommendations are provided for practitioners, encouraging a strategic approach based on specific assessment goals.

Keywords: *Cognitive diagnostic assessment, cognitive diagnostic models, cognitive diagnostic approaches, language proficiency evaluation, language assessment*

1. Introduction

The compelling benefits of cognitive diagnostic assessment (CDA) have enticed educational systems to develop methodologies that can delve into diversified aspects of students' cognitive abilities. CDA was first introduced in the mid-1980s, combining cognitive psychology's focus on examining the mind through mental representations and processes underlying observable behavior with psychometrics models (Sternberg, 1984). This fusion has attracted researchers and practitioners due to its promising potential (Leighton & Gierl, 2007). Despite being introduced more than three decades ago, diagnostic classification models (DCM) have not seen widespread implementation in educational systems for their intended purposes (Ravand & Baghaei, 2020). Instead, much of the research on CDA has focused on methodological aspects, such as model development and refinement, or retrofitting them to existing non-diagnostic tests (Maas et al., 2024). Meanwhile, CDA was only applied to language assessment in the late 90-s (Buck et al. 1997; Kasai, 1997) and gradually gained recognition in the late 2000s (Lee et al., 2009; Lee & Sawaki, 2009).

CDA has been a focal point of attention due to its capacity to gauge students' capabilities beyond the limitations posed by classical traditional test theory and item response theory (Sessoms & Henson, 2018). In stark contrast to other testing approaches that measure latent traits based on unidimensional or multidimensional constructs, CDA stands out by providing intricate insights into students' micro-skills within the assessed constructs (Ravand & Baghaei, 2020). For example, in assessing candidates' reading skills, CDA is able to extract their abilities in identifying main ideas, understanding new words, and making inferences. This article not only serves to illuminate the historical trajectory and impact of CDA within language proficiency evaluation but also offers practical guidance for educators and researchers. By understanding how CDA has been implemented in the field, readers can glean valuable insights into its application in the development of new assessment items. Through the exploration of CDA's concepts, processes and ongoing debating issues, educators can gain a deeper understanding of how to harness its potential to create more effective assessment tools tailored to the diverse

needs of students. Moreover, by examining the evolution of CDA over time, this article provides a roadmap for educators looking to integrate this innovative approach into their assessment practices, ultimately enhancing their ability to accurately measure and support student learning outcomes. This report will therefore delve into the portrayal of CDA in academic studies, a thorough discussion on the conundrum and also some consideration to better apply CDA in the evaluation of language proficiency.

2. How Can We Understand Cognitive Diagnostic Assessment?

CDA is a specialized way of evaluating students' skills in education. It goes beyond traditional tests that give a single overall score and aims to reveal specific strengths and weaknesses in different thinking areas (Wang et al., 2021). CDA is instrumental in language proficiency evaluation as it provides educators and learners with essential information about the specific areas of language that require attention (Mei & Chen, 2022). CDA helps pinpoint a learner's language abilities in detail when applied to language proficiency evaluation. It identifies which specific language skills a learner has mastered and which ones need more work (Toprak & Çakir, 2018). This diagnostic insight enables the customization of educational programs and pedagogical strategies to cater to individual learning needs. By identifying cognitive strengths and weaknesses, CDA facilitates targeted instruction and intervention, ultimately enhancing language learning outcomes (Rupp et al., 2010). For example, in assessing second language (L2) reading comprehension, CDA can determine if a student struggles with vocabulary, grammar, making inferences, or other reading micro-skills (Shahmirzadi & Marashi, 2023).

The role of CDA in language proficiency evaluation is crucial because it provides detailed insights into the particular aspects of language that need focused instruction or scaffolding (Mei & Chen, 2022). Educators and learners benefit from this diagnostic information, enabling them to tailor educational programs and teaching strategies to address the unique needs of each student. This personalized approach ultimately leads to more effective language learning and teaching outcomes. The process of CDA involves defining cognitive attributes, constructing items, creating a Q-matrix (which links test items to the attributes they measure), and employing cognitive diagnostic models (CDMs) to analyze data (Zhang et al., 2023). This approach allows for a detailed examination of language skills, which proves particularly valuable in large-scale language assessments where precise diagnostic feedback supports effective language teaching and learning initiatives.

Cognitive attributes refer to the specific cognitive skills, knowledge, or problem-solving strategies that students require to complete a particular test task (Li et al., 2021). These attributes are synonymous with sub-skills or micro-skills within the context of CDA. The identification and understanding of these attributes are crucial for creating a Q-matrix, which is an association matrix that describes the relationship between test items and the cognitive attributes they assess (Wang et al., 2021). This Q-matrix also serves as a bridge between the answers provided by students and their mastery patterns of the attributes (Zhang et al., 2023). In retrofitting studies, the attributes are extracted from the existing items, while in studies that develop new cognitive diagnostic items, attributes are used to guide the construction of items.

CDA studies focus primarily on data analysis procedures employing cognitive diagnostic models (CDMs). These models present clear advantages compared to classical test theory (CTT) and item response theory (IRT) in educational assessment (Meng et al., 2023). In contrast to CTT and IRT, CDMs furnish in-depth diagnostic information by deconstructing test-takers performances into specific cognitive attributes or sub-skills. This detailed breakdown allows for a thorough comprehension of individual strengths and weaknesses, paving the way for targeted instruction and personalized learning plans (Ravand & Robitzsch, 2018). CDMs prove especially advantageous in evaluating intricate skills like language proficiency, capturing the diverse components contributing to overall performance. Furthermore, CDMs facilitate the tailoring of assessments to pinpoint specific cognitive processes, providing flexibility in evaluating multidimensional constructs (Li et al., 2021). These models also explicitly delineate cognitive processes, offering a profound understanding of how individuals approach diverse tasks. On top of that, CDMs generate comprehensive diagnostic feedback, guiding educators and learners toward precise interventions and instructional strategies (Toprak & Cakir, 2021).

3. Conundrum and Consideration in Cognitive Diagnostic Assessment

Due to its extensive application, CDA has sparked debates among scholars and researchers, particularly

regarding the selection of models capable of comprehensively analyzing the collected data. The literature extensively documents hundreds of cognitive diagnostic models that have been employed to unravel the complexity of various human skills. Also, scholars engage in ongoing discussions about whether to justify the use of a post-hoc study design in retrofitting existing examination questions or to opt for developing newly designed items from scratch. Additionally, during the construction and validation of the Q-matrices, arguments have arisen regarding the best approach to produce valid and reliable matrices.

In the competition between cognitive diagnostic models, who wins?

Cognitive diagnostic models (CDMs) are a class of psychometric models used in educational assessment to provide detailed information about an individual's specific strengths and weaknesses in various cognitive skills or attributes. Unlike traditional assessment models that provide an overall score, CDMs aim to identify the specific cognitive skills or attributes that an individual has mastered or has not mastered (Ketabi et al., 2021). These models are particularly useful in educational settings as they can provide valuable insights into a student's learning needs and inform targeted instructional strategies (Liao et al., 2024). CDMs are based on the assumption that an individual's performance on a test is influenced by their mastery of a set of underlying skills or attributes, and the models aim to infer the individual's skill mastery profile based on their test responses (Li & Hunter, 2015). Various types of CDMs have been developed, including the General Diagnostic Model (GDM), Fusion Models, Latent Class Analysis (LCA), Deterministic Inputs, Noisy "Or" Gate (DINO), the Additive Cognitive Diagnostic Model (ACDM), log-linear cognitive diagnostic model (ACDM) and many more. These models differ in their underlying statistical and computational approaches, but they all share the common goal of providing detailed diagnostic information about an individual's cognitive skills (Eren et al., 2023; Javidanmehr & Sarab, 2017).

Table 1: Examples of compensatory and non-compensatory models

Compensatory CDM	Non-compensatory CDM
Generalized Deterministic Inputs, Noisy "And" Gate model, G-DINA (de la Torre, 2011)	1. Deterministic Inputs, Noisy And Gate, DINA (Junker & Sijtsma, 2001)
Additive Cognitive Diagnostic Model, ACDM (de la Torre, 2011)	2. Reparameterized Unified Model, RUM (DiBello et al., 1995)
Deterministic Inputs, Noisy "Or" Gate Model, DINO (Templin & Henson, 2006)	3. Reduced Rule Space Model, RRUM (Hartz, 2002)
Linear Logistic Test Model, LLTM (Fischer, 1973)	4. Long-DINA (Zhan et al., 2019)
	5. Log-linear Cognitive Diagnostic Model, LCDM (Henson et al., 2009)

The ongoing discourse on cognitive diagnostic models revolves around the pivotal distinction between compensatory and non-compensatory models. Compensatory and non-compensatory models are two types of cognitive diagnostic models (CDMs) used in educational assessment to understand how individuals perform on tests based on their underlying cognitive skills or attributes (Li & Hunter, 2015). The key difference between these models lies in how they account for the relationship between these cognitive skills when making inferences about an individual's performance (Ravand, 2016). In compensatory models, also called disjunctive models, it is assumed that mastery of one cognitive attribute can compensate for the lack of mastery of another attribute (Mohammed et al., 2023). In other words, if an individual is strong in one attribute, it can make up for weaknesses in another attribute when answering test items. This means that in compensatory models, individuals can still perform well on a test even if they have weaknesses in certain attributes, as long as their strengths in other attributes compensate for those weaknesses. Examples of compensatory models include the Deterministic Inputs, Noisy "Or" Gate, DINO (Templin & Henson 2006), the Additive Cognitive Diagnostic Model, ACDM (de la Torre, 2011), and the Generalized Deterministic Inputs, Noisy "And" Gate model, G-DINA (de la Torre, 2011).

On the other hand, it is assumed that all required attributes must be mastered to correctly answer a test item in non-compensatory models, also known as conjunctive models (Tabatabaee-Yazdi & Samir, 2023). It means that weaknesses in any one attribute cannot be compensated for by strengths in other attributes (Effatpanah & Baghaei, 2019). In other words, non-compensatory models are more stringent in their assessment, requiring individuals to demonstrate mastery of all relevant attributes for each test item. Some examples of non-

compensatory models include the Deterministic Input, Noisy "And" gate (DINA) model (Junker & Sijtsma, 2001), Reparameterized Unified Model (RUM) (DiBello et al., 1995), and Reduced Rule Space Model (RRUM) (Hartz, 2022). The main difference between compensatory and non-compensatory models lies in how they account for the relationship between cognitive attributes when making inferences about an individual's performance on a test. Compensatory models allow for strengths in certain attributes to compensate for weaknesses in others, while non-compensatory models require mastery of all relevant attributes for successful performance.

Another different type of CDM classification is saturated models which depends on the number of parameters used to fit the model to the data. A saturated model has enough parameters to perfectly fit the observed data, resulting in a perfect fit with no unexplained variability (Terzi & Sen, 2019). This means that the model is flexible and can perfectly predict the response patterns of individuals based on their mastery or non-mastery of specific cognitive skills (Min et al., 2022). Saturated models also possess the capacity to deal with both compensatory and non-compensatory relationships simultaneously (Dong et al., 2022). However, saturated models may be overly complex and need a large sample size (Sen & Cohen, 2021). Examples of saturated models include the general diagnostic model, GDM (von Davier & Lee, 2019), and the hierarchical diagnostic classification model, HCDM (Templin & Bradshaw, 2013).

Newly-developed CDA items vs retrofitting non-diagnostic items, which is preferable?

Another ongoing discussion in CDA is whether to retrofit an existing item test or develop new measurement items. Both approaches offer different advantages and use distinct ways of conducting studies. Retrofitting studies refer to the process of applying cognitive diagnostic models (CDMs) to existing non-diagnostic tests, to extract diagnostic information from the test results (Mirzaei et al., 2020). This approach involves constructing a Q-matrix, which maps the test items to the cognitive skills they measure, and then fitting a CDM to the test data to estimate the mastery of each skill for each test taker (Toprak & Çakir, 2018). Retrofitting studies are often used when it is not feasible or practical to develop a new diagnostic test from scratch, and have been applied to a variety of high-stakes proficiency exams in language testing. In the context of language assessment, studies have been done to retrofit high-stakes examinations such as the Program for International Student Assessment (PISA) (Chen & Chen, 2015, 2016), Michigan English Language Assessment Battery (MELAB) (Li & Hunter, 2015; Li & Suen, 2013), Test of English as a Foreign Language (TOEFL) (Safari & Ahmadi, 2023; Yi, 2016), College English Test (CET) (Meng et al., 2023; Meng & Fu, 2023; Shi et al., 2024), International English Language Testing System (IELTS) (Mirzaei et al., 2020; Panahi & Mohebbi, 2022) and Progress in International Reading Literacy Study (PIRLS) (Thi & Loye, 2019).

In contrast to retrofitting studies, a distinct approach in cognitive diagnostic assessments involves the creation of new items grounded in the initially specified attributes. These studies undergo various phases before the analysis through cognitive diagnostic models (CDMs) is initiated. The process typically commences with the identification of attributes for measuring selected domains, employing expert judgment, document analysis, and literature review (Toprak & Cakir, 2020). Subsequently, items are meticulously crafted based on these attributes, each assigned a specific number. The next step entails constructing a Q-matrix to delineate the tentative relationship between attributes and items before collecting data from the targeted population (Nallasamy & Khairani, 2022). Ultimately, CDMs are employed to empirically validate the Q-matrix and analyze the data, culminating in the generation of students' mastery profiles (Alavi & Ranjbaran, 2018). Numerous studies on developing new CDA items, conducted across diverse regions and targeting various domains in language assessment, have been previously documented. Among these, a recurrent focus has been on reading comprehension items, chosen by several authors to discern students' proficiency in reading sub-skills (Doe, 2014; Y. Li et al., 2021; Nallasamy & Khairani, 2022; Ranjbaran & Alavi, 2017; Toprak & Cakir, 2021). Another cluster of research endeavors has delved into the creation and validation of cognitive diagnostic items specifically tailored for assessing writing skills (Kim, 2019; Safari & Ahmadi, 2023; Shi et al., 2024). Additional studies have directed their attention toward crafting items gauging proficiency in speaking (Poolsawad et al., 2015) and grammar (Clark & Endres, 2021; Mizumoto & Webb, 2017)

Each approach serves different purposes tailoring to the objectives of the studies. Retrofitting studies follow a different path, where attributes are delineated within the scope of what existing items already assess. Although this approach benefits from the availability of pre-existing items, facilitating a more straightforward Q-matrix

construction, it is limited by constrained attribute specification. The retrofitting process is confined to what the existing items were originally designed to measure. In contrast, developing new CDA items from scratch presents distinct advantages. This is because, in this approach, attributes are first precisely specified, and items are subsequently developed based on these identified attributes. This method allows for greater flexibility in refining and adjusting item quality to accurately measure the specified attributes. Furthermore, the construction of the Q-matrix in this approach is highly tailored to the goals of the studies or the assessment system, ensuring a targeted measurement of candidate skills. While both approaches have their merits, the development of new CDA items stands out for its ability to offer a more customizable and precise measurement of attributes, enhancing the overall quality of the assessment process.

Expert-based or empirical validation, which is better?

A vital component in CDM is the construction of a Q-matrix to map the relationship or association between items and attributes introduced by Tatsuoka (1983). The matrix is typically constructed after attributes have been specified and items have been developed and undergo an iterative process. To validate the relationship between items and attributes, the matrix needs to be validated either through panel judgment or empirical analysis. Some studies have validated the matrix qualitatively using the judgment made by expert panels (Liu et al., 2017; Ravand, 2016). The process of selecting experts typically involves qualitative methods, while their consensus is often quantified, for example, through the utilization of Fleiss' Kappa to establish a shared matrix (Shi et al., 2024). Another method of quantitatively validating these matrices through expert judgment is Interpretive Structural Modeling (ISM) as shown in a study by Zhang et al. (2024).

However, some scholars have expostulated the caliber of qualitative judgment and put forward empirical methods to validate the matrix. Recent advancements have proposed empirical methods using quantitative approaches for Q-matrix validation (Chen et al., 2015; de la Torre & Chiu, 2016; DeCarlo, 2012; Desmarais & Naceur, 2013). Some of these approaches are entirely data-driven, with underlying attributes derived from test takers' responses (Meng et al., 2023). Others are designed to identify potential misspecifications in expert-defined provisional Q-matrices, suitable for situations where misspecifications can be identified (DeCarlo, 2012; Templin & Henson, 2006).

The battle between different methods to validate the Q-matrix reflects a dynamic landscape in the field of cognitive diagnostic modeling (CDM). Researchers and practitioners grapple with choosing the most effective approach among the array of available methods. On one front, the factorization method proposed by Desmarais and Naceur (2013) Emphasizes the iterative refinement of an expert-defined Q-matrix based on test takers' responses. On another front, the Bayesian Extension introduced by DeCarlo (2012) introduces a probabilistic approach to acknowledge uncertainty in the Q-matrix. Meanwhile, the general method of empirical Q-matrix validation, developed by de la Torre and Chiu (2016), offers a comprehensive solution compatible with the G-DINA model and specific DCMs. In contrast, the regularized latent class analysis (RLCA) method, proposed by Chen et al. (2018), presents a non-provisional approach, deriving the Q-matrix directly from test responses. The battle extends to the sphere of model comparison and fit indices, where metrics like the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are employed to assess the appropriateness of different Q-matrices. Additionally, the indices for classification consistency and accuracy, as presented by Cui (2012), add another layer to the skirmish, contributing to the ongoing discourse on the reliability and validity of classifications made by DCMs. In this dynamic arena, the quest for the most robust and applicable method for Q-matrix validation persists, shaping the trajectory of CDM research and application.

4. Future Directions and Recommendations

As the field of cognitive diagnostic assessment (CDA) continues to evolve, researchers are faced with the challenges of exploring and refining existing cognitive diagnostic models (CDMs). The current landscape is dominated by compensatory and non-compensatory models, each with its strengths and limitations. Future research endeavors could focus on expanding the repertoire of Cognitive Diagnostic Models (CDMs) by developing hybrid models that integrate the advantages of both compensatory and non-compensatory approaches, especially in the context of language proficiency evaluation. This hybridization may provide a more significant understanding of how cognitive skills interact and influence overall performance, offering a comprehensive assessment framework, particularly in complex skills in language acquisition. Additionally, the

exploration of novel CDMs with enhanced computational approaches and statistical foundations can contribute to the refinement of diagnostic accuracy and reliability. The quest for the most effective CDM remains an ongoing journey, opening avenues for researchers to innovate and enhance the precision of cognitive diagnostic assessment. On top of that, practitioners engaging in cognitive diagnostic assessment (CDA) should carefully consider the implications of choosing between compensatory and non-compensatory models. The decision has profound consequences for the depth of diagnostic insights provided. While compensatory models allow for a degree of flexibility by acknowledging that strength in one skill can compensate for weaknesses in another, non-compensatory models demand a more stringent mastery of all relevant skills for successful performance. Practitioners should align their choice with the specific objectives of the assessment and the educational context in which it is applied.

Additionally, the ongoing debate on retrofitting existing items versus developing new diagnostic items calls for a strategic approach. When retrofitting is deemed appropriate, practitioners must ensure the alignment of existing items with the intended cognitive attributes. Conversely, when developing new items, the careful crafting of items based on identified attributes is crucial for the validity and reliability of the diagnostic process. Future studies should emphasize the development of entirely new items rather than relying solely on retrofitting existing non-diagnostic tests. This shift in focus is crucial for the continuous evolution of CDA, ensuring that the assessment tools are aligned with the ever-changing landscape of language proficiency evaluation. By delving into the creation of innovative diagnostic items, researchers can address the limitations of retrofitting studies and contribute to the refinement and expansion of the CDA framework.

Apart from that, the clash between expert-based and empirical validation methods for Q-matrix in cognitive diagnostic assessment (CDA) presents a dynamic arena for future research. Researchers and practitioners should focus on exploring the strengths and limitations of different validation methods to enhance the reliability and validity of Q-matrices. Comparative studies that systematically evaluate the performance of various validation approaches, such as the factorization method, Bayesian Extension, regularized latent class analysis (RLCA), and model comparison metrics, will contribute to a more profound understanding of their applicability in different contexts. Practical guidelines for practitioners in choosing the most suitable validation method based on their specific assessment goals and constraints should also be a focus of future research endeavors.

The integration of adaptive cognitive diagnostic assessment represents a promising avenue for future research. Adaptive CDA tailors the assessment process in real-time based on the test taker's responses, dynamically adjusting the difficulty and content of subsequent items. This adaptive approach has the potential to enhance the efficiency and precision of diagnostic assessments by focusing on the specific cognitive skills relevant to an individual's proficiency level. Researchers should explore adaptive strategies within the CDA framework and investigate their implications for improving the accuracy of diagnostic feedback and the overall effectiveness of language learning interventions. Additionally, CDA holds the capacity to assist teachers and educational practitioners in discerning students' mastery of micro-skills within the classroom. This can be particularly valuable for formative assessments or in-class evaluations. Consequently, beyond research concentrated on high-stakes international assessment systems, a strategic initiative should be undertaken to seamlessly integrate CDA into low-stakes settings.

Furthermore, while the adoption of CDA has been notably successful in specific nations like the United States of America, Iran, and China, there is a compelling case for broader global participation. Other countries especially Asian countries would greatly enhance their assessment systems by actively integrating CDA methodologies. CDA possesses the capability to enhance the quality of assessment systems, whether in high-stakes or low-stakes contexts, thereby indirectly elevating teacher practices and the overall education system.

5. Conclusion

In the exploration of cognitive diagnostic assessment for language proficiency evaluation, this article has delved into the wide-ranging possibilities of assessing students' cognitive skills, moving beyond traditional testing methodologies. From the foundational understanding of CDA's emergence to the ongoing conundrum of different classifications of models, and the strategic considerations in developing new diagnostic items, the discussion on

this discourse has illuminated the significance of evolving assessment approaches. With its ability to unravel the specific strengths and weaknesses of individuals in various cognitive domains of language skills, CDA stands as a beacon for educational systems aiming to tailor instruction to the unique needs of learners. However, CDA is not without its challenges, and practitioners must remain vigilant to potential threats. Given its capability to offer detailed insights into an individual's abilities, the assessment demands a meticulous approach to rating and score analysis. This process requires practitioners to navigate issues such as cultural biases in assessment tools and the potential impact of test anxiety on accurate measurements. Additionally, considering environmental factors and addressing motivational aspects becomes crucial to ensuring the reliability and validity of the intricate information CDA aims to provide. In conclusion, the rigorous research on the methodological aspects of CDA should be coupled with initiatives to develop new CDA items as empirical evidence of how the application of CDA can be meaningful and impactful. With the dynamic nature of language proficiency evaluation, CDA stands out as a great method to capture the intricacies of cognitive processes in language acquisition.

Funding: This study was funded by Ganjaran Penerbitan GP-KO21854 and TAP-KO21854 Universiti Kebangsaan Malaysia.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgment: All authors contributed equally to the conception and design of the study.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Factors Influencing Changes in Consumer Behavior amidst Post COVID-19 Pandemic

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Abstract: The COVID-19 pandemic had an immediate and significant impact on consumer behavior, radically changing attitudes and behaviors, as reflected in sales figures. While some researchers believed the pandemic would lead to lasting changes, others expected a return to pre-pandemic behavioral patterns. Despite this ambiguity, there has been little research on the factors influencing consumer behavior, especially about the demand for everyday goods. This study, rooted in the theory of planned behavior (TPB) and the protection motivation theory (PMT), investigated the determinants of consumer behavior in the purchase of daily necessities following the COVID-19 outbreak. In light of the possibility that the pandemic could have caused a new pattern of consumer behavior during the endemic phase, a convenience sampling of 1438 respondents was conducted. Using Partial Least Square Structural Equation Modelling (PLS-SEM), the present study found that choice, information, and perceived economic stability (PES) positively affected consumer behavior, while COVID-19 and risk had negative effects. Interestingly, stress had no impact on consumer behavior. These findings provide valuable insights for companies desiring to understand and anticipate customer behavior during and beyond the pandemic. The present study not only identifies the factors influencing consumer behavior but also enables salespeople to develop strategies to proactively address changes in consumer behaviors.

Keywords: *Choice, Consumer behavior, COVID-19 pandemic, Necessity goods, Risks*

1. Introduction and Background

In 2019, the global community was shaken by the COVID-19 pandemic. According to the World Health Organization (WHO), coronaviruses are categorized as viruses from the Coronaviridae family. These viruses affect both humans and animals. This pandemic led to the worst economic and social crisis in recent history (Donthu & Gustafsson, 2020; Kirk & Rifkin, 2020). As the virus progressed, the mobility of people and goods was restricted in most countries, as authorities were forced to impose full or partial lockdowns.

These measures disrupted markets and economic and social functions. Several new economic constraints emerged as a result of COVID-19 lockdown orders, including reduced disposable income and income security due to job losses or furloughs (Karpen & Conduit, 2020). In Malaysia in particular, it was reported that 140,608 people lost their jobs between March and August 2020 due to the pandemic (Hassan, 2021). The pandemic also affected industries such as tourism, entertainment, and food and beverage, especially restaurants (Martin, 2020).

Beyond the economic perspective, the pandemic also had a radical social impact, changing almost all aspects of daily living. Unexpected and unintended changes included social distancing, wearing masks, the deferment of public transportation, and travel restrictions. The COVID-19 pandemic was therefore much more than a health issue: It disrupted the world economy and healthcare systems while causing fear, terror, and uncertainty among people across the world (Islam et al., 2021; Naeem, 2021).

Although the long-term consequences of COVID-19 are unknown, it had a significant and immediate impact on consumer behavior. Consumer behavior is the study of individuals or groups who want to buy, use, evaluate, or dispose of products and services to satisfy their needs. Consumer behavior can change for a variety of

reasons, including personal, economic, psychological, contextual, and social (Di Crosta et al., 2021). However, in dramatic situations such as a natural disaster or the outbreak of a disease such as COVID-19, some factors have a greater influence on consumer behavior than others. This serious public health crisis profoundly changed consumer attitudes and behavior, as economic sales statistics show. According to a Nielsen Company study, the COVID-19 pandemic led to observable changes in consumer behavior and spending levels worldwide (Nielsen, 2020). The pandemic also changed consumption patterns. For example, some product categories (e.g., clothing) experienced reduced sales during the pandemic while others (e.g., entertainment products) experienced increased sales (Degli et al., 2021). Some researchers believed that the Covid-19 pandemic permanently redirected human behavior. However, Sheth (2020) pointed out that consumers might return to previous patterns following the lockdown, though at the time of this writing, this remains to be seen.

Therefore, it is important to examine the determinants that precede or follow consumer purchasing behavior, especially for everyday goods, after a pandemic takes place. Previous research in consumer psychology and behavioral economics has found that various psychological factors influence customer behavior in different ways (Durante & Laran, 2016; Asioli, 2017; Foxall, 2015). Under pandemic circumstances, it is unsurprising that the need to purchase essentials takes priority (Larson & Shin, 2018). However, research on the factors influencing changes in consumer behavior regarding essential goods due to the COVID-19 pandemic has received little attention (Lingqvist et al., 2021, Sheth, 2020). These factors include choice, COVID-19, information, perceived social equity, risk, and stress. Understanding consumer behavior is vital for predicting the purchasing behavior of potential customers. Since the COVID-19 pandemic may create a new consumer behavioral pattern during the endemic phase, this data can help companies understand how customers might behave both during this time and in the future. The study not only identifies the factors influencing consumer behavior but also allows sellers to plan tactics to proactively address these behaviors once they are aware of the changes in their consumers.

2. Literature Review

In this study, Ajzen's (1988) theory of planned behavior (TPB) and additional external variables were included to identify the elements that influence consumer behavior about necessity goods. In addition, this study explored the theoretical aspects of consumer buying behavior and the influencing factors, building on the work of Khaniwale (2015), who examined the relationship between consumer buying behavior and the variables that influence customers' buying processes and decisions (Khaniwale, 2015; Noel, 2017; Al-Salamin & Al-Hassan, 2016). Research shows that a consumer's purchasing behavior is strongly influenced by internal and external variables, including cultural, social, personal, and psychological factors.

Furthermore, it is crucial to analyze the theory of how individuals receive, understand and apply information in decision-making. During the COVID-19 epidemic and endemic phase, consumers received a wealth of information from various sources about safety protocols, product accessibility, and economic forecasts. An overabundance of information or conflicting messages could influence consumer decision-making by either helping or hindering the evaluation of essential items. Consumers can rely on reputable sources and look for concise, relevant information to make their purchasing decisions.

Consumer behavior for everyday goods

Consumer behavior has been described as the study of how people buy, what they buy when they buy, and why they buy (Kotler, 1994). This scientific field seeks to understand the consumer's decision-making processes, which can help firms and marketers capitalize on buying behavior. Necessity goods are products or services that consumers are willing to buy irrespective of changes in their income levels, which is why these products are less sensitive to income level changes.

During the COVID-19 pandemic, consumer purchasing behavior concerning necessities called attention to the urgency of acquiring items relevant to avoiding COVID-19 and ensuring survival. Not surprisingly, in such an emergency, the need to buy necessities took priority (Larson & Shin, 2018). In general, consumers buy necessities regardless of whether they feel obligated to do so or whether they buy the product impulsively.

Since the outbreak of COVID-19, many researchers conducted studies to determine the impact of the disease

on people's lives and what effect it had on consumer behavior (e.g., Werner-Lewandowsk et al. 2021). In another study, a distinction between necessary and non-necessary products was recommended to better understand consumer behavior, especially in stressful situations (Di Crosta et al., 2021). The present study, however, focused on consumer behavior regarding daily necessities. Furthermore, this study investigated how variables such as choice, COVID-19, information, PSE, risk, and stress affect consumer purchasing behavior of daily necessities in the post-COVID-19 pandemic period.

Choice

The COVID-19 pandemic had a significant impact on consumer behavior concerning product choice. Consumers bought relatively more essential goods, health and hygiene products, and digital platforms (Das et al., 2022). Factors such as the fear of contagion, government measures, and changes in activities and travel influenced consumer choices, especially in terms of transportation choices and consumption behavior. Consumers prioritized safety, social distancing, and infection concerns in their decision-making, which led to increases in online shopping, contactless payment, and essential goods purchases (Rizvi, 2021). The pandemic also led to a shift towards e-commerce, with consumers buying more groceries and other goods online (McKinsey, 2020). These changes in consumer behavior were expected to evolve based on choices related to health, safety, and convenience (Das et al. 2022). Therefore, it is hypothesized that

H1: Choice significantly influences consumer behavior for everyday goods.

COVID-19

The current study explores how the fear of COVID-19 influences purchasing behavior. Fear, a basic human emotion, functions to protect us by alerting us to potential dangers and priming us to react with fight or flight responses. Simply put, fear functions as a natural warning system in our bodies, cautioning us to be careful and alert. With so many deaths worldwide, it is undeniable that this pandemic significantly affected individuals' mental and physical health (Rodríguez-Hidalgo et al., 2020). Consequently, it is not surprising that consumers became more cautious and altered their behavior during that time. Panic buying is an example of a phenomenon that occurs when fear and panic influence behavior. It is defined as herd behavior that occurs when consumers buy large quantities of products in anticipation of, during, or after a disaster (Di Crosta et al., 2021). Panic buying generally increases consumers' fear of supply shortages, exacerbating their purchasing behavior. Previous studies found that people fearful of a pandemic are more likely to gravitate towards products that reduce their risk of infection. For instance, appeals to fear are often positively associated with increased purchasing of personal protective equipment (Liu, et al., 2021). In addition, Addo et al. (2020) confirmed that fear of COVID-19 significantly influenced consumer behavior concerning necessities purchasing. However, it is still unclear to what extent the fear of COVID-19 influences consumer behavior in that study. Therefore, it is hypothesized that the

H2: COVID-19 pandemic significantly influences consumer behavior related to daily necessities.

Information

Up-to-date information is crucial in a pandemic situation, as it assists in understanding how consumers are protected. Themselves from COVID-19. The behavior of consumers regarding necessary goods can change as a result of the pandemic. For example, consumers might research or consult with other people to decide on the type or brand of essential items such as face masks or hand sanitizer. A McKinsey study (2020) reported that consumers around the world shaped their purchasing behavior differently, often influenced by information received from advertising on platforms such as Twitter, Facebook, Instagram or other online platforms. Consequently, they tended to spend their money on the type or brand of everyday goods that appealed to them. In a recent Trust Barometer Special Report (2020), the results showed that a third of respondents actively turned away from brands they perceived as responding inappropriately to the crisis, highlighting the power of social media to provide up-to-date information. Therefore, it is hypothesized that

H3: Information significantly influences consumer behavior about everyday goods.

Perceived Economic Stability (PES)

The COVID-19 pandemic had a profound impact on consumer behavior, with PES being an important factor. Several studies showed the influence of perceived economic stability on consumer behavior during and after the pandemic. For example, a 2022 study found that consumers' perceptions of uncertainty, scarcity, pandemic severity, and pressure, led to changes in purchasing behavior (e.g., panic buying and a preference for useful

products; Tao et al., 2022). Another study, conducted in an emerging country and published in 2021, examined the impact of COVID-19 on changing consumer behavior based on socioeconomic status and emphasized the need to understand how different consumer groups adjusted their purchasing behavior during the pandemic (Das et al., 2022). In addition, a literature review published in 2023 described the significant behavioral changes of consumers during the pandemic, including abnormal purchasing behavior and changes in consumer preferences, which have implications for consumer-oriented logistics (Cai et al., 2023).

These studies collectively suggest that PES plays a critical role in shaping consumer behavior during and after a pandemic. The uncertainty and economic impact of the COVID-19 pandemic led to changes in consumer purchasing behavior, with a preference for essential products, consumer durables, and online shopping. In the post-pandemic period, it will be critical for businesses and policymakers to understand the ongoing impact of perceived economic stability on consumer behavior to adjust their strategies and support consumer needs. Therefore, it is hypothesized that
H4: PES significantly influences consumer behavior for everyday goods.

Risks
Everything we do in our daily lives carries risks, whether it is driving, jogging, or even eating. The same risk applies to products and services. According to Bauer (1960), consumer behavior inherently involves risk in that every action has consequences that the consumer cannot be certain about with at least some of these consequences potentially being unpleasant. Researchers have analyzed that a purchase decision involves risk if the outcomes are associated with the decision. From a consumer behavior perspective, the consumption of goods during a pandemic is considered a risky phenomenon (Lee, 2009). In this study, the overall risk is determined based on the consumption process. It has some dimensions such as performance risk, social risk, physical risk, financial risk, psychological risk, and time loss risk (Mitchell & Harris, 2005). Consequently, this element should be taken into account. The likelihood that the consumer will be affected by the risk posed by the product or service they purchase can influence their behavior. However, some scientists believe that these risks need to be thoroughly researched to better identify consumer behavior and recommend appropriate solutions. Accordingly, it is hypothesized that the
H5: Risks significantly influence consumer behavior for everyday goods.

Stress
Stress can influence consumer behavior in various ways. Studies have shown that people react strategically in stressful situations by adjusting their spending behavior. Many consumption decisions, such as buying or remodeling a home and buying a new car, are classified as stressful events and ranked on a life events scale (Moschis, 2007). Stress related to consumption can be experienced before and after the purchase of a product. In addition, stress affects consumer behavior in the context of essential items. Many of us face difficulties that are stressful and unpleasant, triggering intense emotions. Although public health measures such as social isolation, distancing, and regulations are needed to prevent the spread of COVID-19, they can make us feel lonely, tense, and anxious. As a result, COVID-19 has had a wide range of stress-induced effects on consumer behavior. During the pandemic, stress was found to increase the purchase of daily necessities while simultaneously leading to decreased spending on non-essential items (Di Crosta et al., 2021). Therefore, it is hypothesized that
H6: Stress significantly increases the consumer purchasing of daily necessities.

3. Research Methodology

As Malaysia was expected to complete the transition from the pandemic to the endemic phase of the outbreak in June 2023, convenience sampling was used to collect the sample for the present study. Respondents were contacted via WhatsApp groups with a link to an online survey. According to the Department of Statistics Malaysia (DOSM, 2023), there will be 22.3 million people of working age (18 to 64) in Malaysia in 2023. According to Krejcie and Morgan (1970), the sample size based on population statistics was about 384. On the other hand, the GPower software determined a minimum sample size of 98 with six variables, a medium effect size (0.15) and a power requirement of 0.95, based on a predictive power of 0.80. Finally, after cleaning the data, only 1438 were deemed useful for the analysis.

The demographic part of the questions was followed by sections on consumer behavior for daily goods, choice, COVID-19, information, work management, risks, and stress. In the final sections, Likert scales from 1 to 7 were used, with 1 indicating the highest level of disagreement and 7 indicating the highest level of agreement. The sources used in the study were adapted and adopted based on the sources of Di Crosta et al. (2021) on consumer behavior for necessity goods, Di Crosta et al. (2021) on choice, Hesham et al. (2021) on COVID-19 and risks, Di Crosta et al. (2021) on information, Di Crosta et al. (2021) on PES and Cohen et al. (1983) and Al-Dubai et al. (2012) on stress.

4. Results

The study used kurtosis and multivariate skewness to test for normality. The common variance method (CMV) was the next issue to be investigated as the study involved the simultaneous collection of the independent and dependent variables from the same respondents. In addition to cross-loadings, average variance extracted (AVE), composite reliability (CR) and heterotrait-to-monotrait ratio (HTMT), the current study also examined the measurement model criteria. PLS-SEM modeling was used to evaluate the measurement and structural model. The path coefficients, standard errors, t-values, and p-values for the structural model were then displayed using a bootstrapping technique with 5,000 samples after confirming normality with Mardia's multivariate skewness and kurtosis.

Before this, respondents' demographics were analyzed. The analysis was then explained, starting with the measurement model and the structural model.

Table 1: Demographic of the Respondents

	Items	n	%
Gender	Female	1021	71
	Male	417	29
Age	≤20	156	10.85
	21-30	1110	77.19
	31-40	76	5.29
	41-50	64	4.45
	51-60	28	1.95
	>61	4	0.28
Education	Diploma or Certificate	433	30.11
	have not attended school	7	0.48
	Postgraduate	20	1.39
	Primary school	3	0.21
	Secondary school	98	6.82
	University Bachelor's degree	877	60.99
Employment	Government sector	125	8.69
	Housewife	4	0.28
	Private sector	161	11.2
	Retiree/pensioner	6	0.42
	Self-employed	91	6.33
	Students	1008	70.1
	unemployed	43	2.99
Marital status	Divorced or widowed	13	0.9
	Married	196	13.63
	Single	1229	85.47

Residential	rural	416	28.93
	suburban	357	24.83
	urban	665	46.24

Table 1 shows the demographic characteristics of the respondents in the current study. The sample consisted of 1438 individuals, with 71% being women and 29% men. The age of the respondents ranged from under 20 to over 61, with the majority being between 21 and 30 years old (77.19%). Regarding education level, 60.99% had a bachelor's degree, while 30.11% had a diploma or certificate. The majority of respondents were students (70.1%), followed by those working in the private sector (11.2%) and the government sector (8.69%). Regarding marital status, the sample was predominantly single individuals (85.47%) and most respondents lived in urban areas (46.24%). Multivariate skewness and kurtosis were assessed according to Hair et al. (2017) and Cain et al. (2017). The data collected for the study were not multivariate normal, as indicated by Mardia's multivariate skewness (b=5.6674, P<0.001) and multivariate kurtosis (b=82.2917, p<0.001). As a result, the bootstrapping approach was used in the study to obtain the standard errors when testing the structural models. A bootstrapping technique with 5000 replicate samples was used (Ramayah et al., 2018). Common Method Variance (CMV) was a concern in this study due to the simultaneous collection of the independent and dependent variables from the same respondents (Avolio et al., 1991). To control CMV, the study used a single common method factor approach, following the recommendations of Podsakoff et al. (2003) First, the PLS marker variable approach was used to construct a method factor (Ronkko & Ylitalo, 2010). Crowne's (1960) social desirability scale was chosen as the marker variable using four items collected in the same survey but not included in the tested model. The marker indicators were: 1. "I am sometimes annoyed when I do not get my way;" 2. "I am always careful about my clothes;" 3. "I am always polite, even to people who are unpleasant;" 4. "Sometimes I have insisted on getting things my way;" Second, a method factor was created using the marker indicators as an exogenous variable predicting each endogenous construct in the model. Finally, the study compared the method factor model with the base model and found that the significant paths in the base model remained significant in the method factor model. From this, we can conclude that the data did not exhibit a CMV problem.

Figure 1: Constructs of the Study

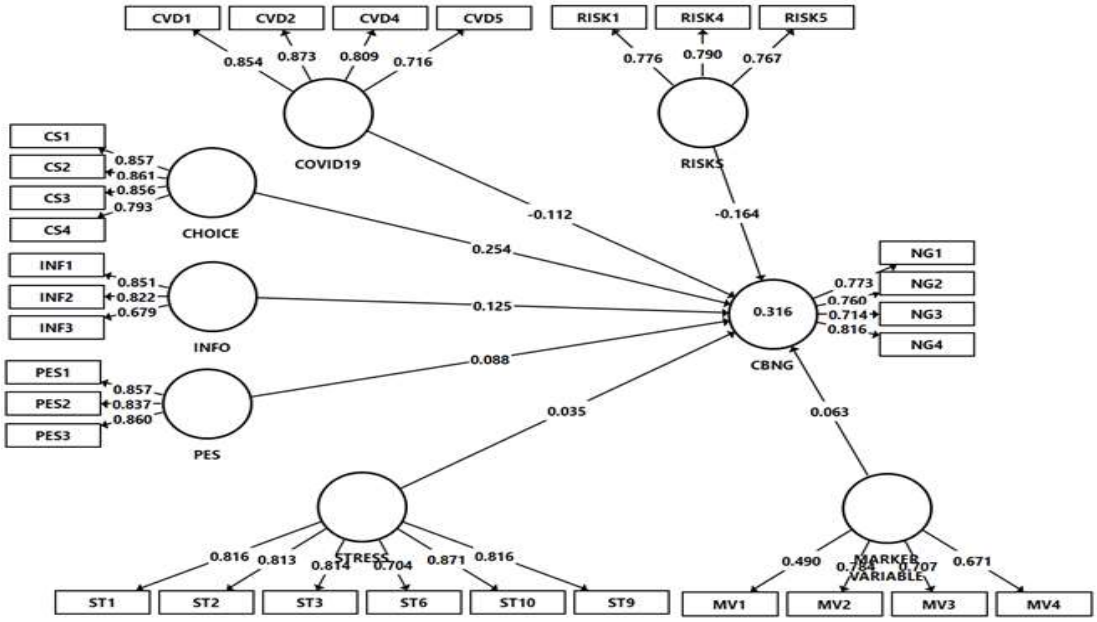

Table 2: Measurement Model

Variables	Item	Loading	CR	AVE
CBNG	NG1	0.775	0.851	0.588
	NG2	0.758		
	NG3	0.713		
	NG4	0.817		
CHOICE	CS1	0.857	0.907	0.709
	CS2	0.861		
	CS3	0.856		
	CS4	0.793		
COVID19	CVD1	0.854	0.887	0.664
	CVD2	0.873		
	CVD4	0.809		
	CVD5	0.716		
INFO	INF1	0.851	0.829	0.620
	INF2	0.822		
	INF3	0.679		
PES	PES1	0.857	0.888	0.725
	PES2	0.837		
	PES3	0.860		
RISKS	RISK1	0.776	0.822	0.605
	RISK4	0.791		
	RISK5	0.767		
STRESS	ST1	0.816	0.918	0.652
	ST2	0.813		
	ST3	0.814		
	ST6	0.704		
	ST9	0.816		
	ST10	0.871		

Next, the study continued with an examination of the measurement model. As suggested by Hair et al. (1998) and Ramayah et al. (2018), the indicator loadings, AVE and CR of the measurement model were tested. The criteria for these tests were that all indicator loadings should be greater than 0.5, the average value for each construct should be greater than 0.5, and the CR coefficient had to be greater than 0.7.

As shown in Figure 1 and detailed in Table 2, all indicator loadings exceeded 0.5, the AVE values ranged from 0.588 to 0.725, and the CR values ranged from 0.822 to 0.918. Thus, the requirements for indicator loadings, the reliability of the measures, and the convergent validity were all met.

Table 3: Discriminant Validity

	1	2	3	4	5	6	7
1. CBNG							
2. CHOICE	0.562						
3.COVID19	0.396	0.359					
4.INFO	0.592	0.704	0.520				
5. PES	0.379	0.329	0.292	0.527			

6. RISKS	0.493	0.431	0.373	0.553	0.329		
7. STRESS	0.068	0.126	0.274	0.125	0.067	0.133	

Next, Henseler et al. (2015) introduced the Heterotrait-Monotrait (HTMT) ratio for testing discriminant validity, supplanting the Fornell and Larcker (1981) criterion. According to Kline (2011), if the HTMT value exceeds 0.85, or 0.90 as suggested by Gold et al. (2001), there are concerns about discriminant validity. On the other hand, if the HTMT ratio is below 0.85 or 0.90, the constructs are considered discriminable. As shown in Table 3, all HTMT values are below 0.85, which confirms the discriminant validity of all the constructs.

Table 4: Hypothesis Testing

	RELATIONSHIP	Std. Beta	Std. Dev	t-value	p-value	BCI LL	BCI UL	f^2	VIF
H1	CHOICE -> CBNG	0.266	0.034	7.855	0.000	0.211	0.321	0.068	1.519
H2	COVID19 -> CBNG	-0.12	0.03	4.054	0.000	-0.170	-0.072	0.016	1.295
H3	INFO -> CBNG	0.135	0.035	3.836	0.000	0.078	0.193	0.015	1.749
H4	PES -> CBNG	0.101	0.027	3.757	0.000	0.052	0.143	0.012	1.244
H5	RISKS -> CBNG	-0.173	0.027	6.37	0.000	-0.218	-0.130	0.035	1.234
H6	STRESS -> CBNG	0.029	0.024	1.232	0.109	0.002	0.095	0.001	1.082

Path coefficients, standard errors, t-values and p-values for the structural model were presented using a bootstrapping approach with 5,000 replicate samples as suggested by Hair et al. (2019) and Ramayah et al. (2018). Based on Hahn and Ang's (2017) critique that p-values are not a good criterion for testing the significance of hypotheses, several alternative methods were suggested, including the use of replication studies (Sawyer & Peter, 1983; Singh, Ang, & Leong, 2003), effect size estimates, and confidence intervals (Aguinis et al. 2010; Ely, 1999; Hubbard and Meyer, 2013; Lin, Lucas, and Shmueli, 2013). Therefore, several decision rules were used in the study, including the p-value criterion, effect size, and confidence intervals.

The current study used Cohen's (1988) criteria of 0.02, 0.15 and 0.35 to determine the effect size, reflecting small, medium and large effects, respectively. Table 4 shows that four relationships had a significant influence with a small effect size. The effect sizes for factors of choice, COVID-19, information and risks were small, with f^2 values of 0.068, 0.016, 0.015 and 0.035 respectively.

The criteria for the hypothesis test are also summarized in Table 4. As can be seen from the table, the study first examined the influence of six variables on consumer behavior. Overall, choice ($\beta = 0.266$, $p<0.01$), information ($\beta = 0.135$, $p<0.01$) and PES ($\beta = 0.101$, $p<0.01$) had a positive influence on consumer behavior, while COVID-19 ($\beta = -0.12$, $p<0.01$) and risk ($\beta = -0.173$, $p<0.01$) had a negative influence. As a result, support was found for hypotheses H1, H2, H3, H4 and H5. In contrast, the study found an insignificant relationship between stress and consumer behavior.

According to Hair et al. (2019), R^2 values of 0.75, 0.50, and 0.25 are considered significant, moderate and weak respectively by Hair et al. (2019). The explanatory power R^2 of the result in the sample was 0.313 (Q^2=0.181), which is considered reasonable for a model of this type. The variables account for 31.3 percent of the variation in consumer behavior.

Table 5: PLS-Predict

	PLS RMSE	LM RMSE	PLS-LM RMSE	Q^2_predict
NG2	0.751	0.748	0.003	0.183
NG4	0.691	0.696	-0.005	0.212
NG3	0.823	0.818	0.005	0.139
NG1	0.680	0.683	-0.003	0.179

The study also performed the PLS Predict analysis to see how good the predictive power was. Predictive validity refers to the ability of a set of measures for a particular concept to predict a particular outcome variable (Shmueli et al., 2019; Felipe et al., 2017). Predictive validity (out-of-sample prediction) was assessed using cross-validation with holdout samples, as described by Shmueli et al. (2019), who obtained k-fold cross-validated prediction errors and prediction error summary statistics, such as the root mean squared error (RMSE), mean absolute error (MAE), and mean absolute percentage error (MAPE), to assess the predictive performance of their PLS path model for the indicators and constructs. The equivalent Q^2 from the PLS-Predict study were NG1 (0.179), NG2 (0.183), NG3 (0.139) and NG4 (0.212), which were all greater than zero, indicating that the data was sufficiently predictive. Since the errors were normally distributed or symmetrical, the root mean square error (RMSE) was used. The RMSE showed that out of 4 items, half were negative and lower than the corresponding values in LM (see Table 5), indicating that the model had some predictive power.

Discussion

The current study aimed to investigate the determinants that influence consumer purchasing behavior, especially for everyday goods, after the COVID-19 pandemic. The study's findings on the positive impact of choice on consumer behavior align with the findings of Das et al. (2022) and Chernev, Böckenholt and Goodman (2015), suggesting that a wider choice of products can positively influence consumer behavior.

Furthermore, the current study found a positive relationship between information and consumer behavior, consistent with an earlier study by Broniarczyk and Griffin (2014), which supports the idea that providing consumers with more information can positively influence their behavior. In addition, the results suggested that PES had a positive influence on consumer behavior. This is in line with existing research by Mishkin and Serletis (2015) and Dholakia and Dholakia (2019), which indicates that the perceived stability of the economy can significantly influence consumer confidence, spending, and investment decisions.

On the other hand, the study's finding that COVID-19 negatively impacted consumer behavior aligns with previous research that has shown that the pandemic led to decreased spending, especially in sectors such as travel and hospitality (Sotgiu & Galati 2020; Di Crosta et al., 2021). In addition, numerous studies during the COVID-19 pandemic have shown the negative impact of risks on consumer behavior, leading to decreased spending and changing consumption patterns. As predicted, the result of this study is clearly in line with that of Sotgiu & Galati (2020).

Nevertheless, the study's finding that stress had no impact on consumer behavior contradicts some previous research. For example, a study by Luce, Payne, and Bettman (2000) found that stress influenced consumer behavior and led to impulsive decisions and changes in purchasing behavior. It is important to note that the discrepancy in the results of the study may be due to the specific context that was studied. The demographic characteristics of the respondents, as shown in Table 1, provide additional context for interpreting the current study's findings. The majority of respondents were young adults with a bachelor's degree, employed in the private sector or students, and residing in urban areas. These demographic insights about young consumers provide a better understanding of the consumer behavior patterns observed in the study, similar to Luqman et al. (2019). Undoubtedly, this demographic of young adults is less engaged and responsible compared to the older demographic, suggesting an insignificant relationship between stress and consumer behavior.

5. Implications and Recommendations

This study contributes to the understanding of consumer buying behavior in Malaysia by combining elements of the major theories of TPB and PMT. Given that consumer behavior is highly unpredictable, further research is recommended to thoroughly understand the extent to which these factors influence customers' purchasing decisions. This discovery is significant as it provides new insights into the psychological factors that influence purchasing decisions from the consumer's perspective. It also contributes to our understanding of the factors leading to changes in consumer behavior during the current health crisis. From a manufacturer's perspective, understanding these characteristics allows companies to gain a deeper understanding and anticipation of consumer buying behavior. This helps companies to develop more suitable products and marketers to devise more effective marketing strategies.

Limitations and Recommendations

This study has several drawbacks. First, consumers were selected for this study using a convenience sampling technique. It is recommended that future studies use appropriate probability sampling to address the problem of generalization. Second, the majority of the samples were mainly young adults. In the future, potential researchers should increase the number of respondents to cover other consumer segments. Third, the current study examined only a limited number of variables that influence changes in consumer behavior. Future studies should integrate other appropriate constructs based on the latest literature recommendations to obtain better predictive power for changes in consumer behavior regarding necessity items.

Conclusion

In summary, the results of the study provide valuable insights into the various factors that influence consumer behavior. The study showed that the choice of goods, information about the goods and PES had a positive influence on consumer behavior. Conversely, the study showed that external factors such as COVID-19 and risks had a negative influence on consumer behavior. The unexpected finding, however, is that stress had no impact on changes in consumer behavior, which contradicts some previous research in this area.

Overall, the results of the study highlight the complex relationship between various factors in shaping consumer behavior, emphasizing the need for further research to examine the nuanced relationship between stress and consumer behavior. The results of the study are valuable for businesses, policymakers and marketers to understand how different circumstances and individual characteristics can influence consumers' decision-making processes when choosing necessary goods, especially during a pandemic.

Acknowledgment

This research received no specific funding from any public, commercial or non-profit organization.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Analyzing the Research Landscape on Digital Tax: A Bibliometric Analysis of Digital Tax Worldwide

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Abstract: The emergence of the digital economy has fundamentally changed traditional business models and tax frameworks. The digital services tax has been proposed as a strategic measure to address the taxation challenges posed by large digital businesses. This study uses a bibliometric analysis to examine the research environment related to the digital services tax. By analyzing articles published in the Scopus database between 2001 and 2023, this study investigates publication patterns, identifies prominent authors and institutions, and explores citation metrics. The study provides insight into the scientific discussion on the digital services tax, including the network on the co-occurrence of keywords, using VOSviewer. The data shows that scholars from all over the world have published 158 articles. According to the data, 107 of the 158 published documents (67.72%) come from articles as a source type. The data also shows that more than two-thirds of all articles originate from the social sciences. The article written by Mpofu from Zimbabwe ranked first in terms of dissemination and was cited a total of 17 times by academics. The keyword trends were also used to identify further research topics for this theme. This study provides valuable insights into the academic discourse on the digital services tax, including the global research focus, leading academics, and influential institutions. This comprehensive examination of the intellectual framework for the study of digital services tax provides valuable guidance for future research endeavors and ultimately contributes to a deeper understanding of the evolving landscape of digital taxation.

Keywords: *Digital tax, Bibliometric Analysis, and Network map.*

1. Introduction

The emergence of the digital economy in the last two decades has led to a notable change in society, the economy, and personal life. This transformation, known as digitalization, refers to the widespread adoption of information and communication technology in various aspects of life (Vuori et al., 2019). Hojeghan and Esfangareh (2011) define the digital economy as a system in which providers and customers exclusively engage in transactions through the Internet using electronic goods and services. These commodities and services are exclusively generated and exchanged over the Internet and web-based technology. As claimed by Haltiwanger and Jarmin (2000) the use of electronic devices and the Internet is changing the characteristics of products and services, the manufacturing process, and the methods used to market and sell them.

The Internet also provides taxpayers with the opportunity to generate additional money through virtual commerce. These transactions can be completed using either physical currency or digital currencies (Switzer & Switzer, 2014). Even when these transactions occur in the virtual domain of the digital economy or entail the utilization of virtual currencies, they nonetheless have tax consequences for the individuals participating in the transactions. Therefore, taxpayers need to have a thorough understanding of tax regulations to appropriately document these transactions on their tax returns. Lack of comprehension regarding this information can lead to participants in the digital economy failing to adhere to tax legislation (Cockfield, 2002). Tax authorities can utilize the taxpayers' expertise to identify the tax compliance issues of individuals involved in the digital economy. As taxes are a major source of revenue for governments worldwide, tax compliance has become a paramount concern (Kamarudin et al., 2024).

In addition, the digital economy has revolutionized traditional business models and highlighted the limits of the existing tax framework. Large digital companies often operate across borders, challenging governments to collect their fair share of taxes. Understanding the global research landscape on digital taxes is critical for Malaysia as it grapples with how to effectively tax the digital economy. As a Southeast Asian country experiencing rapid digitalization, Malaysia has seen a sharp increase in digital trade and the presence of multinational digital companies. Implementing an effective digital service tax policy requires a comprehensive understanding of current research trends, leading voices in the field, and emerging challenges related to the

taxation of digital services. Hence, the objective of this paper is to perform a bibliometric examination of digital tax. Currently, the utilization of this approach in business research remains restricted (Donthu et al., 2021).

This study provides a bibliographic analysis of academic publications on digital tax from around the world indexed in the Scopus database. The aim is to identify emerging themes in the existing body of literature. As Donthu et al. (2021) stated, bibliometric analysis is a widely used and comprehensive method for analyzing and evaluating substantial scientific data. Similarly, Ahmi and Nasir (2019) claim that bibliometric analysis is a remarkably effective method for identifying research patterns in specific subject areas. The specific aims of this study are as follows:

- To identify the source type, language, and field of research of digital tax
- To assess global patterns in the quantity of digital tax research
- To investigate research collaboration in digital tax
- To analyze the co-occurrence of keywords among authors in digital tax research

The following sections describe the research methodology used to achieve the objectives of this study, followed by an analysis of the research findings. This study concludes with a summary of the findings. The following section deals with the literature review.

2. Literature Review

Bibliometric Analysis: Bibliometric analysis is a quantitative approach to assessing various elements of the scientific literature, focussing on publication, citation, and collaboration patterns within a particular subject area or across numerous disciplines. This is a systematic analysis of bibliographic data from scientific publications such as journals, conference proceedings, books, and patents. The word bibliometrics was defined for the first time by Alan Pritchard in 1969 as an application of statistics and mathematical approaches to articles, books, and other mediums of communication.

Since its introduction, bibliometric analysis has become a crucial tool in research for evaluating scholarly impact and understanding research trends gives insight to the next researcher and concerned party for the future research direction (Wigantini & Nainggolan, 2022; Teiușan & Deaconu, 2021; Ogrean & Herciu, 2021; Rosyidiana et al., 2019). Initially, bibliometric analysis focused on assessing citation patterns and journal impact, nowadays bibliometrics has evolved to encompass a wide range of applications. Researchers use bibliometric analysis to identify influential authors, institutions, and publications, track the dissemination of knowledge within and across disciplines, and uncover emerging research areas.

Additionally, bibliometric analysis plays a vital role in assessing the societal impact of research and guiding policy development (Nobanee & Ullah, 2023). By analyzing citation patterns, collaboration networks, and knowledge dissemination pathways, the bibliometric analysis offers insights into how research findings are being utilized, applied, and disseminated within academic circles and beyond. This information is invaluable for policymakers seeking to understand the real-world implications of research findings and design evidence-based policies that address pressing societal challenges. Thus, bibliometric analysis serves as a bridge between academic research and policy implementation, facilitating the translation of research insights into meaningful actions and outcomes for society.

Past Studies

Digital tax refers to the imposition of charges on the income derived from digital services offered by global technology corporations. This tax policy aims to tackle the issue of taxing digital companies that operate internationally but may not have a substantial physical presence in the countries where they generate income (Latif, 2020). When comparing previous research that utilized scientometric or bibliometric methods to study taxation with more recent findings, it is evident that only a small number of studies employ bibliometric analyses to explore different facets of taxation (Ya'u & Saad, 2021). Most of the bibliometric research on taxation focuses mostly on tax evasion, tax compliance, tax administration, tax avoidance, and green taxes (Nevzorova et al., 2016; Wigantini & Nainggolan, 2022; Nobanee & Ullah, 2023).

Boateng et al. (2022) conducted a thorough investigation into the interrelation between tax risk assessment, financial restrictions, and tax compliance using a bibliometric approach. The paper emphasizes that there is limited empirical evidence about the effects of tax risk on tax compliance, indicating that research in this area is still in its preliminary stages. Although there is a solid theoretical basis, there is a lack of practical research investigating this connection. This presents difficulties for tax authorities, particularly in the context of globalization and complex financial markets. Ya'u and Saad (2021) performed a bibliometric analysis to examine the patterns and frequencies of published literature on taxation in Malaysia using the Scopus database. Their research indicates a rise in the rate of expansion of literature on taxation studies in the Malaysian setting from 1977 to 2020. In addition, Nevzorova et al. (2016) have conducted bibliometric analyses to investigate the degree to which scholarly articles on tax evasion correspond with the practical issues encountered by stakeholders. This research contributes to the integration of theoretical ideas and practical applications, providing valuable information for policy discussions and enforcement methods.

Another focal point of taxation research is the examination of tax policies aimed at addressing environmental concerns, such as carbon taxes and green taxes. Wigantini and Nainggolan (2022) utilized bibliometric analysis to map the landscape of carbon tax research and assess its implications for the economy and businesses. This approach facilitates a comprehensive understanding of the scholarly discourse surrounding environmental taxation, shedding light on the emerging trends and areas for further investigation. Furthermore, the effectiveness of taxation in promoting sustainable practices and mitigating environmental degradation has garnered significant attention in recent years. Nobanee and Ullah (2023) explored the efficacy of green taxes in reducing pollution, stimulating economic growth, and fostering sustainable development. Through bibliometric analysis, researchers can track the evolution of green tax literature and assess the impact of policy interventions on environmental outcomes.

Moreover, scholars have increasingly turned their attention to the intersection of taxation and globalization, particularly in the context of international tax competitiveness. Mazurenko and Tiutiuyk (2021) undertook a bibliometric analysis to systematize research on international tax competitiveness and its relationship with other economic factors. By identifying gaps and promising avenues for future research, this line of inquiry contributes to the development of effective tax policies in an increasingly interconnected world. Recently, a study by Nasir et al. (2023) examined a bibliometric analysis of tax research by examining trends, patterns and contributions to the field. However, this study only focused on corporate tax in the last two decades from 2003 to 2022.

In addition to these areas, the emergence of digital taxation as a pressing issue in the modern economy has sparked renewed interest among scholars. Since the primary focus of most bibliometric studies lies in areas such as tax evasion, tax compliance, tax administration, tax avoidance, and green taxes. Hence, this research assumes a pioneering role by undertaking an analysis of digital taxation spanning from 2001 to the present. The primary objective of this research is to provide guidance to researchers and facilitate a broader comprehension and mastery of the digital tax subject. This study can be used as an introduction reference and initial approach for new scholars who want to become acquainted with the literature on digital tax. To achieve this objective, this study conducts a bibliometric analysis of the current research on digital taxation by documenting the progression of this subject over 23 years (2001–2023). The bibliometric analysis allows us to identify the most influential authors, the most prolific journals, the countries with the highest productivity rates, the annual number of studies on dynamic capabilities, the studies that cite dynamic capabilities, and the recent advancements in this field.

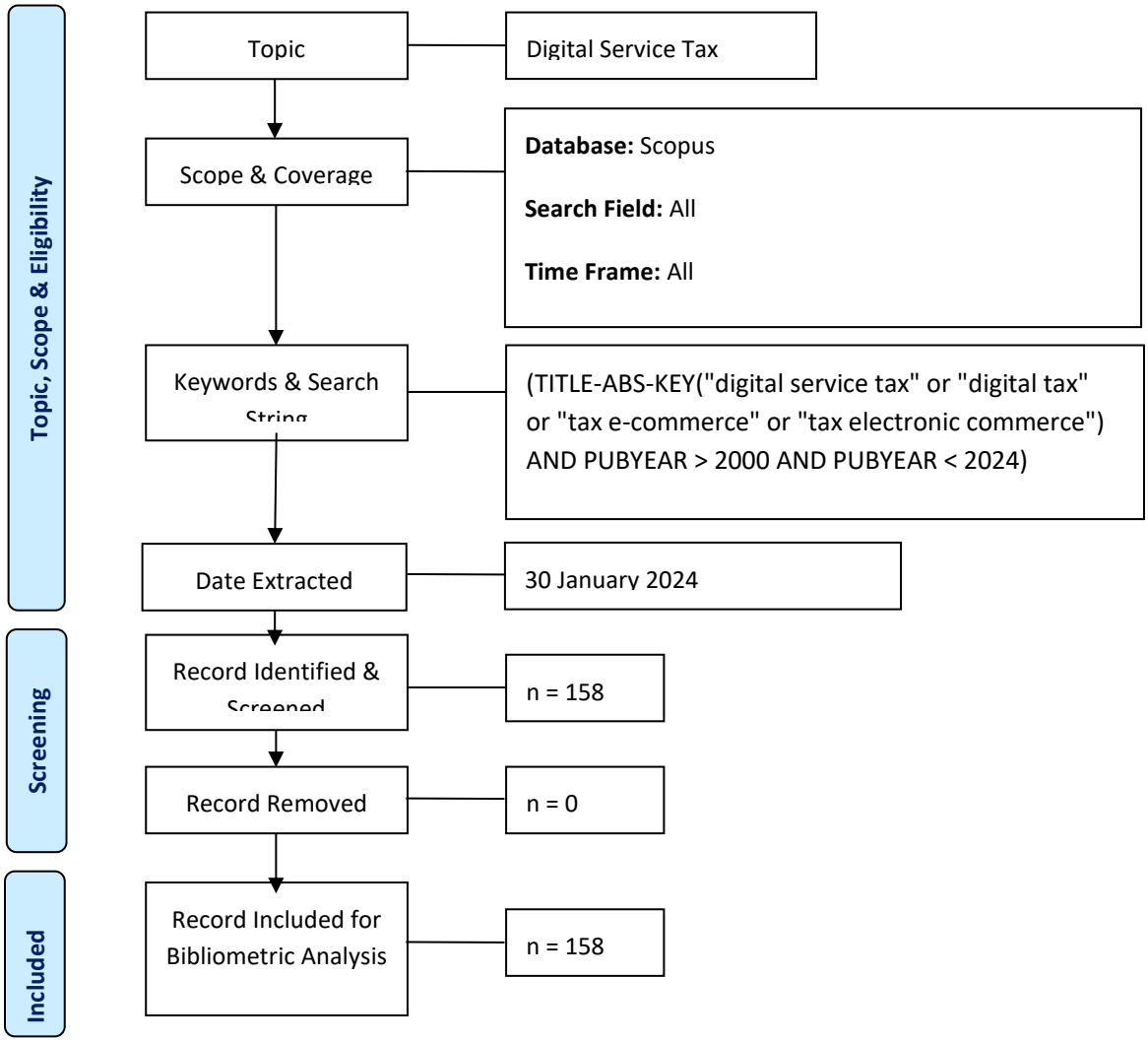
3. Method

The study aims to conduct a comprehensive analysis of digital tax research. The analysis includes examining trends in research volume, distribution by country and author, identifying subject areas, document types, and sources, and analyzing co-authorship between authors and countries and the co-occurrence of keywords. To achieve the objectives of this study, digital tax research data from the Scopus database (as of 30 January 2024) was used. The Scopus database was selected due to its reputation as the most comprehensive abstract and index database. The metadata available in the Scopus database enables researchers to efficiently collect

information on a large amount of published research and save time and resources compared to manual literature reviews.

The bibliometric approach has become a valuable tool for researchers to understand the intellectual structure and development of a particular field. To evaluate the published research, the bibliometric method has been used to collect information about the publications (Wigantini & Nainggolan, 2022). In ensuring the analysis includes only related materials, each document is chosen solely based on its title. A search was conducted in the Scopus database: TITLE ("digital service tax" or "digital tax" or "tax e-commerce" or "tax electronic commerce"). A total of 158 documents were retrieved by this query for further analysis after the data had been cleaned by reviewing the abstract. The flow of the search strategy is shown in Figure 1. VOS Viewer software was used to map co-authorship networks to uncover patterns of collaboration between researchers and countries. In Harzing Publish or Perish, Excel was used to analyze citation patterns and identify influential articles, authors, and journals.

Figure 1: Flow diagram of the search strategy



Source: Zakaria et al. (2020), Moher et al. (2009)

4. Results and Discussion

Documents Profiles: Table 1 shows the categories of sources published by various scholars. The source types published by various scholars are provided in Table 1. Based on the findings, most of the publications are produced in articles (67.72%), book series (15.82%), and reviews (6.69%). The remaining percentages are allocated to conference papers (5.06%), editorials (1.90%), books (1.27%), and notes (1.27%).

Table 1: Document Type

Document Type	Total Publications (TP)	Percentage (%)
Article	107	67.72%
Book Chapter	25	15.82%
Review	11	6.96%
Conference Paper	8	5.06%
Editorial	3	1.90%
Book	2	1.27%
Note	2	1.27%
Total	**158**	**100.00**

Table 2 illustrates the number of digital tax publications categorized by language. According to data gathered from Scopus, English is the most frequently used language, with 149 documents followed by Russian and Spanish as the second most utilized languages, each appearing in three articles. These findings are aligned with expectations, as English-language journals are the most abundant and are crucial for researchers to master in the contemporary global academic community. Additionally, several digital tax publications are available in languages beyond English, including German, Italian, and Portuguese.

Table 2: Languages

Language	Total Publications (TP)*	Percentage (%)
English	149	93.71%
Russian	3	1.89%
Spanish	3	1.89%
German	2	1.26%
Italian	1	0.63%
Portuguese	1	0.63%
Total	**159**	**100.00**

*One document has been prepared in dual languages

Table 3 presents the number of documents published according to the field of research in the Scopus category. The search yielded 113 papers in the field of Social Sciences, 81 articles in the domains of Economics, Econometrics, and Finance, and 66 articles in the fields of Business, Management, and Accounting. There were also some documents in other fields, but their numbers were insignificant. This numerical value quantifies and discerns numerous disparities between the quantities of documents in the field of social sciences and those in other study disciplines. These findings also suggest that the subject of digital tax is highly pertinent in the realm of social sciences.

Table 3: Subject Area

Subject Area	Total Publications (TP)	Percentage (%)
Social Sciences	113	71.52%
Economics, Econometrics and Finance	81	51.27%
Business, Management and Accounting	66	41.77%
Computer Science	15	9.49%
Engineering	7	4.43%
Decision Sciences	6	3.80%
Medicine	3	1.90%
Environmental Science	2	1.27%

Psychology	2	1.27%
Arts and Humanities	1	0.63%
Energy	1	0.63%
Materials Science	1	0.63%
Mathematics	1	0.63%
Multidisciplinary	1	0.63%
Nursing	1	0.63%
Pharmacology, Toxicology and Pharmaceutics	1	0.63%

Publication Trends: Table 4 shows that interest in this field of knowledge has increased over the last 23 years. The data presented in the table indicates a significant increase in publications between 2018 and 2023. 2021 was the most productive year with 35 publications and 63 citations. In 2019, 26 articles received a total of 76 citations, resulting in an average of 2.92 citations per publication. The continued rise in this trend demonstrates the ongoing importance of digital taxation and emphasizes that several areas of research need to be explored further in the future. According to Mashabela and Kekwaletswe (2020) and Soulange et al. (2017), e-filing rates in industrialized countries are still relatively low despite the rising trend. Participants in digital transactions must have the necessary tax expertise to recognize the specific instances and timing in which tax implications arise. A lack of expertise in this area could result in individuals in the digital economy not complying with tax requirements.

Table 4: Year of Publication

Year	TP	NCP	TC	C/P	C/CP
2001	1	0	0	0.00	0.00
2003	1	1	13	13.00	13.00
2015	1	0	0	0.00	0.00
2016	1	1	13	13.00	13.00
2017	1	0	0	0.00	0.00
2018	6	6	39	6.50	6.50
2019	26	18	76	2.92	4.22
2020	34	15	49	1.44	3.27
2021	35	21	63	1.80	3.00
2022	26	15	67	2.58	4.47
2023	26	4	8	0.31	2.00
Total	**158**				

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

Publications by Authors: Table 5 shows the ranking of the top 10 authors according to the number of articles published in the field of digital taxes. Accordingly, Mpofu, F.Y. from Zimbabwe has achieved the highest rank as the most productive author with six published articles. However, the number of cited publications is only four, as is the case for Kofler, G. from Austria. Sinnig, J. has the most citations with 31, although the number of cited publications is only three. Figure 2 also shows the co-authorship among the authors and how they are networked with other authors. This network map visually represents the connections between authors in the field of digital taxes as determined by their publication links. The color tone of the map indicates the collaborating clusters, while the line connecting the authors symbolizes their co-authorship.

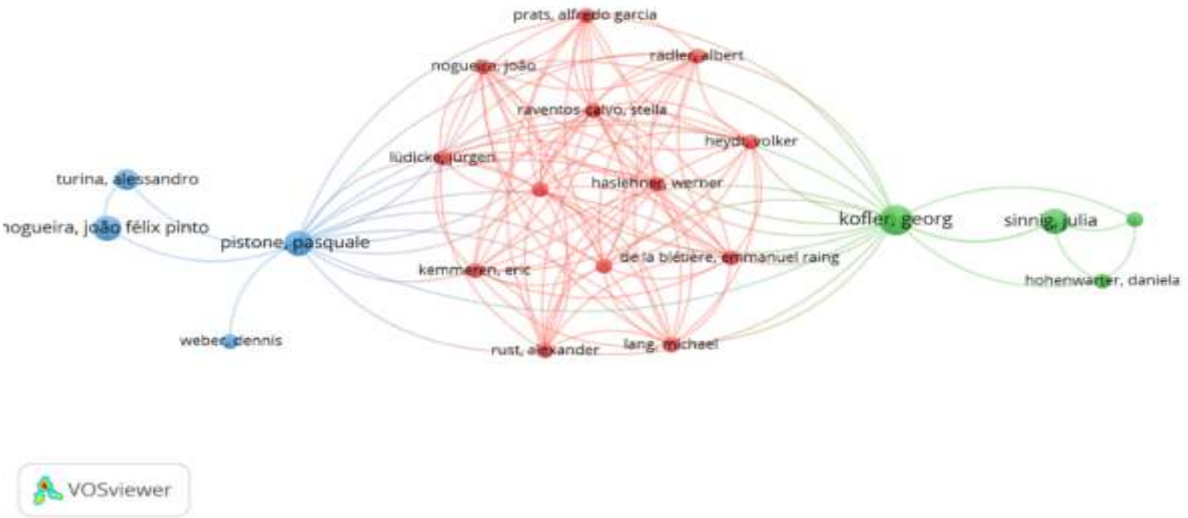
Table 5: Publications by Authors

Author's Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP
Mpofu, F.Y.	National University of Science and Technology Bulawayo	Zimbabwe	6	4	17	2.83	4.25
Kofler, G.	WU Vienna University of Economics and Business	Austria	4	4	28	7.00	7.00

Sinnig, J.	Universität Bremen	Germany	3	3	31	10.33	10.33
Nogueira, J.F.P.	Universidade Católica Portuguesa	Portugal	3	3	4	1.33	1.33
Pistone, P.	"Università degli Studi di Salerno	Italy	3	3	4	1.33	1.33
Ponomareva, K.A.	Financial Research Institute of the Ministry of Finance of the Russian Federation	Russian Federation	3	1	1	0.33	1.00
Geringer, S.	University of Economics and Business	Austria	2	1	12	6.00	12.00
Dimitropoulou, C.	WU Vienna	Austria	2	2	7	3.50	3.50
Avi-Yonah, R.	University of Michigan	United States	2	1	4	2.00	4.00
Bevacqua, J.	Monash University	Australia	2	1	2	1.00	2.00

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

Figure 2: Network visualization map of the co-authorship by authors



Publications by Institutions: Table 6 presents the leading ten institutions that have made contributions in the form of papers regarding digital tax adoption, ranked by the number of publications. Based on the findings, WU Vienna University of Economics and Business, under the Government of the Austria Federation, leads with the highest contribution of eight papers, followed by the University of Johannesburg with seven papers. As noted by Rosyidiana et al. (2019), differences in expenditure and research support among universities or institutions may account for variations in the number of paper publications. Furthermore, Man et al. (2004) suggest that different universities or institutions may have distinct reward systems for assessing publication outcomes. Hence, institutions offering reward systems for human resources are likely to support research publications in high-impact journals. Generally, universities with a greater number of research publications indicate their proficiency in securing research grants, financial support, or effective systems to encourage more publications.

Table 6: Most productive institutions

Affiliation	Country	TP	NCP	TC	C/P	C/CP
WU Vienna University of Economics and Business	Austria	8	7	21	2.63	3.00
University of Johannesburg	South Africa	7	4	17	2.43	4.25
Financial University under the Government of the Russian Federation	Russian Federation	5	4	8	1.60	2.00
Universität Wien	Austria	4	3	22	5.50	7.33
University of London	United Kingdom	4	2	7	1.75	3.50
University of Luxembourg	Luxembourg	4	2	7	1.75	3.50
IBFD	Netherlands	4	3	5	1.25	1.67
Russian Presidential Academy of National Economy and Public Administration	Russian Federation	4	3	5	1.25	1.67
University of Cape Town	South Africa	3	2	3	1.00	1.50
Financial Research Institute of the Ministry of Finance of the Russian Federation	Russian Federation	3	0	0	0.00	0.00

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

Publications by Countries: Furthermore, the bibliographic analysis encompasses the quantification of publications supplied by each country to ascertain the most productive countries. The results for the top ten contributors are displayed in Table 7. The number of publications since 2001 in the Russian Federation was 17 documents. Austria and South Africa tied for second place with 13 publications. Both the UK and Spain own ten documents each. The remaining 5 countries have less than 10 publications. According to this table, the Russian Federation had a greater impact on research publications concerning digital tax concerns. This is supported by Rahman and Fukui (2003), who states that the number of publications for each country is affected by research funding. Hence, this result was the answer to the domination of the Russian Federation as a developed country. The reason for this is that developed countries provide robust financial support for research, increasing the number of research projects created by these nations.

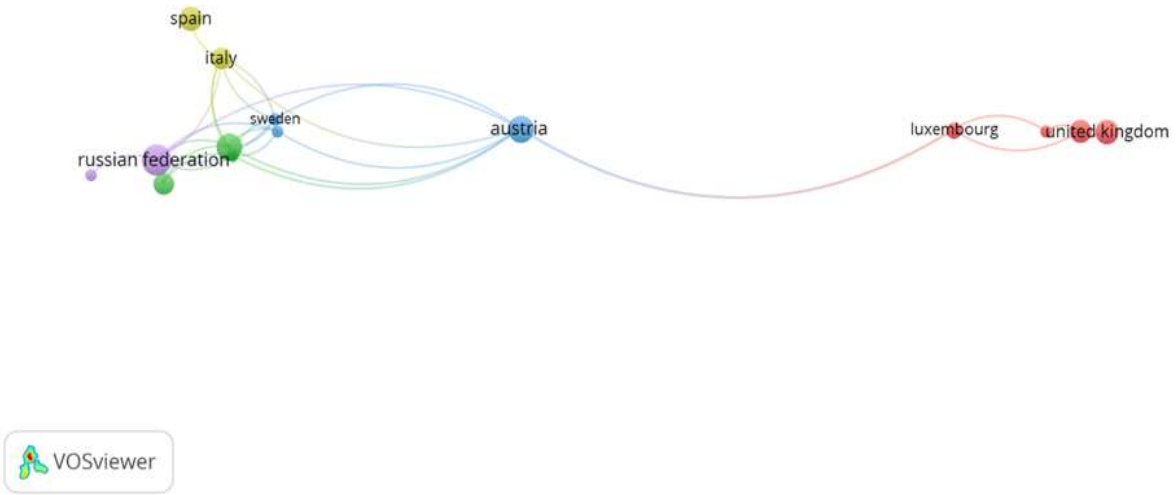
Furthermore, a visual examination of the network map, as illustrated in Figure 3, reveals the presence of five distinct colored clusters. The clusters indicate the countries that are co-authors which shows a high degree of collaboration in research between these countries. The size of the nodes could indicate that they have co-authored more publications than other countries in the network. It also discloses the nations that dominate each cluster, as defined by the magnitude of the circle. Based on the findings, the Russian Federation has been identified as the most solid connection in this field.

Table 7: Top 10 Countries contributed to the publications

Country	TP	NCP	TC	C/P	C/CP
Russian Federation	17	11	36	2.12	3.27
Austria	13	10	54	4.15	5.40
South Africa	13	7	24	1.85	3.43
United Kingdom	10	6	27	2.70	4.50
Spain	10	2	6	0.60	3.00
Belgium	9	6	20	2.22	3.33
United States	9	5	24	2.67	4.80
Netherlands	8	3	5	0.63	1.67
Italy	8	3	3	0.38	1.00
China	6	2	7	1.17	3.50

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

Figure 3: Network visualization map of the co-authorship by countries



Publications by Source Titles: Table 8 shows the results of the top ten sources of articles, as indicated by the number of article publications. The most popular source of articles is from Intertax which contributed 15 papers. Eleven papers were published in the European Taxation, while seven were published in the Taxing the Digital Economy: The EU Proposals and Other Insights. Additionally, Table 8 demonstrated that the correlation between the number of publications and citations was not direct, as several journals have a substantial number of publications but a relatively low number of citations.

Table 8: Most Active Source Titles

Source Title	TP	NCP	TC	Publisher
Intertax	15	11	66	Kluwer Law International
European Taxation	11	4	6	International Bureau of Fiscal Documentation (IBFD)
Taxing The Digital Economy The EU Proposals and Other Insights	7	3	5	International Bureau of Fiscal Documentation (IBFD)
National Tax Journal	5	5	31	University of Chicago Press
International Transfer Pricing Journal	5	0	0	International Bureau of Fiscal Documentation (IBFD)
EC Tax Review	4	3	9	Kluwer Law International
International Tax Studies	4	3	8	International Bureau of Fiscal Documentation (IBFD)
Advances In African Economic Social and Political Development	4	1	1	Springer Nature
British Tax Review	3	1	2	Thomson Reuters
E-Journal of Tax Research	3	1	2	Thomson Reuters

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations.

Citation Metrics: The results of the citation metrics are shown in Table 9. Citation metrics are fundamental in bibliometric research and serve as quantitative measures of the impact and influence of scientific publications. These indicators can be used to assess the general recognition and dissemination of research results within a particular discipline. For this study, a total of 158 publications with 326 citations dealing with digital tax over 23 years were analyzed.

Table 9: Citations Metrics

Metrics	Data
Papers	158
Number of Citations	326
Years	23
Citations per Year	14.17
Citations per Paper	2.06
Citations per Author	228.27
Papers per Author	113.85
Authors per Paper	1.85
h-index	10
g-index	12

Highly Cited Documents: When performing bibliometric analysis, it is also crucial to consider highly cited articles as they provide valuable insights into which papers are referenced by scholars worldwide in particular academic disciplines. Table 10 presents the ten most cited papers. The article authored by G. Kofler and J. Sinnig, entitled "Equalization taxes and the EU's 'digital services tax," has garnered a notable 18 citations in total and an annual average of 3.6 citations.

Any tax imposed by the government, according to Kofler and Sinnig, (2019) ought to adhere to international obligations, possess an administratively straightforward structure, and have a scope that does not exceed reasonable boundaries.

Table 10: Top 10 Highly Cited Articles

No.	Authors	Title	Cites	Cites per Year
1	G. Kofler, J. Sinnig	Equalization taxes and the EU's 'digital services tax'	18	3.6
2	A. Turina	Which 'Source Taxation' for the digital economy?	15	2.5
3	W. Cui	The superiority of the digital services tax over significant digital presence proposals	13	2.6
4	C.E. McLure Jr.	The value-added tax on electronic commerce in the European Union	13	0.62
5	G. Verne, T. Bratteteig	Do-it-yourself services and work-like chores: on civic duties and digital public services	13	1.63
6	W. Lips	The EU Commission's digital tax proposals and its cross-platform impact in the EU and the OECD	12	3
7	E. Bassey, E. Mulligan, A. Ojo	A conceptual framework for digital tax administration - A systematic review	12	6
8	S. Geringer	National digital taxes–Lessons from Europe	12	4
9	M.R. Hoffman	Can Blockchains and Linked Data Advance Taxation	12	2
10	C. Noonan, V. Plekhanova	Taxation of digital services under trade agreements	11	2.75

Top Keywords: Another astonishing discovery resulting from the bibliographical research is the identification of the keywords most frequently used by the authors. These findings are important for identifying potential research areas in the subject area. Besides, primary findings indicate that digital taxation is the most frequently mentioned keyword in 28 publications, as evidenced by the data presented in Table 11. The second most frequently used keyword was "digital economy," which appeared in 27 publications and contributed around 17.09% of the total publications. In addition, digital services tax represents 14.56% and Taxation represents 12.66%. The remaining keywords account for less than 10% of the overall publications. Upon analysis, it can

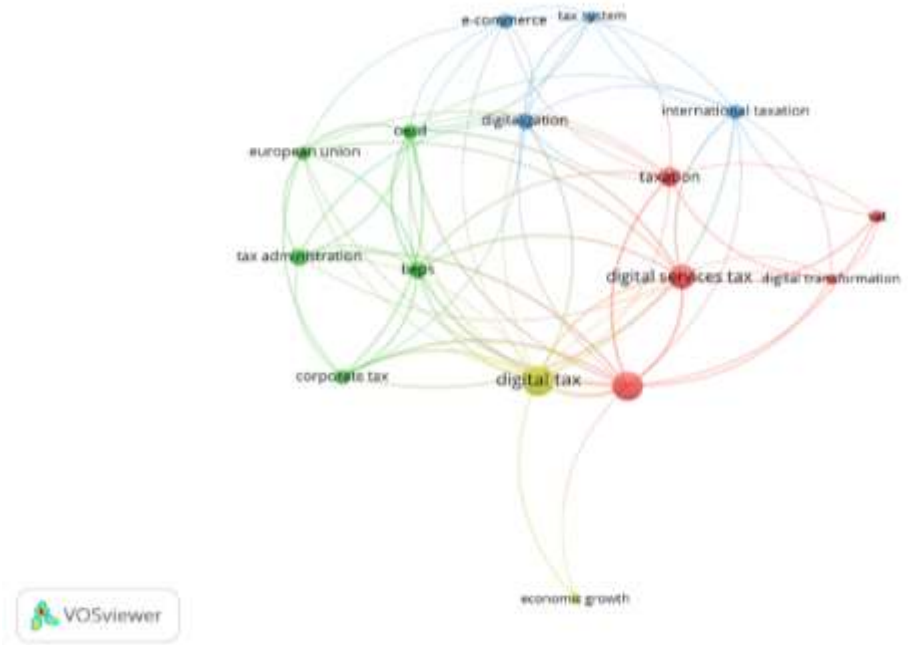
be inferred that the study trend in this area has encompassed a wide range of disciplines and diverse literature. This also demonstrates that there are still certain aspects of digital tax studies that require further investigation.

Figure 4 shows the network visualization map, which depicts a co-occurrence network of author keywords related to the digital services tax. The nodes with the highest degree of centrality, shown by the size of the circles, correspond to the terms "digital tax" and "digital service tax". Around the central keywords, other terms form clusters that likely represent related topics within the broader field of digital services taxation. For example, "e-commerce tax system" and "international taxation" could form a thematic cluster around the challenges of taxing cross-border digital trade.

Table 11: Top 10 Author's Keywords

Author Keywords	Total Publications (TP)	Percentage (%)
Digital Tax	28	17.72%
Digital Economy	27	17.09%
Digital Services Tax	23	14.56%
Taxation	20	12.66%
BEPS	13	8.23%
Tax Administration	10	6.33%
Digitalization	9	5.70%
Corporate Taxation	8	5.06%
E-Commerce	8	5.06%
International Taxation	7	4.43%

Figure 4: Network Visualization Map of The Co-Occurrence by Author's Keywords



5. Conclusion

The study analyses the development of research publications on digital tax. Bibliometric analysis is used to assess several papers that are correlated with digital service tax. The results provide an analysis of the language and the field of study under the Scopus category, including trends in the annual publication. In addition, the findings reveal the institutions and countries that possess the highest volume of relevant research publications, as well as the preferred journals and publishers for authors to publish their papers on digital tax. In addition,

this study also investigates the commonly used keywords by authors who have researched this topic. This analysis is valuable for authors interested in digital tax, as it provides guidance on recommended journals to consult and highlights the most prolific researchers in the field.

This study offers several significant contributions to this topic. According to the findings, digital tax emerges as the dominant topic in this subject area, with potential areas for exploration including digital economy, digital services tax, and taxation. Moreover, by mapping the citation and co-authorship network, this study successfully identifies the most significant studies on digital tax and the authors with the highest number of publications. Besides, through co-occurrence and co-citation analysis in this study, the academic network of this field is delineated, potentially unveiling new research areas. Thus, this study augments prior literature on digital tax by employing bibliometric analysis, thus furnishing valuable insights into past trends in the literature. To summarise, this study contributes to the existing body of knowledge by providing valuable insights into the evolving research landscape of digital taxes.

As the digital economy continues to reshape traditional business models, research on digital taxation is likely to gain even more momentum. Future studies can delve deeper into the issues identified in this analysis, explore the effectiveness of proposed digital tax solutions, and examine the legal and economic implications of different policy approaches. By providing insight into the global research landscape, this study should provide valuable insights for Malaysia as it grapples with the complex issues surrounding the taxation of the digital economy. The dynamic nature of the digital economy requires continuous research and adaptation in the digital field. By understanding the global research landscape on digital services taxation, this study serves as a springboard for further research where additional research is needed to explore implementation strategies and potential challenges other countries face. It can also help policymakers capitalize on the successes of digital services taxation internationally. By utilizing the insights gained, the study can contribute to the advancement of knowledge and help to understand the complexities of taxing the digital economy in the 21st century. The findings can help policymakers develop sound digital tax policies that promote a fair and efficient tax system in the digital age.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Analyzing Consumers Online Shopping Behavior Using Different Online Shopping Platforms: A Case Study in Malaysia

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Abstract: Nowadays, online shopping is gaining increasing popularity in Malaysia. The development of online shopping has led some to argue that there are additional elements influencing consumer behavior. As a result, a growing number of researchers are currently studying online consumer behavior to better understand the specific characteristics of online shopping. Therefore, this study is conducted to determine the factors that influence online shopping behavior between different online shopping platforms among Malaysian consumers. This is a quantitative study, and 371 students and staff from Universiti Teknologi MARA (UiTM) were randomly picked to participate. The data was gathered via an online questionnaire using Google Forms. The findings show a positive relationship between the variables, namely web characteristics, external stimulus, affection, and cognition. It indicates that all variables influence online shopping behavior among Malaysian consumers. Furthermore, the findings reveal that consumer behavior patterns for online shopping are not different even when using different online shopping platforms. Therefore, it is very critical to understand consumer online purchasing behavior and its influencing factors to improve online shopping in Malaysia. Malaysian businesses must have an in-depth knowledge of the market for their goods and the demographics of the customers they are targeting before engaging in online commerce.

Keywords: *Behavior, external stimuli, cognition, affection, web characteristics*

1. Introduction and Background

Nowadays, the population predominantly resides in the digital realm. Originally a means of spreading knowledge, the Internet is now essential to modern life. In Malaysia, there has been a rapid expansion in information and communication technology. Commerce, social interaction, and shopping are just a few of the categories in which the World Wide Web enables connectivity. Online shopping is also becoming more common as people transition from traditional to digital lifestyles. Malaysia has 21.93 million internet users as of 2018, with a figure expected to rise in the next few years, opening new online commerce opportunities (Alias, 2018). The popularity of online shopping is rising as more people become aware of the advantages of the Internet. It is frequently referred to as the practice of purchasing and selling goods online. Stated differently, buying goods directly from a vendor without the help of a dealer is known as "direct buying." Consumers have access to a broad selection of items and services while purchasing online. They can compare those prices with those of other intermediaries at the same time to find the best deal (Sivanesan, 2017).

Currently, many sellers or retailers in Malaysia are involved in e-commerce. Online retailers have started providing numerous deals, leading to a significant increase in online traffic. Their goal when they started using online shopping was to cut costs associated with marketing, which would make them have to reduce the price of their goods to remain competitive in very competitive markets. Businesses connect, transmit, and distribute information and products using the Internet (Singh & Sailo, 2013). Even though continuing to purchase goods

from traditional stores, the majority of people find online shopping incredibly useful. Consumers can gain a lot from online shopping, primarily due to its 24-hour accessibility to the products they want to purchase. Due to their hectic schedules, modern customers find that online shopping is a big help when it comes to saving time (Rahman, Islam, Esha, Sultana, & Chakravorty, 2018). Consumers are searching for a more beneficial deal in terms of variety, pricing, information, and convenience. Online stores describe every product in detail using text, photos, and multimedia, in contrast to traditional stores. Many internet sellers include links to pages containing further details about their goods. Additionally, consumers use the Internet for a variety of purposes, such as making online purchases and evaluating product features, prices, warranties, and delivery options.

The development of online shopping has led some to argue that there are additional elements influencing consumer behavior. Usually, consumer behavior is regarded as an applied topic since some choices have a major impact on how people behave and take expected actions. The composition balances the fields of economics, sociology, psychology, and management. It tries to comprehend how customers decide, both individually and collectively (Kuester, 2012). Individual customers' characteristics, such as their demographics and behaviors, are the main focus to comprehend what they want. As a result, a growing number of researchers are currently studying online consumer behavior to better understand the specific characteristics of online shopping. It has become one of the most significant research themes in e-commerce. Only a few studies have been conducted on consumer online buying behavior in Malaysia. The knowledge and comprehension of consumers' opinions about online shopping seem insufficient. There is still much to learn about the significance of online buying behavior among consumers and how it affects e-commerce. Thus, the purpose of this study is to identify the variables influencing Malaysian consumers' online purchasing decisions across various e-commerce platforms.

2. Literature Review

Behavior

Consumer behavior is the study of how individuals select, acquire, and arrange goods, services, events, or ideas to satisfy their wants as well as the requirements of society (Kuester, 2012). According to Rafsandjani (2018), to meet their needs and desires and promote customer loyalty, individuals, groups, and organizations pick, purchase, use, assess, and reject goods and services. This is known as consumer behavior. It is a procedure whereby the customer decides whether to buy, use, or discard the good or service to satisfy their needs and wants (Jongeun, 2004). In addition, studies on consumer behavior have discovered a wide model of purchasing behavior that embodies the decisions consumers make when making purchases (Vrender, 2016). Marketers use these designs because they improve in predicting and understanding consumer purchasing trends. Meanwhile, Javadi, Dolatabadi, Nourbakhsh, Poursaeedi & Asadollahi (2012) stated that online shopping behavior is the act of purchasing goods or services over the Internet. Liang & Lai (2000) stated that online shopping involves several processes that are similar to those involved in traditional buying activity. First, throughout the online buying process, prospective consumers use the Internet to find out the needs they have before deciding to buy a good or service. After that, individuals assess each choice and decide which best meets their needs to fulfill the perceived need. At last, a deal is completed, and post-purchase services are provided.

Web Characteristics

The qualities of a website play a key role in online purchasing. According to Chen, Hsu, & Lin (2010), a website incorporating functional and content development increases customer happiness and online purchase intent, ultimately boosting the return rate. Several factors are used to evaluate a website's characteristics, including information content, design, safety, and confidentiality (Wu & Tsai, 2017). For a website to successfully serve customers, it must first provide the necessary information or services, then present those services or information on an appropriately designed web page, and finally ensure complete security and privacy during transactions to ensure that customers will complete the transaction as intended (Lai, Li, & Lin, 2017). Additionally, Jadhav & Khanna (2016) mentioned that a website's layout and functionality could motivate customers to purchase by encouraging them to shop there. To enhance user experience and help with decision-making, consider including more photographs, product videos, and three-dimensional (3D) imagery on the website (Daroch, Nagrath, & Gupta, 2021). Furthermore, it should be made interesting and more user-friendly, providing detailed product information and member discounts to encourage online shoppers to spend time discovering the site and making online price comparisons.

External Stimulus

According to Sawyer & Dickson (1984), along with being impacted by internal factors like personal ideas and values, people's attitudes will change in response to external stimuli and will therefore reflect their actions. Customers will be persuaded to purchase when a business owner uses promotional activities to present external stimuli, making external stimuli a vital component of a successful marketing plan. Online sellers would gain customer favor if they could offer specific personalized services or products in response to their individual wants. Marketing, products, quality, cost, offers, and customer service are the main external factors influencing customers' purchasing decisions (Wu & Tsai, 2017). Based on Li (2022), the consumer's consciousness is first stimulated by external stimuli, which can be categorized into social stimuli and marketing stimuli. Social stimuli fall into two categories: those created by peers, family, and other associated groups, and those created by the macroenvironment, which includes cultural and economic factors. In the meantime, promotion, channel, pricing, and quality stimuli are examples of marketing stimuli.

Affection

Affection is related to emotional characteristics such as satisfaction (Fihartini, Ramelan, Karim, & Andriani, 2023). Peter, Olson & Grunert (1999) divided affection into sensations, specific emotions, moods, and evaluations. However, Hanna & Wozniak (2001) defined affection as an attitude resulting from an individual's understanding of the subject matter, irrespective of the subject's liking or dislike. Meanwhile, affective is recognized as influencing loyalty in addition to motivational, perceptual, and behavioral effects (Sari & Alversia, 2019). The affective state of the customer resulting from order fulfillment is referred to as shopping satisfaction in the context of e-commerce; it is a result of previous e-commerce transactions (McKinney, Yoon, & Zahedi, 2002). As per the findings of Verhagen & Van Dolen (2011), virtual information about emotional experiences such as website atmosphere, feelings evoked during website interactions, or web page browsing can direct viewers towards a specific emotional atmosphere or elicit a specific emotional response in them.

Cognition

Consumer cognition is the total of observation, beliefs, and subject-matter knowledge about the attitude, according to (Peter, Olson, & Grunert, 1999). Typically, this idea is based on personal experience or other pertinent information sources. Therefore, cognition is the comprehension and perception of an attitude's subject matter that arises by combining information about the issue from diverse sources with personal experiences. Meanwhile, Fihartini, Ramelan, Karim, & Andriani (2023) claimed that the consumer's cognitive variables in the context of online shopping include emotional intelligence and buying values such as utilitarian and hedonistic values. The cognitive method, however, argues that measuring buying behavior is not the only sign of brand loyalty, as it can also result from low prices (Kuleh & Setyadi, 2016).

Past Studies on Online Shopping

Numerous studies have been conducted to decide the causes that influence online shopping. One study found that the primary variables influencing online purchases are time, diversity of options, customer service, availability, cheap pricing, discounts, and comparisons (Jadhav & Khanna, 2016). It was supported by several studies (Abd Aziz & Abd Wahid, 2018; Martin, Mortimer, & Andrews, 2015). Prices may be easily compared while shopping online, according to these findings. The competitive rates and offers made by online businesses are significant drivers of online purchases. Due to online shops providing lower costs than traditional channels, consumers choose to shop online to save money (Harn, Khatibi, & Ismail, 2006). Younger people appreciate it more since online merchants offer a range of sales and discounts during the festive and holiday seasons, increasing online traffic (Karthikeyan, 2016). Aside from that, convenience is one of the major aspects of online shopping. It can save customers time because services are always available, and products are typically delivered to their destination (Pilík, Klimek, Jurickova & Palka, 2016). Shopping online is more convenient for busy customers since online shops cater to their specific needs.

Trust is also a main factor influencing consumers to shop online. Customers who believe they have a higher level of confidence in an online medium are more likely to make purchases through it (Ching, Hasan, & Hasan, 2021). Based on Verhagen & Van Dolen (2011), trust is very valuable in the context of online purchasing. This is due to the consumer's perception that there is more transaction risk in an online setting when they do not have direct contact with the seller and the items they want to purchase. They frequently deal with the issue of the product presented being different from the one that is sold. Customers' trust in the website may be

impacted by this situation, and they may decide not to make another order therein (Isa, Shah, Palpanadan, & Isa, 2020). Other findings also indicate that the perception of risk has an impact on an individual's propensity to shop online (Ha, Nguyen, Van Pham, & Nguyen, 2021). The term perceived risk refers to how customers perceive the unpredictability and unfavorable outcomes when purchasing a website. A few of the risks associated with online purchasing are financial risks, product risks, seller risks, privacy risks, and security risks where personal information can be stolen. Demographic variables that affect consumers' perceptions and behaviors, such as age, gender, and economic level, also make it easier for people to shop online (Sabbir Rahman, 2012).

3. Research Methodology

Sampling Technique

This quantitative study investigates consumers' online shopping behavior between different online shopping platforms. This study was conducted at the Universiti Teknologi MARA (UiTM) in Malaysia. In this study, convenience sampling was used to select respondents, which were students and staff. This technique was used due low cost and ease of use. Sekaran & Bougie (2016) and Roscoe (1975) recommended adequate sample sizes for the majority of cases of study that were greater than 30 and lower than 500. A minimum of 300 observations has been chosen as the sample size for this investigation in light of these claims. 371 respondents were randomly picked to participate and cooperate in answering the questionnaire.

Data Collection Method and Research Instrument

Data was gathered via an online survey made with Google Forms. The questionnaire used in this study was adopted from Wu & Tsai (2017). It consists of two sections. The first section focuses on the demographic profiles of respondents, including gender, level of education, age group, UiTM branch, and preferred online shopping platforms. Meanwhile, the second section consists of 39 items on a 7-point Likert scale ranging from strongly disagree to strongly agree. This section assesses the degree of agreement among respondents on five variables: web characteristics, external stimulus, cognition, affection, and behaviors.

Table 1: Distribution of Items

Variables	No. of Items
Web Characteristics	9
External Stimulus	12
Affection	6
Cognition	6
Behavior	6

Since the questionnaire was adopted from a previous study, it has been tested for reliability and validity. The internal consistency of the questionnaire was sufficient, with 0.932, 0.935, 0.923, 0.860, and 0.922 for web characteristics, external stimulus, affection, cognition, and behavior, respectively. These results showed the instruments' reliability. This leads to the conclusion that these questionnaires are already reliable and valid.

Data Analysis

In this study, descriptive statistics, the Pearson correlation coefficient, and an independent T-test were applied. A frequency table was used to identify the demographic profiles of the respondents. A bar chart was also used to determine the online shopping platforms that respondents preferred. Then, the mean and standard deviation were used to identify the level of the five variables involved. The Pearson correlation coefficient was applied to see the relationship between the two variables. Then, an independent T-test was conducted to determine the differences in online shopping behavior among consumers involving different online shopping platforms.

4. Results

Demographic Profiles

Table 2 indicates the demographic profiles of the 371 consumers. Based on Table 2, the majority of the consumers are female, which is 70.9%, while 29.1% are from the male group. Meanwhile, 45.3% of the consumers studied at the diploma level, and another 20.8% came from the degree level. The highest percentage of the consumers was from the age group of 18 to 25 years old (62.5%). The age group of 36 to 40 years old came in second (10.2%), and the group of 26 to 30 years old had the lowest percentage, which was 4%.

Table 2: Demographic profile of the consumers (n = 371)

Variable	Frequency	Percentage
GENDER		
Male	108	29.1%
Female	263	70.9%
Total	**371**	**100%**
AGE (years old)		
18-25	232	62.5%
26-30	15	4.00%
31-35	27	7.30%
36-40	38	10.2%
41-45	24	6.50%
More than 45	35	9.40%
Total	**371**	**100%**
LEVEL OF EDUCATION		
SPM/ Pra Diploma	18	4.9%
Diploma	168	45.3%
Degree	77	20.8%
Masters	71	19%
PHD	37	10
Total	**371**	**100%**

Online Shopping Platforms in Malaysia

Table 3 presents the top online shops that respondents choose. Shopee was selected as the top online shopping platform in Malaysia by about 86.5% of those who responded. This was followed by TikTok Shop, with 4.3%, and another 3.8% preferred shopping online at Lazada.

Table 3: Online shopping platforms preferred by 371 consumers

Online Shopping Platforms	Frequency	Percentage
Lazada	14	3.8 %
Shopee	321	86.5 %
Lelong	1	0.3 %
Mudah. my	2	0.5 %
Sephora	2	0.5 %
Zalora	9	2.4 %
Carousell	4	1.1 %
Amazon	1	0.3 %
TikTok Shop	16	4.3 %
Shein	1	0.3 %

The Level of Web Characteristics, External Stimuli, Cognition, Affection, and Behavior among Consumers Table 3 shows descriptive statistics for each item in the construct for web characteristics, external stimulus, cognition, affection, and behavior. The overall mean score of constructs under web characteristics was 5.53 ± 1.207 on the 7-point Likert scale. Therefore, most of the consumers agreed that the statement related to web characteristics towards online shopping. "The online shop accepts a variety of payment methods" is ranked as the highest attribute compared to others. The overall mean for external stimulus items

was 5.07 ± 1.291. It indicates that the majority of consumers agreed with all statements regarding external stimulus on online shopping behavior, with the highest rating item being "The online shopping website ensures that customers can obtain real-time promotional information". Meanwhile, the overall mean score for cognition was 5.43 ± 1.346. It shows a moderate level at which most of the consumers agreed with all statements that relate to cognitive online shopping behavior. The topmost rating is "Shopping online is attractive". Aside from that, the overall mean score for affection at the moderate level is 4.93 ± 1.357. The results show that the majority of consumers agreed with the statement that online shopping is very convenient and time-saving. However, consumers disagree with the statement that people shopping online do not have to worry about being cheated. Then, the overall mean score of behavior toward online shopping was 4.68 ± 1.555, which indicates a moderate level. Overall, the level of web characteristics, external stimuli, cognition, affection, and behavior among consumers was moderate.

Table 3: Level of Web Characteristics, External Stimuli, Cognition, Affection and Behavior

No.	Items	Mean	Standard deviation	Interpretation
A1	The online shopping website is designed with a good interface.	5.63	1.125	Moderate
A2	The online shopping website allows for a diversified means of payment.	6.09	1.157	High
A3	The online shopping website is updated on a real-time or regular basis.	5.71	1.177	High
A4	The online shopping website comes with safe transaction mechanisms.	5.55	1.178	Moderate
A5	The online shopping website makes it easy to find the information one needs.	5.75	1.180	High
A6	The online shopping website provides a rich amount of information in detail.	5.47	1.209	Moderate
A7	The online shopping website is designed with satisfactory operational interfaces.	5.57	1.106	Moderate
A8	It is safe to have transactions on the online shopping website.	5.37	1.186	Moderate
A9	The online shopping website will not cause any data leakage.	4.62	1.548	Moderate
Web Characteristics		**5.53**	**1.207**	**Moderate**
B1	The online shopping website makes sure that consumers can buy intact products on it.	5.05	1.303	Moderate
B2	The online shopping website makes sure that the products displayed on it are the cheapest.	4.99	1.401	Moderate
B3	The online shopping website makes sure that the products displayed on it are quality-guaranteed.	4.67	1.369	Moderate
B4	Online shopping websites launch new products frequently.	5.22	1.186	Moderate
B5	The online shopping website makes sure that the products displayed on it are satisfactory and of good quality.	4.88	1.296	Moderate
B6	The online shopping website makes sure that consumers can receive promotional information in real-time.	5.41	1.129	Moderate
B7	The prices on the online shopping website are set reasonably.	5.32	1.161	Moderate
B8	The products displayed on the online shopping website allow for greater bargaining space.	4.51	1.648	Moderate
B9	The online shopping website is designed with a satisfactory return/exchange mechanism.	5.01	1.330	Moderate
B10	The online shopping website is designed with a satisfactory interaction mechanism with customers.	5.24	1.215	Moderate
B11	The online shopping website could respond to customers' needs immediately.	5.11	1.262	Moderate

B12	The online shopping website makes sure that consumers can buy discount products on it.	5.39	1.190	Moderate
	External Stimulus	**5.07**	**1.291**	**Moderate**
C1	Shopping on the website is very interesting.	5.77	1.147	High
C2	I like shopping on the Internet.	5.61	1.301	Moderate
C3	Shopping online is attractive.	5.74	1.191	High
C4	I prefer to shop online.	5.21	1.457	Moderate
C5	Shopping online is as interesting as hunting for treasure.	4.99	1.517	Moderate
C6	Compared with physical stores, I prefer to search for information on a product online.	5.25	1.460	Moderate
	Affection	**5.43**	**1.346**	**Moderate**
D1	Online shopping can be reassuring.	4.52	1.338	Moderate
D2	Online shopping for goods is inexpensive.	5.38	1.275	Moderate
D3	In online shopping do not have to worry about being cheated.	3.55	1.688	Low
D4	Online shopping return mechanisms can reduce transaction risk.	4.46	1.485	Moderate
D5	Online shopping is more time-saving.	5.80	1.200	High
D6	Online shopping is very convenient.	5.85	1.156	High
	Cognition	**4.93**	**1.357**	**Moderate**
E1	I shop online for the products I need regularly.	4.81	1.469	Moderate
E2	When I want to buy something, online shopping is my first choice.	4.72	1.635	Moderate
E3	I do all the shopping on the Internet.	4.17	1.696	Moderate
E4	When I want to buy something, I would buy it online.	4.44	1.542	Moderate
E5	I have a great intention to shop online.	4.84	1.504	Moderate
E6	Shopping online is more convenient.	5.09	1.486	Moderate
	Behavior	**4.68**	**1.555**	**Moderate**

The Relationship Between Web Characteristics, External Stimulus, Cognition and Affection with Consumers Online Shopping Behavior

Table 4 demonstrates the correlations between independent variables, which are web characteristics, external stimulus, affection, and cognition and the dependent variable, which is behavior. The findings indicate that every independent variable and consumer online buying behavior have significant correlations. The relationship between web characteristics and consumer online shopping behavior is 0.445, which indicates that there is a moderately positive relationship between these two variables. Similarly, there is a moderately positive relationship between external stimulus, affection and consumer online shopping behavior, which is 0.522 and 0.695, respectively. Meanwhile, the relationship between cognition and brand consumer online shopping behavior is 0.705, which indicates that there is a strong positive correlation between these two variables.

Table 4: Correlations between Independent Variables and Dependent Variable

Variables	Web Characteristics	External Stimulus	Affection	Cognition	Behavior
Web Characteristics	1	0.711	0.630	0.623	**0.445**
External Stimulus	0.711	1	0.621	0.713	**0.522**
Affection	0.630	0.621	1	0.712	**0.695**
Cognition	0.623	0.713	0.712	1	**0.705**
Behavior	0.445	0.522	0.695	0.705	1

*** At the 0.01 level, the correlation is significant.*

Consumers' Online Shopping Behavior Based on Different Online Shopping Platforms

Table 5 shows the result of the difference between consumers' online shopping behavior and online shopping platforms using a one-way ANOVA. The results indicated that the p-value exceeded the significance level ($p = 0.063 > \alpha = 0.05$). As a result, customers using various online shopping platforms did not differ in their online buying habits. This indicates that even while using various online shopping platforms, including Shopee, Lazada, Zalora, TikTok Shop, and so on, the pattern of customer behaviors for online purchasing remained the same.

Table 5: The Difference between consumer behavior and Online Shopping Platforms

Model	Sum Squares	DF	Mean Square	F	P-Value
Between Groups	26.223	9	2.914	1.821	0.063
Within Groups	577.536	361	1.600		
Total	603.759	370			

*** At the 0.05 level, the correlation is significant.*

Discussion

According to the findings, respondents prefer Shopee more than any other e-commerce website. Previous research found that Shopee, Lazada, and Food Panda were the top three online shopping sites where consumers went to purchase their everyday basic needs, with Shopee ranking best (Isa, Shah, Palpanadan, & Isa, 2020). These findings are also supported by Vasudevan & Arokiasamy (2021) and Ching, Hasan, & Hasan (2021). As stated by their research, Malaysian consumers' two favorite online shopping sites are Lazada and Shopee. Most consumers from different online shopping platforms indicated that they agreed with all statements related to web characteristics, external stimulus, affection, cognition, and behavior since the level of all these variables was moderate. Most of the respondents agreed that the online shop accepts a variety of payment methods. This is in line with Rahman, Islam, Esha, Sultana, & Chakravorty (2018), who indicates that websites with various payment methods are a highly important factor in purchasing decisions among consumers. On the other hand, consumers mostly agreed that the online shopping website ensures that customers can obtain real-time promotional information. People are now more likely to make purchases through e-commerce sites as the promotional strategies for a particular product are highly effective. According to Shariff & Abd Hamid (2021), their findings proved that respondents agreed with statements related to various promotional strategies via online shopping. In this study, consumers agreed that online shopping is convenient and time-saving. By allowing consumers to make purchases online and have their purchases delivered, e-commerce sites offer convenience. Shariff & Abd Hamid (2021) suggested that customers were more likely to use an online shopping platform if they thought it was convenient, which meant they could shop from home or go to get the necessary items. They can also save time by shopping online.

Aside from that, this study found that all independent variables, which are web characteristics, external stimulus, affection, and cognition, are positively correlated with consumers' online shopping behavior. At the p-value < 0.01 level of significance, all the variables have an association with each other that influences online shopping behavior among consumers in Malaysia. All these factors should be continually emphasized by e-commerce companies on all online shopping websites to expand or grow their business and ensure the success of their online retail operation in Malaysia. According to the findings, web characteristics have a positive influence on consumer behavior. This finding is consistent with Pandey & Parmar (2019), who hypothesized that website design influences customers' online purchasing behaviors. About Isa, Shah, Palpanadan, & Isa (2020), most consumers prefer to explore websites with attractive designs. They claimed that to choose what products to buy online, they needed a comfortable website. Internet consumers are encouraged to participate in online purchasing activities by the attractive effects of captivating and interesting e-tailer websites (Ganesh, Reynolds, Luckett, & Pomirleanu, 2010). However, Hasanov & Khalid (2015) stated that website quality is not the only aspect that could influence a consumer's purchase decision; other factors like effective product distribution and logistics, outstanding customer service, and positive consumer feedback are also significant.

This study also reveals a positive relationship between external stimuli and consumers' online shopping behavior. This means that the buying decisions of consumers are influenced by external stimuli like promotion, marketing, products, price, and others. The many buying channels offer external stimulus. It was supported by

Wu & Tsai (2017), who found that the influence coefficient between external stimulus and online shopping behavior was the same for both high-frequency and low-frequency groups. The external stimulus that both groups are exposed to while buying online will have an impact on their behaviors. Other studies also claimed that several factors in external stimuli affect consumer behavior. The product quality, pricing, and channel components of the advertising strategy have a major impact on the quantity and frequency of consumer purchases. This finding suggests that consumers are more likely to make purchases when a product's quality is higher, its price is more reasonable, and the channel is easier to use (Li, 2022). Additionally, credit cards and encouragement for more purchases allow online shoppers to frequent online retail stores, which could lead to an increase in impulsive purchases (Dawson & Kim, 2009). In contrast, about the use of a credit card has the smallest effect on impulsive purchasing (Khalil & Raza, 2018).

Besides that, the result also shows a positive relationship between affection and consumer behavior towards online shopping. It implies that if a customer experiences positive emotions about shopping online, such feelings will be successfully translated into actual online shopping behavior. Successfully enhancing consumers' emotions towards online shopping may positively influence both their purchase intent and behavior. This was agreed upon by Mis (2022). Positive attitudes and repurchases were influenced by favorable emotions. Emotional encounters are recognized as having an important impact on customers' behavior when they shop online. Customer emotion can be influenced by satisfaction, thereby enhancing customer frequency, purchase intentions, and consumption behavior. Additionally, Fihartini, Ramelan, Karim, & Andriani (2023) also claimed that consumer purchase behavior is greatly influenced by emotional or affective variables. According to Kidwell, Hardesty, & Childers (2008), emotional intelligence and shopping behavior are associated with customers exhibiting higher emotional intelligence and making better purchasing decisions than those with lower emotional intelligence. Pappas, Kourouthanassis, Giannakos, & Chrissikopoulos (2014) also stated that emotions, feelings, and moods had been linked to consumer behavior. Positive emotions like happiness raise purchase intention, whereas negative emotions like fear, hopelessness, and anger reduce it.

Conversely, however, the analysis of the findings also proves that the cognition variable is strongly correlated with consumers' online shopping behavior. It suggests that a customer's positive perception of online shopping will be effectively influenced if they begin making purchases there. Previous studies provided evidence in support of this claim. When purchasing online, consumer behavior has a strong positive impact on consumer cognition (Wu & Tsai, 2017). Ning Shen & Khalifa (2012) found that the relationship between the desire to buy and actual impulsive behavior is moderated by the consumer's cognition. Useful cognition positively affects consumer purchase habits in terms of the relationship between cognitive and behavioral actions (Hu, Huang, Zhong, Davison, & Zhao, 2016). Some results show that respondents had a favorable opinion of online shopping and that consumers behave differently while making purchases online than they do in-store (Badlani, 2010). Cognitive characteristics like complexity, relative advantage, trust, feasibility, and observability were used by Yadav, Goel, & Sharma (2020). According to their findings, these elements show how respondents view the value of internet shopping and how it affects consumer behavior.

5. Managerial Implications and Recommendations

The endemic era continues to present challenges for many businesses. Low consumer confidence has resulted in high unemployment rates and a sluggish pace of economic recovery. However, encouraging recovery indicators are beginning to emerge in a few industries. The online business is beginning to show improvement. Online retailers' sales have increased recently, indicating that consumers may be starting to spend more money again. This is good news for the economy. This also clarifies why online shopping is so common these days. On the other hand, businesses usually experience lower overhead costs while conducting operations online compared to having physical stores. Because of its efficiency, consumers may pay less, which would encourage more spending and boost the economy. Nowadays, online shopping has also become more familiar among consumers. Most of them preferred to do online shopping rather than go to physical stores. Consumers frequently spend more money since online shopping is so convenient. They may be more likely to make impulsive purchases when they have the flexibility to browse and buy things whenever they want, which would increase overall economic productivity. As a result, companies or internet retailers should improve their online businesses to increase sales. Several factors, such as the website, external stimulus, affection, and cognition, should be concentrated so that they will meet the consumer's requirements when doing online shopping. Aside

from that, the government needs to work harder to encourage online shopping. The government should improve IT infrastructure and facilities, as well as online payment security. Therefore, this can help stimulate the demand for online shopping, expand consumption, and create jobs, thus strengthening the global economy. In this study, various limitations could be fixed for future research. This study is only available to university students and staff. The current study should thus be conducted with consumers in Malaysia outside of this university. Besides that, employing advanced statistical techniques for analyzing consumers' online shopping behavior, especially the factors that affect consumer behavior when shopping online could further enhance the depth and accuracy of the research findings.

Conclusion

In conclusion, there is a relationship between all the variables and consumers' online shopping behavior. There is a positive relationship between the variables, namely web characteristics, external stimulus, affection, and cognition. The finding also shows that consumer behavior patterns for online shopping do not differ even when using different online shopping platforms such as Shopee, Lazada, Zalora, TikTok Shop, and others. Therefore, this study is useful and crucial for ensuring the success of an online retail business in Malaysia. Understanding consumer online purchase behavior and the elements that influence it is crucial for improving online shopping in Malaysia. Malaysian businesses must possess in-depth knowledge of the market for their goods and the demographics of the customers they are targeting before engaging in online commerce. Businesses and retailers can create more targeted and efficient online retail operations that satisfy the needs and expectations of their new customers by developing a thorough grasp of their target consumer base. Furthermore, sellers on the internet have at their disposal a range of strategies for convincing individuals to shop online. To do this, businesses must point out the shortcomings of their products and provide fixes, turning the infrequent or non-existent online shopper into a devoted patron. To achieve continuous growth in a competitive global market, online businesses can benchmark with successful companies that offer outstanding goods and services. This mission has also benefited the adoption of the digital strategy by enterprises, creating more opportunities for Malaysians to find employment. For this reason, the government should continue to assist internet merchants to ensure the sector's prosperity.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Social Networking and Technological Entrepreneurial Intention: Demand-Resource Mechanism

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Abstract: Social networking (SN) has changed the landscape of businesses, especially for entrepreneurs. Hence, this paper is conducted to identify the indirect effect of social networking in association with technological entrepreneurial intention (EI). The study was undertaken purposefully with two objectives. The first objective is determining the relationship between university support, risk, and student entrepreneurial intention. The second objective is related to the mediating role of social networking. This study utilized a quantitative form of research using a questionnaire as a data collection method. The population of this study is 300 technology entrepreneurship students from two different faculties: the Faculty of Plantation and Agrotechnology (FPA) and the College of Computing, Informatics & Mathematics (KPPIM). The response return is 224, which represents a 74.7% response rate. Data analysis utilized structural equation modeling in AMOS software to measure the effect among variables and answer all research questions. University support, risk, and social networking significantly and directly affect entrepreneurial intention among students. The mediating impact of social networking on the relationship between university support and entrepreneurial intention is significant. Social networking significantly and indirectly affects the relationship between risk and entrepreneurial intention. This recently proposed framework can explain the influences of resources (i.e., university support, social networking) and demand (i.e., risk) on the intention to become technological entrepreneurs.

Keywords: *University support, Risk, Social networking, Entrepreneurial intention, University students*

1. Introduction

Entrepreneurial intention has become a significant highlight among scholars. Soomro et al. (2020) defined entrepreneurial intention as individual readiness for accomplishing a targeted behavior. Entrepreneurial intention is important to ensure that entrepreneurship activities positively affect the economy. Globally, the percentage of people who choose to build their involvement in entrepreneurship is growing. Most countries encourage their citizens to become entrepreneurs as it is seen as an alternative strategy for development, competitiveness, and reducing unemployment. This is in line with the research conducted by Hafizuddin and Lattif (2020), who highlighted that entrepreneurship is crucial for economic development, productivity, innovation, and job opportunities in any country. New start-up statistics in 2022 reported a rise compared to 2021: from 762,278 to 778,219 companies. Specifically in Malaysia's context, to support entrepreneurial activities in the industry and contribute to economic development, the Malaysian Government introduced a National Entrepreneur Policy 2030. A local newspaper reported serious initiatives launched by the Malaysian government aimed at fostering an entrepreneurial nation, such as the Business Financing Guarantee Scheme (SJPP), which subsidizes part of the interest rate to reduce the burden on entrepreneurs (Bernama, 2024). Another initiative reported in The Star newspaper highlighted that the Malaysian government allocated RM15.11 billion for entrepreneurship programs, targeting to benefit 470,350 entrepreneurs (Sekaran, 2024).

Further, in support of the initiative by the government, knowledge transfer is essential to develop a balanced entrepreneur in terms of knowledge and skill. Doğan (2016) argued that education in entrepreneurship is essential as it improves self-awareness and introduces them to the main characteristics of entrepreneurs. Masri et al. (2021) in their studies argued that students' engagement in class and among communities influences their intention to be involved in entrepreneurship. However, in the present era of digitalization and the industrial revolution, a lot has changed for entrepreneurs in the last decade, most of it brought about by technological improvements. For instance, the Malaysian government, through the Ministry of Higher Education (MOHE) and Cradle Fund, has collaborated with universities such as Universiti Teknologi Malaysia (UTM) and Sunway

University to create a platform known as LaunchX. This platform aims to assist university students and expose them to the technological entrepreneurship process (The Sun, 2024). However, the involvement rate of university students has only reached 40%. Further investigation is needed to identify the reasons for the low acceptance rate. Hence, this study aligns with the effort to identify factors affecting students' intention to engage in entrepreneurial activities. This initiative demonstrates the government's commitment to helping future entrepreneurs balance their capabilities in information technology (IT), encompassing knowledge, technology, and skills to align with the current business environment.

Information Technology (IT) and conventional business expertise are among the collective skills required to create the landscape of digital entrepreneurship-based enterprises (Antonizzi & Smuts, 2020). Among the challenges is mastering many skills and knowledge, such as technical and business (Najda-Janoszka, 2012; Rashidi et al., 2013). Possessing management and technology knowledge is beneficial for entrepreneurs to stay relevant and competitive in their industries. For example, through websites, blogs, messaging, and social media pages, technology enables a company to communicate with its partners, clients, and customers more effectively while improving the public image of their organization. Technology also simplified internationalization and global networking strategies, allowing us to connect with everyone worldwide. Entrepreneurs cannot undervalue the evolution of technology as, together with other factors (i.e., diversity and acquisition of the business), it led to business gaining competitive advantage at the organization, industry, and country levels (Nazarov et al., 2017).

To support the growth of entrepreneurship and gain a competitive advantage, the involvement of universities is essential as a platform to transfer knowledge on business, finance, marketing, and technology. According to Israr and Saleem (2018) studying entrepreneurial education boosts people's knowledge and skills while increasing their entrepreneurship intentions. Comparing students with and without entrepreneurial education, it was found that the latter had higher perceived entrepreneurial motivation (Solesvik, 2013). The reason why university support is vital in the development and growth of entrepreneurs is to make sure that when a student or individual wants to start a business, it is essential to have a particular resource related to the administration of business and technology that will strengthen the business's growth and success. Although substantial support is provided by universities and other responsible authorities through educational programs and initiatives (Soetanto et al., 2018), many people remain reluctant to engage in entrepreneurship. It has been shown that individual context also significantly influences entrepreneurial intention (EI).

The less negatively an individual is impacted by action fear, action doubt, or action aversion, the better their level of self-control (Van Gelderen et al., 2015). These three types of emotional instability can positively and negatively affect a person's risk aversion. Regardless of the danger associated with the new firm, people with high self-control and motivation are prepared to make risky judgments. As a result, they will not be as risk averse. People with a high-risk propensity (willingness to incur risk) are less risk-averse. Although the relationship between personality and entrepreneurial ambition has been ongoingly debated, it is still unclear how risk may impact entrepreneurial intention (Ahmed et al., 2022). More specifically, some individuals are not considered to start a new venture because of a lack of funding, the significant risk associated with forming a company, and a lack of support. However, some personality qualities (i.e. risk-taking) may inspire individuals to start a new business. Risk is recognized as one of the dimensions of the entrepreneurial process. Entrepreneurs must be willing to take calculated risks to succeed. Ben Fatma et al. (2024) argued that young individuals are better at innovating because they are more willing to take risks compared to older generations.

Although numerous studies have investigated entrepreneurial intention from various aspects, there is still inadequate research regarding psychological models. For example, recent studies conducted on Malaysian private university students on entrepreneurial intention applied self-learning theory about social contexts and entrepreneurial intention (EI), such as learning from referent others (Chin et al., 2024). Therefore, it is crucial for entrepreneurs to carefully consider the influence of the resources context (i.e., university support) and demand context (i.e., risk) they face in this digital age, and how technological aspects (i.e., social networking) affect individual career choices as entrepreneurs. Besides that, identifying how the university helps students establish their businesses from an entrepreneurial perspective also matters. Therefore, the present study was conducted to ascertain how social networking influences university students' intention to be involved in technology entrepreneurship through a demand-resource mechanism. Besides, studies related to

entrepreneurial intention are crucial as also predict a higher chance of students' employment opportunities (Gazi et al., 2024)

2. Literature Review

Previous research has focused on factors that can be divided into several categories, such as contextual factors (such as environmental and social events) and individual factors (such as cognitive, personality, demographic, and education) (Maheshwari et al., 2023). Studies on entrepreneurial intention focus on contextual factors relating to relationship and structure (Tucker et al., 2009), economic condition and political stability (Ozaralli & Rivenburgh, 2016) and intention to be involved in entrepreneurship. Meanwhile, studies on individual factors have highlighted risk attitudes (Zhang et al., 2015), age types of job (Hatak et al., 2015), personal attributes, demographic variables, motivations (Raposo et al., 2008) and individual characteristics (Ozaralli & Rivenburgh, 2016) and education(Liñán et al., 2011; Nguyen & Nguyen, 2023). Many theories have been highlighted to explain the mechanisms of these associations of factors, such as the entrepreneurial event model (EEM)(Shapero & Sokol, 1982), the expectancy theory (Vroom, 1964) and the social cognitive theory (Bandura, 2001). The theory of planned behavior (TPB) (Ajzen, 1985) is the most used theory to explain the intention to be involved in entrepreneurial activities, especially among students. The theory of planned behavior (TPB) proposed three key factors, including individual attitude, social norms, and behavioral control. Many studies relate TPB measurement to the intention to be involved in entrepreneurship, such as studies conducted by Al-Jubari et al. (2019) That has been conducted on Malaysian university students. However, it is recommended other models to utilized altogether, such as the psychological model known as the job demand-resource model (JD-R). Bakker & Demerouti (2017) proposed from the conversation of resource theory (COR)(Hobfoll, 1989) About the demands and resources of becoming entrepreneurs. Entrepreneurs can cope with higher entrepreneurial demands related strains should they be provided with adequate resources (Dijkhuizen et al., 2016).

The psychological models have less been considered and given proper consideration on entrepreneurial intention, even though it is a fundamental source of entrepreneurial knowledge and skills to increase one's quality of entrepreneurship and a crucial element in entrepreneurial success. To enable researchers to discover distinctive discoveries of factors that determine the intention to be involved in entrepreneurial activities among university students, this study used the concept of demand-resource that came under the theory of conservation of resources (COR)(Hobfoll & Shirom, 2001). Entrepreneurs determine the associations of factors using the demand-resource mechanisms toward intentional involvement in entrepreneurial activities in the context of university students. Variables included university support and social networking as resources and risk as demand. These variables are tested about technological and entrepreneurial activities.

Therefore, it is crucial for entrepreneurs to carefully consider the potential challenges they face in this age of digitalization and social networking based on the challenges and concerns they face when starting a business. Besides that, how the university helps students establish their businesses from an entrepreneurial perspective matters. Therefore, this study investigates how social networking influences university students' demand-resource mechanisms and intentions for technology entrepreneurship.

University Support and Entrepreneurial Intention: The roles of the university as an institutional resource in fostering the intention to be involved in entrepreneurial activities are varied. One recent study by Martins et al. (2023) argued that proactive universities' involvement fosters the association between creativity and entrepreneurship intention. Attending business knowledge courses conducted by the universities boosts the students' intention to become entrepreneurs. Another study by Huang et al. (2023) and Bulad (2023) also stated a similar positive influence between the role of college teachers and university lecturers at campus or university on entrepreneurial ambitions. Additionally, Israr and Saleem (2018) provided further evidence that university support through entrepreneurship education boosts individuals' intentions, knowledge, and abilities related to becoming entrepreneurs. Additionally, the university's support through providing entrepreneurial education influences entrepreneurial motivation more than those not exposed to education (Solesvik, 2013). As a result, this study suggested:
H1: University support significantly affects the intention to become an entrepreneur.

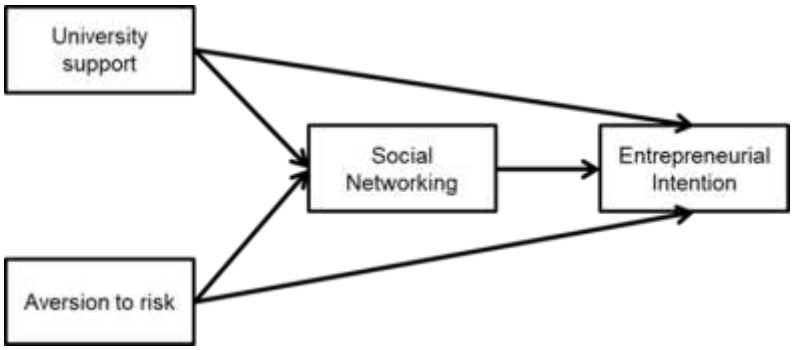
Risk and Entrepreneurial Intention: Entrepreneurial intention is also associated with the risk factors that determine planned behavior. One of the demands required to be involved as an entrepreneur is to have the willingness to take the calculated risk. Since risk is the strongest demand as an entrepreneur (Dijkhuizen et al., 2016) that involves the uncertainties of chances of success or failure, and there argument on either positive or negative influence of being risk-taking or risk averse. For example, previous research discovered the role of avoiding risks in entrepreneurship is argued to lower the intention to become an entrepreneur. However, surprisingly, short-term risk-taking preference positively correlates to being involved as an entrepreneur. (Mahola et al., 2019; Zhang et al., 2015). Maulany and Aldy (2018) also agreed that aversion to risk and loss is related to losing interest in becoming an entrepreneur. However, it is still debatable whether being careful to take risks reduces the interest in becoming entrepreneurs. In the study conducted by Zhang and Cain (2017), the evidence is still not consistent on the direct relationship between aversion to risk and loss of interest in entrepreneurial activities. Although being someone who averts risk will hinder the intention to become an entrepreneur, the researchers need to investigate further because, in some settings, scholars are inconclusive in providing significant evidence on the association between these variables (Ahmed et al., 2022). Hence, the present study suggests the postulate below hypothesis to discover the roles of being averted to risk and whether it affects the intention to become technology entrepreneurs among these students.
H2: Risk negatively affects entrepreneurial intention.

Social Networking and Technological Entrepreneurial Intention: One of the key elements influencing the intention to become an entrepreneur is social networking. Many entities, including peer groups, families, educational institutions, and universities, influence the intention to become entrepreneurs. According to Zafar et al. (2012), the mass media, in particular, was identified as a critical source for supplying networking-related entrepreneurial platforms. Through Park (2017) discovered that students with entrepreneurial spirit, strong leadership skills, access to networks, and commitment to run their start-up businesses successfully. Additionally, social networking sites improve students' perceptions of the viability and desirability of participating in entrepreneurial activities (Alayis et al., 2018). The usability of social networking among micro-entrepreneurs has also been influenced by their personality such as those entrepreneurs that are categorized under personality openness to experience (O) categories prone to utilize social networking more in their business (Giovanni Di et al., 2023).

Apart from the highlighted direct association between social networking and the intention to become an entrepreneur, we trigger to investigate did social networking assists in providing a mechanism for other resources and demands of entrepreneurs with regards to the intention to further the job as an entrepreneur. For example, Ombaka et al. (2020) argued that having an excellent social network moderates the relationship between youth and performance as an entrepreneur. Other than that, social networking is the mediator between social mission and social innovation in business (Jiatong et al., 2021). However, the mediating effect of social networking on student's intentions has been discovered. Thus, the following hypotheses were put out as follows:
H3: Social networking positively affects entrepreneurial intention.
H4: Social networking mediates the relationship between university students' demand-resource mechanism and technological entrepreneurial intention.

Proposed Model: Below is the tested conceptual model, as shown in Figure 1, which anticipates the variables affecting the intention to become a technological entrepreneur. The two critical factors in this model were academic support and reluctance to take risks with entrepreneurial purposes, as well as the mediating function of social networking in those relationships.

Figure 1: Model of factors affecting social networking in the association between university students' demand-resource mechanism and technological, entrepreneurial intention (proposed by the researchers)



3. Method

This study utilized quantitative research using a questionnaire for data collection. This study's population and targeted respondents are from two faculties in a public university in Melaka, Malaysia. They were technology entrepreneurship students from the Faculty of Plantation and Agrotechnology (FPA) and the College of Computing, Informatics & Mathematics (KPPIM), actively involved in classes, seminars, and innovation competitions in the business area. The respondents were selected based on their ability to provide critical information about their experience and entrepreneurial intention. The sample size for this study is 300, and the online survey-based method has been adopted. Questionnaires were distributed to students, and 224 responses were collected, representing a 74.7% response rate. The purposive sampling technique was used to ensure higher validity of generalization.

Instrument: University support was measured using a 6-item scale by Lüthje and Franke (2002). An example of the questions from the scale is "*The creative atmosphere inspires to develop ideas for new businesses*." The reliability of the scale is acceptable ($\alpha = 0.78$). A modified 2-item scale from Singh Sandhu et al. (2011) was adopted for the following variable: aversion to risk. The reliability is acceptable when the Cronbach value is at $r = 0.35$ $p<0.001$. An example of a statement asked is, "*Prefer job security than risky business*."

Social networking measurement is represented through a modified 3-item scale from Singh Sandhu et al. (2011). One of the statements asked is, "*Lack of social networking makes it difficult to start a new business*." The Cronbach value is acceptable ($\alpha=0.89$). The entrepreneurial Intentions Questionnaire scale, used to represent an intention to become an entrepreneur, has been proposed by Liñán and Chen (2009). One statement in this scale is, "*I am ready to do anything to be an entrepreneur*." The Cronbach value is acceptable ($\alpha=0.93$). All the variables used a scale of 1 (absolutely disagree) and 7 (absolutely agree).

Statistical Analysis: Before the hypotheses were tested, we conducted single factors testing known as the Harman Single factor test using results from the process of exploratory factors in SPSS to assess for bias that occurred for data collected by one source known as common method variance (CMV) (Podsakoff & Organ, 1986). Through the findings, this data is free from biases, where the value of variance explained by one factor is less than 50 percent (24.75 percent) (Table 2). We also conducted the second analysis, known as Confirmatory Factor Analysis (CFA) to measure the sampling adequacy by measuring the Kaiser-Meyer-Olkin Measure (KMO) value near 1 (.84) (Table 3). It shows that the four studied variables (university support, risk, social networking, and entrepreneurial intention) are measured using suitable instruments.

Variables and model testing have been done simultaneously using path analysis (SEM-AMOS). Firstly, we run for frequency, correlation, and factor values using SPSS software to generate profiles for demographic, mean, standard deviation, correlation, and factor analysis for this study. Secondly, the data was analyzed using path analysis in AMOS software to produce measurement and structural models. We measured the model fit by looking at the five absolute fit indices, X^2 goodness-of-fit statistics, Goodness-of-Fit-Index (GFI), Tucker-Lewis-Fit Index (TLI), Comparative-Fit Index (CFI), AIC=Akaike Information Criterion, CMIN/df=minimum

discrepancy divided by degrees of freedom and the Root Mean Square Error of Approximation (RMSEA). Acceptable values for GFI, TLI, and CFI are above .90. Smaller values of AIC mean a better model (Akaike, 1973), and CMIN/df values should be less than 3(Hair et al., 2006). Meanwhile, an acceptable value for the RMSEA is smaller than .08 (Byrne, 2001). Several assessments were carried out on four (4) different types of models: the direct effect model (M1), the partial mediation model (M2), and the full mediation model (M3). We used the Monte Carlo Simulation by R open-source program (Selig & Preacher, 2008), with a value of 95 of confidence interval ≠ zero, which indicates a significant value.

Table 1: Common method variance test result

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.676	27.029	27.029	5.199	24.758	24.758	4.583
2	3.580	17.047	44.075	2.921	13.911	38.669	2.621
3	2.336	11.125	55.200	2.175	10.356	49.025	3.560
4	1.415	6.739	61.940	1.132	5.391	54.417	3.549
5	1.090	5.189	67.128	.647	3.081	57.498	1.995
6	.945	4.501	71.629				
7	.750	3.573	75.202				
8	.665	3.167	78.369				
9	.646	3.078	81.447				
10	.522	2.483	83.931				
11	.489	2.328	86.259				
12	.475	2.260	88.519				
13	.395	1.881	90.400				
14	.370	1.764	92.164				
15	.321	1.528	93.692				
16	.301	1.433	95.125				
17	.255	1.213	96.339				
18	.244	1.160	97.499				
19	.209	.996	98.495				
20	.174	.828	99.323				
21	.142	.677	100.000				

Note: Extraction Method: Maximum Likelihood.
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 2: Factor Analysis

	Factor			
	1	2	3	4
My professional goal is to become an entrepreneur.	.88			
I am determined to create a business venture in the future.	.87			
I have very seriously thought about starting a firm.	.84			
I have got the intention to start a firm one day.	.80			
I am ready to do anything to be an entrepreneur.	.79			
I intend to start a firm within five years of graduation.	.74			
A good social network increases the probability of success.		.96		
Social networking is important for new business.		.85		
Lack of social networking makes it difficult to start a new business.		.77		
The courses provide students with the knowledge required to start a new company.			.86	

The courses foster the social and leadership skills needed by entrepreneurs.	.80	
The creative atmosphere inspires me to develop ideas for new businesses.	.70	
The university actively promotes the process of founding a new company.	.47	
Business ventures are uncertain and risky.		.73
Prefer job security than risky business.		.59

Table 3: KMO values

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	**.84**
Approx. Chi-Square	2433.45
df	210
Sig.	0

4. Results and Discussion

Below is the demographic profile of the students participating in this survey. 65.5% of the respondents are females and 61% of them are aged 21. Approximately 67% of the respondents came from the College of Computing, Informatics & Mathematics (KPPIM). The family occupational background from the father's side is diverse, whereas the mother's occupational background mostly belongs to the other categories (54%). Lastly, 63.4% of the students have been working before.

Table 4: Demographic profile of respondents

Variables	Categories	Frequency	Percent
Gender	Male	77	34.5
	Female	146	65.5
Age	21 years old	136	61.0
	Above 22 years old	87	39.0
Faculty	FPA	75	33.5
	KPPIM	149	66.5
Father's background	Self-employed	56	25.3
	Private sector	56	25.3
	Government servant	64	29.0
	Others	45	20.4
Mother's background	Self-employed	32	14.3
	Private sector	17	7.6
	Government servant	53	23.8
	Others	121	54.3
Working experience	Yes	142	63.4
	No	82	36.6

Table 5 shows the study variables' mean, standard deviation (*SD*), and inter-correlations. Entrepreneurial intention correlates strongly with university support and social networking. Meanwhile, for risk, a direct association is insignificant for entrepreneurial intentions. All tested variables were measured reliably.

As shown in Table 6, we provide results by comparing the model with the fit indices values. We analyzed the Direct Effect Model (M1) which comprises university support → entrepreneurial intention, risk → entrepreneurial intention, social networking → entrepreneurial intention. The M1 model showed data fits the model: CFI=.95, GFI=.91, TLI=.94, AIC = 248.59, CMIN/df =2.11 and RMSEA=.07.

Next, we screened the fit indices for the partial mediation model (M2). The model comprised of university support → entrepreneurial intention, risk → entrepreneurial intention, university support → social networking → entrepreneurial intention, and risk → social networking → entrepreneurial intention. Results shown in Table 6 indicated the adequate model fit values of CFI=.98, GFI=.94, TLI=.97 AIC = 196.84, CMIN/df = 1.46 and RMSEA=.05

We also evaluated the model fit for the full mediation model (M3) proposed earlier. This model consists of a combination of these paths with university support → social networking → entrepreneurial intention, risk → social networking → entrepreneurial intention. The fit indices that showed M3 also fit the data very well, CFI=.98, GFI=.93, TLI=.97, AIC = 198.97, CMIN/df = 1.50 and RMSEA=.05.

To prove which model (M2) is likely better compared to M1 and M3, values that scholars suggested to refer to are the lowest AIC; based on the AIC values, M2 is the best model. Further chi-square analysis was conducted. It was found that M2, if compared with M1, is significant (p-value > .1) and shows that M2 is a better model; meanwhile, between M2 and M3, the chi-square test is not significant p-value> .5, which shows M2 significantly improved and better. Hence, we had to reject the proposed full mediation model (M3) and use the M2 model to test our hypotheses.

Our first hypothesis concerns the following influence of university support on the intention to become an entrepreneur among students. The results are significant (β = .55 SE=.15 p< .0001), and hypothesis 1 is supported. The following hypothesis proposed that risk adversely affects entrepreneurial intentions among students. It is supported where the associations are negatively significant (β = -.27 SE=.12 p< .05). Regarding Hypothesis 3, where we expect social networking to affect the intention to become an entrepreneur, there is a significant association between social networking and the intentions (β = .18 SE=.09 p< .05). Hypothesis 4 predicted that social networking mediates university support and risk on entrepreneurial intentions. The Monte Carlo Simulation results show support where social networking mediates the association between university support and intention to become a technology entrepreneur (95% CI, LL=0.009519 UL=.2914 did not contain 0). Social networking also mediates risk and entrepreneurial intentions among university students (95% CI, LL=.005589 UL=.1692 did not contain 0)

Table 5: Means, standard deviation & correlations for studied variables

	M	*SD*	1	2	3	4
1. Entrepreneurial intention	4.65	1.02	-			
2. University support	3.80	.55	.33***			
3. Risk	4.72	.96	-.05	.24***		
4. Social networking	5.46	1.04	.24***	.42***	.39***	-

N = 224 * p< .05, ** p< .01, ***p<.001

Figure 2: Model proposed

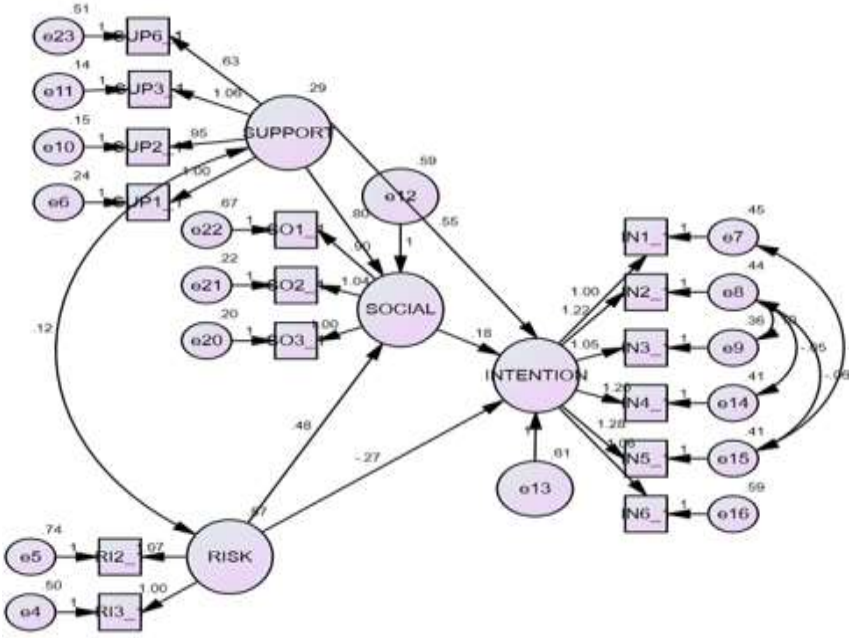


Table 6: Model comparison

	χ^2	*df*	GFI	TLI	CFI	RMSEA	AIC	CMIN/*df*	$\Delta\chi^2$(*df*) sig.	Comparison
M1. Direct Effect Model	172.58	82	.91	.94	.95	.07	248.59	2.11		
M2. Partial Mediation Model	116.84	80	.94	.97	.98	.05	196.84	1.46	55.71 (2) +	M2–M1
M3. Full Mediation Model	122.97	82	.93	.97	.98	.05	198.97	1.50	6.13 (2) *n.s*	M3–M2

N=224; *p<0.05; **p<0.01; ***p<0.001; c^2=goodness-of-fit statistic; GFI=Goodness-of-Fit Index; CFI=Comparative Fit Index; TLI=Tucker–Lewis Index; RMSEA=root mean square error of approximation; AIC=Akaike Information Criterion; CMIN/*df*=minimum discrepancy divided by degrees of freedom; sig.=significant; *n.s*=not significant

Our findings show that university support was positively associated with entrepreneurial intention among university students. In line with previous studies conducted among university students in China, the researchers found weak associations between university support and entrepreneurial intention among their students. (Lu et al., 2021). As universities are currently expected to operate more entrepreneurially, such as commercializing the research outputs and spin-off some knowledge-based companies, universities are also expected to incorporate economic and social elements (i.e., technology entrepreneurship) inside their curriculum. This ensures that graduates have enough knowledge and skills to become future employees and operate their ventures. For example, Li et al. (2023)Highlighted the important role of university support as an institutional resource for students in universities in China to be involved with green entrepreneurship activities through entrepreneurship education. Furthermore, current research also suggests fully utilizing all the program resources in universities including teacher-student relationships to further cope with entrepreneurial demands and improve entrepreneurial competencies at the university level.(Liu, 2023)

Among the earliest university support highlighted from previous studies conducted at the University of Spain are whether to incorporate university entrepreneurship courses as part of their study plan, influential roles of the technological transfers division, and the assistance and support program available. (Coduras et al., 2008). Through their findings, Coduras et al. (2008) Highlighted the role of university support in increasing entrepreneurial intention among their students. However, it does not guarantee an increment in entrepreneurial activities within the campus. Another input from universities based in the US and Germany highlighted the main components of university support that support entrepreneurship at universities including environmental contexts such as public funds, institutional framework(i.e. culture), key persons(i.e. management), and external interaction(i.e. networks) (Fichter & Tiemann, 2018). Since the university in this context is known as an entrepreneurship-based university whose mission is to deliver graduates who master the knowledge and skills in entrepreneurship regardless of their enrolled programs, entrepreneurship courses are mandatory. The current university also has a specific division known as the Malaysian Academy of SME and Entrepreneurship Development (MASMED) to cater to entrepreneurship development activities that provide support, including training, financial assistance, and guidance, which ensures graduates are necessary for the students. This is in line with the findings on the main roles of an institution as a main resource to entrepreneurs that have been translated into institutional approaches such as entrepreneurial climate within universities as highlighted in a recent study by Sim et al. (2023)

For entrepreneurs, the most critical dimension is a willingness to take risks; risk is expected to reduce entrepreneurial intention among students. Technology entrepreneurs can be considered commercial entrepreneurs where the need for commercial purposes influences risk-seeking. However, Choi et al. (2019) argue that commercial entrepreneurs are more risk-averse than social entrepreneurs, who experiment more while conducting activities such as fundraising for the public interest. In line with previous findings, the mean value (M = 4.72) for risk is relatively high, reducing the entrepreneurial intention among students from both faculties. Another study conducted among university students in Singapore reported a high mean of perceived risk among their students, indicating low interest in starting up a business (Wang & Wong, 2004). Few suggested ways to change students' perception of risk propensity by exposing them to the success stories of entrepreneur role models as one of the efforts to change the stigma of fear of failure in business. Maulany and

Aldy (2018) also suggested that students start the venture with low risk as a starting point. Then, the risk incorporated can be mitigated using knowledge and experience gained along the process.

On the other hand, social networking in the present model plays a crucial part where it becomes the mechanism of university support and demands as an entrepreneur to influence intention to become an entrepreneur. Currently, most businesses use social networking sites (SNSs) as a medium to run their business. (Alayis et al., 2018). Among the social networks commonly used in Malaysia are Facebook, Instagram, TikTok, and many more. They can introduce their products and services via these social networking sites through the content. SNSs are also becoming part of our daily lives, and most people spend more than 6 hours browsing social networking sites. (Dalol et al., 2021). Using social media as a platform for new start-ups can be considered a low-risk step in starting a venture where students can start immediately without specific business locations. It allows them to connect with their potential customers quickly and inexpensively. (Emmanuel et al., 2022) . Entrepreneurs can also gain many things through social networking, such as business networks, resources, knowledge, and business contacts, which are crucial for the future success of the ventures.(Singh Sandhu et al., 2011). Even Western countries such as the UK agreed and recognized the importance of social networking for future entrepreneurs for them to have access to real entrepreneurs themselves, potential customers, and resources available. (Lockett et al., 2017). Based on the result of this study, the university and the government agencies need to enhance the initiative in transferring knowledge and increase the confidence of students to take a risk to start their business.

5. Conclusion and Recommendations

The present study aims to discover the mechanism of resources provided by the university (i.e., university support) and demands for being an entrepreneur (i.e., risk) towards entrepreneurial intention among university students through the elements of another resource such as social networking. Hence, universities must provide adequate institutional resources as support and encourage more start-ups among students. Among the practical implications discussed, these findings align with the Malaysian government's initiatives to support an entrepreneurial nation by identifying the significant roles of universities. Researchers recommend that policymakers focus on the roles of social networking so that it can be utilized and strengthened as an appropriate mechanism to enhance the effect of university support and reduce the strain of risk demands associated with being an entrepreneur, ultimately improving EI. Since knowledge and skills related to operating social networking are crucial, it is also suggested that universities provide training and courses related to social networking. This would offer students numerous benefits, such as access to financial support and entrepreneurial programs like LaunchX (The Sun, 2024). However, the findings of this study have several limitations, such as in terms of generalization since this study focuses on two faculties from specific universities. Besides, the limitation is also in terms of the findings output from a quantitative approach, which limits the depth of the study that can be uncovered only through a qualitative approach. As for further research, the focus should be more on the effectiveness of current programs held by universities since their support plays a vital role in encouraging entrepreneurial intention among students. Unraveling each significant factor in this proposed model is also needed through a qualitative approach.

Acknowledgment: We want to thank grants MYRA-PHD 2022-1 [600-RMC/GPM LPHD 5/3(095/2022)] through Universiti Teknologi MARA (UiTM) under the Deputy of Vice Chancellor Office (Research & Innovation) for funding these studies. This research also received ethics approval from the UiTM Research Ethics Committee (REC) with reference number REC/02/2024 (ST/MR/33).

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Evaluating Audit Oversight Board's Regulatory Impact: Analysis of Sanctions Imposed on Malaysian Audit Firms

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Abstract: This study analyzes the 12-year trend of cases involving auditor wrongdoing as disclosed on the Audit Oversight Board (AOB) Malaysia's website from 2012 to 2023. Utilizing content analysis, the research examines the nature, frequency, and severity of penalties or sanctions imposed on audit firms for various offenses. Findings indicate a dynamic pattern of regulatory actions, reflecting Malaysia's evolving landscape of audit quality and regulatory oversight. It was revealed that a total of 56 breaches of the Securities Commission Act 1993 involving 30 audit firms were reported and disclosed by the Audit Oversight Board over the period from 2012 to 2023. The findings revealed that most misconduct cases relate to the failure of audit firms to comply with the requirements of International Auditing Standards, International Standard on Quality Control and Malaysian Institute of Accountant By-Laws. There has been a notable decrease in cases involving auditors over the past six years. This could also indicate the dedication of the AOB to monitoring auditors' conduct to prevent their involvement in malpractice. This study contributes to the understanding of audit regulation effectiveness and the behavioral patterns of auditors in response to regulatory scrutiny.

Keywords: *Audit Oversight Board (AOB), sanctions, audit quality, audit firm*

1. Introduction

In the world of business, there's a high focus on publicly traded companies, especially regarding the auditing of their financial statements. This ensures that their transactions are transparent and audited with integrity. To do so, the auditors are bestowed with such responsibility. In Malaysia, auditors are obliged to abide by the International Auditing Standards (IAS), International Standards on Quality Control (ISQC) as well Malaysian Institute of Accountant By-Law (MIA By-Law) instituted by the Malaysian Institute of Accountants in performing their duties (MIA, 2023).

However, rising concerns over auditor malpractices have brought into question the thoroughness of their oversight and the need for improved audit practices. In this context, the Asian Corporate Governance Association (ACGA), in collaboration with Credit Lyonnis Securities Asia (CLSA), released its latest Corporate Governance Watch report on December 13, 2023. This report assesses the corporate governance and ESG performance across 12 markets in the Asia-Pacific region. The report has awarded the top ranking to Malaysia's regulatory body under the Audit Oversight Board for auditors and audit regulators, with a remarkable score of 92. This score places the Malaysian regulator ahead of its counterparts in Singapore (83), Japan (83), Hong Kong (80), and Australia (82). The Audit Oversight Board (AOB) of Malaysia has demonstrated exceptional performance, setting a benchmark in the region. This study aims to explore the practices of AOB Malaysia that have led to their commendable achievement in regulation, as highlighted in the ACGA report for 2023) (ACGA, 2023).

The establishment of the Audit Oversight Board (AOB) in Malaysia has been a significant development in the field of auditing and financial reporting for publicly listed companies. Instituted in 2010 under the Securities Commission Amendment Act, the AOB has extended regulatory oversight into the statutory audit domain, marking a shift from self-regulation by the auditing profession to co-regulation involving a statutory body with considerable regulatory powers. The primary function of the AOB is to oversee the auditors of publicly listed companies to enhance confidence in the quality and reliability of audited financial statements in Malaysia. AOB is empowered to inspect audit working papers, conduct inquiries, and impose sanctions against non-compliance with International Standards on Auditing and other quality control standards (Securities Commission, 2023). As of 31 December 2023, a total of 38 audit firms have registered with AOB (Securities Commission, 2023).

The importance of disclosure on sanctions by Audit Oversight Boards like the Public Company Accounting Oversight Board (PCAOB) is highlighted in several aspects of audit methodology and regulatory compliance. These disclosures are critical for maintaining the credibility of financial statements and ensuring the independence of auditors. Audit committees and management have a shared responsibility to monitor and maintain auditor independence, including compliance with auditor independence rules and considering the impact of any non-audit services provided by the auditor (The United States Securities and Exchange Commission, 2023).

In the United States, the PCAOB has implemented two sets of disclosure requirements applicable to audit firms. The first set requires firms to disclose the identity of the engagement partner, other auditors involved in the audit, and the duration of the firm's service as the auditor. This information is valuable for investors and the public, and its importance is expected to grow over time. The second set involves the establishment of a central database providing basic information about firms auditing public companies and SEC-registered broker-dealers. This database includes information on the firm's clients and certain disciplinary proceedings, serving as a crucial source of information for investors and the public (PCAOB, 2023).

These oversight and disclosure requirements play a vital role in the financial reporting systems of public companies. They enhance the independence of auditors and facilitate communication among the board of directors, management, internal auditors, and independent auditors. This effective oversight by knowledgeable and independent audit committees significantly furthers the goal of providing high-quality, reliable financial information to investors.

Indeed, the importance of disclosure on sanctions and oversight by Audit Oversight Boards lies in ensuring auditor independence, enhancing the credibility of financial statements, and maintaining the integrity of the financial reporting ecosystem. These disclosures provide critical information to investors and the public, assisting them to make informed decisions based on the reliability of the audited financial statements. It is pertinent also to highlight the Securities Commission (Amendment) Act 2017 which becomes the reference for the AOB in cases involving audit firms' malpractice. The Act which was enacted in 1993 was primarily aimed at enhancing regulatory enforcement, improving market efficiency and transparency, bolstering investor protection, aligning with international standards, and adapting to emerging trends in the financial sector.

The role of auditors in ensuring the integrity, transparency, and reliability of financial statements is pivotal. In Malaysia, the Audit Oversight Board (AOB) plays a crucial role in overseeing auditors of public interest entities. This study is motivated by the need to understand the trends and patterns of auditor wrongdoing cases disclosed on the AOB's website over 12 years (2012-2023). It seeks to analyze the nature and severity of penalties and sanctions imposed on audit firms, offering insights into the effectiveness of regulatory oversight and its implications for audit quality in Malaysia.

2. Literature Review

Impact on Audit Quality

Past studies have extensively explored the impact of the AOB on audit quality. Ismail and Mustapha (2015) conducted interviews with auditors and found that the majority believed audit quality would improve due to AOB's regulatory powers. Their study confirmed these expectations, indicating an enhancement in audit quality following the AOB's establishment. Similarly, Ismail and Theng (2015) reported a decrease in discretionary accruals after the AOB's inception, although the change was not statistically significant, suggesting a positive but moderate impact on audit quality. Whilst AOB focuses on publicly listed companies, Zainal et al. (2022) explored audit quality at the Inland Revenue Board Malaysia (IRBM). Their study, though not related to the AOB, highlighted concerns about audit quality, particularly regarding the number of aging cases, indicating that audit quality issues are not confined to the corporate sector but also extend to tax auditing.

In the United States, the Public Company Accounting Oversight Board (PCAOB) serves as the audit regulator. Lamoreaux et al. (2023) found that large audit firm offices enhance the quality of their audit following enforcement actions taken by the PCAOB against different offices in the same firm. In contrast, small firm offices, whose reactions vary based on the type of enforcement, improve their audit quality in response to

enforcement actions taken against local small firm competitors. In their investigation of the PCAOB's disciplinary actions on small audit firms, Guo et al. (2021) discovered that while these firms pay more audit fees, they are less likely than peer clients who are not subject to a disciplinary order to obtain a going concern opinion. This implies that to obtain favorable audit reports, these clients could prefer to pay greater prices. Lamoreaux (2016) further discovered that auditors subject to PCAOB inspection access provide higher quality audits, evidenced by more going-concern opinions, more reported material weaknesses, and less earnings management, in comparison to auditors not subject to PCAOB inspection access. Chiu et al. (2017) highlighted that PCAOB inspections are more effective when conducted annually rather than triennially, suggesting a positive relationship between inspection frequency and audit quality. Similarly, Feng et al. (2023) emphasized that the more robust enforcement measures taken by the audit regulator, such as the suspension of audit firms in China, were associated with enhanced audit quality. This improvement was evidenced by higher accruals quality and a reduced likelihood of reporting a small profit or a small profit increase in the two years following the suspension.

Ye & Simunic (2024) found that audit regulatory oversight can enhance social surplus even in jurisdictions with robust legal systems, as it motivates auditors to improve audit quality through better control systems and greater effort. However, they also warned that excessive regulatory costs and overly stringent auditing standards might impede social surplus by burdening social planners. Ghattas et al. (2024) discovered that although the Egyptian Audit Oversight Unit (AOU) seeks to comply with global audit standards, its reliance on pre-practice checklists has not led to substantial changes in local audit firms, particularly smaller ones without international affiliation. It seems that these firms put the appearance of regulatory compliance ahead of actively addressing any gaps between regulatory standards and their implementation. In contrast, internationally affiliated audit firms tend to perform better under the AOU's oversight, signaling their compliance more effectively.

External Auditors' Perspective

Mustafa and Foong (2015) provided insights into how the AOB affects external auditors in Malaysia. Their findings showed that AOB's establishment impacted documentation and training costs and increased pressure on external auditors. This pressure was attributed not only to the AOB but also to revised accounting standards and other regulations. Similarly, Mustapha and Kong (2021) observed an increase in workload and documentation after the AOB's establishment. However, as more efforts were invested and additional work conducted, clients were charged higher fees. The results also suggested a rise in informal meetings to seek more information and clarification from the clients to address audit issues. In addition, AOB's establishment also influenced the workload of audit partners. Hussin et al. (2016) also noted a significant reduction in multiple client engagements per signing partner post-AOB suggesting that audit quality and oversight were enhanced as engagement partners could devote more time to each audit.

Rönkkö et al. (2023) found that a sizable portion (70%) of Finnish Certified Public Accountants (CPFAs) often voluntarily adopt the International Standards of Auditing (ISA) in local government audits, even though it is not strictly mandatory. Despite this, auditors criticized the documentation requirements, deeming them excessive and leading to unnecessary work. These findings highlight that some auditors may undertake additional efforts to comply with presumed or unclear requirements set forth by the Finnish Audit Oversight Board. Guo et al. (2021) examined the impact of disciplinary actions on audit firms and found that only 12 audit firms persisted in carrying out public audits in the year after the disciplinary order. Meanwhile, 146 out of 158 selected firms were held responsible when their personnel were found to have committed misconduct. This study underscores the stringent consequences of misconduct.

Impact on Audit Fees

Using data from New Zealand, Hay et al. (2023) discovered an audit inspection and heightened scrutiny by the regulatory body on audit firms resulted in a significant increase in audit fees for small, listed companies compared to both unlisted companies and large listed companies. Auditors, in response to the inspection process, tended to allocate more time and effort to prepare for inspections and address inspection reports. These increased efforts often translated into higher audit fees passed on to audit clients. Similarly, Feng et al. (2023) pointed out that suspended audit firms in China raised their audit fees in comparison to non-suspended audit firms in the aftermath of disciplinary actions imposed by the audit regulator.

Impact on Clients of Audit Firm

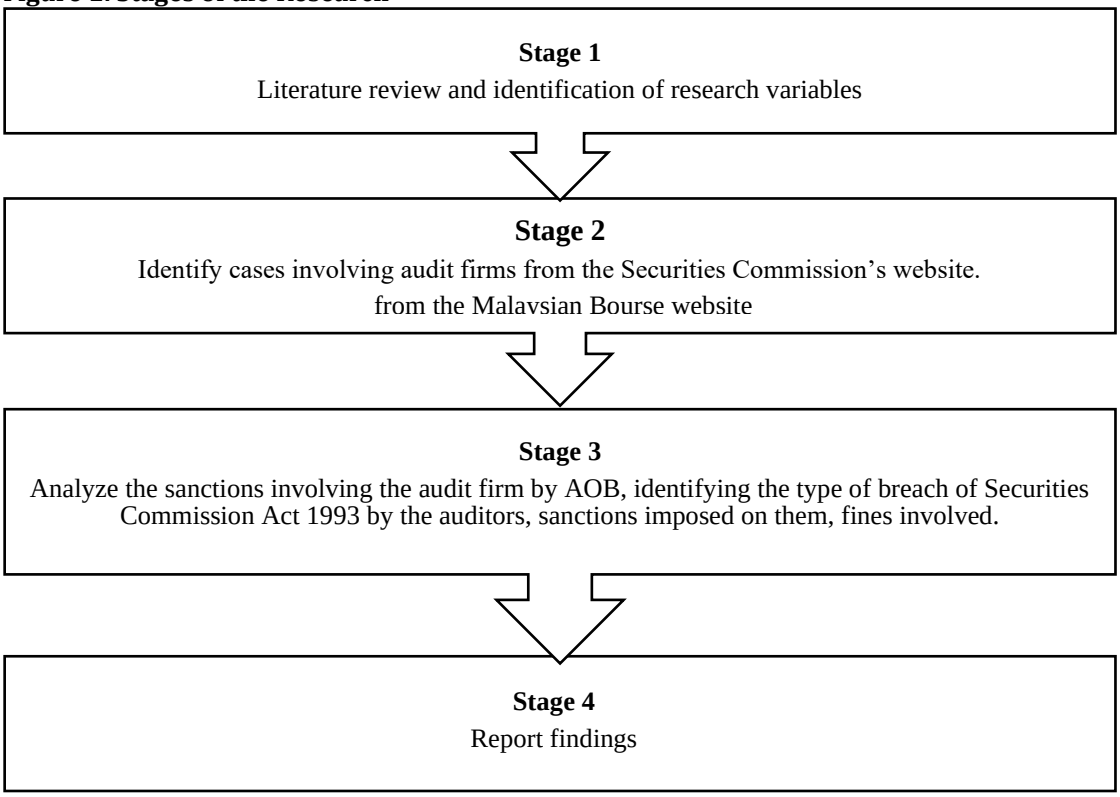
In response to news of the PCAOB enforcement against Ernst & Young Indonesia (EY-Indonesia), Soepriyanto & Zudana (2020) observed that clients of EY-Indonesia saw a considerably positive market reaction compared to non-clients. The investors do not perceive PCAOB's sanction as negative news. Instead, the investors saw the sanction as an indication that EY-Indonesia's internal control would continue to strengthen in the future.

3. Methodology

This research utilizes content analysis as its primary methodology, a qualitative approach aimed at interpreting and analyzing text-based information. The focus of the study is on the cases of auditor misconduct reported on the Audit Oversight Board (AOB) Malaysia's section of the Securities Commission of Malaysia's website, covering the period from 2012 to 2023 (Securities Commission, 2023). The process involves systematic extraction of data from this website, with particular attention to disclosures about penalties or sanctions levied on audit firms for different violations. This content is then categorized and analyzed according to predetermined classifications such as the type of offense, the severity of the penalties, and the occurrence frequency of such cases spanning over 12 years.

A thematic analysis was also conducted to uncover patterns and trends that emerged from the data. The procedural flow of this study is graphically represented in Figure 1. The third stage of the study involves the extraction and summarization of sanction details by the AOB, presented in Appendix 1. This is followed by a discussion of AOB's disclosures in the findings section of the study.

Figure 1: Stages of the Research



4. Findings and Discussion

It is revealed that over 12 years (2012 to 2023), a total of 56 cases of audit quality non-compliance involving 30 audit firms were penalized in various ways by the AOB. Out of 30 audit firms, the majority (28/30. 93.3%) are small-medium practice audit firms and only two (2) cases involving Big Four (4) audit firms were noted,

which are Deloitte and Ernst & Young Ptd Ltd. Appendix 1 summarizes the types of misconduct, sanctions or actions taken by AOB, amount of fine imposed, type of audit firms and which section of Securities Commission Act 1993 violated by the firms as disclosed in the AOB in the Securities Commission website.

From Appendix 1, it is revealed that from a total of 30 firms involved, there are firms that have a maximum of five (5) cases which is audit firm AF27 and four (4) firms have a record of cases in two different years, namely AF5, AF20, AF25 and AF27 with a total of two(2), three (3), two (2) and five (5) cases respectively. Analysis of the cases involved shows that most of the sanctions involved cases of failure to comply with the International Auditing Standards (IAS), International Standard on Quality Control (ISQC) as well as Malaysian Institute of Accounting By-Law. Firms were found to have failed to conduct themselves professionally as they failed to gather sufficient audit evidence to substantiate their audit opinion. The maximum single fine is RM227,000 whilst the minimum fine imposed was RM5,000. In many cases also, audit firms were only reprimanded or sanctioned from providing any audit services to the Public Interest Entity (PIE) for a minimum of nine (9) to a maximum of 12 months.

The summary in Appendix 1 shows insights into the audit quality and regulatory landscape in Malaysia, particularly in the context of the Audit Oversight Board's (AOB) influence. From a total of 30 firms involved, notable cases include audit firm AF27 with a maximum of five cases, and four firms (AF5, AF20, AF25, and AF27) with records of cases in two different years. These findings, when contrasted with earlier studies like Ismail and Mustapha (2015), and Ismail and Theng (2015), which indicated an enhancement in audit quality following the AOB's establishment, suggest a continuing trend towards improved audit practices and regulatory oversight. The nature of the offenses, primarily failures to comply with International Auditing Standards (IAS), International Standard on Quality Control (ISQC), and Malaysian Institute of Accounting By-Law, echoes the concerns raised by Zainal et al. (2022) about audit quality issues extending beyond the corporate sector. This breadth of issues underlines the widespread need for stringent audit quality control, not just in corporate auditing but across various sectors, including tax auditing. The summary of the total cases involving misconduct among the firms is depicted in Table 1 and Figure 1 respectively.

Table 1: Summary of Number of Sanction Cases and audit firms over 12 years (2012 to 2023)

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Number of cases	2	6	3	1	0	1	13	12	6	3	6	3	56
Number of audit firms involved	2*	5*	3	1	0	1	7*	5	4	2	2	2	34*

*Four firms have cases in two different years. Details are disclosed in Appendix 1
(Source: Securities Commission website, 2023)

Figure 1: Number of Sanction Cases by AOB and Audit Firms involved over 12 years (2012 – 2023)

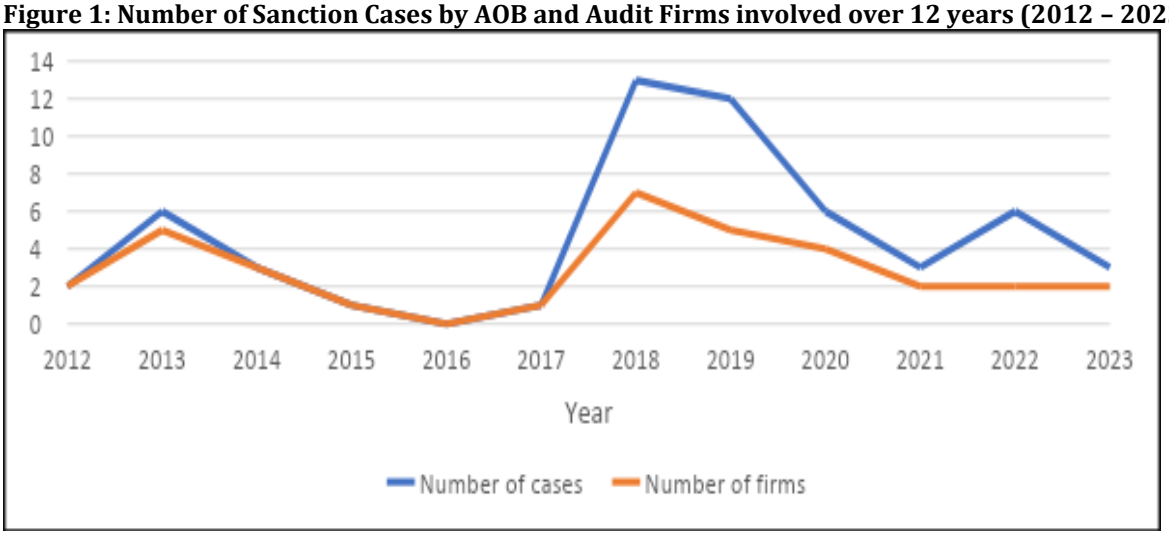


Table 1 and Figure 1 can be viewed simultaneously to show the trend of misconduct cases involving audit firms spanning 12 years from 2012 to 2023 as disclosed on the AOB section of the Securities Commission website. A total of 56 cases of misconduct were reported throughout the 12 years with no cases reported in 2016 and a maximum number of cases were reported in 2018 with 13 cases involving seven (7) firms. In line with Hussin et al. (2016), who noted a significant reduction in multiple client engagements per signing partner post-AOB, our findings show that only a small fraction (5.3%) of the total firms, including two Big Four firms, participated in misconduct cases. This could be indicative of the positive impact of reduced workload per partner as highlighted by Hussin (2016), allowing for more thorough oversight, and potentially leading to fewer instances of misconduct as suggested by Feng (2023).

The trend of increased regulatory actions over the years, with a peak in 2018 and no cases reported in 2016, reflects the AOB's commitment to enhancing audit quality and accountability, as also observed in the literature. This trend aligns with the insights provided by Mustafa and Foong (2015), who highlighted the increased pressure on external auditors due to AOB's establishment, impacting documentation and training costs. The range of sanctions imposed, from reprimands to fines and temporary service prohibitions, underscores the evolving landscape of audit regulation in Malaysia. The global recognition of Malaysia's Audit Oversight Board (AOB), as demonstrated by its higher rating from the Asian Corporate Governance Association (ACGA) in 2023, signifies the organization's effectiveness in overseeing firms' conduct, thereby contributing to the enhancement of audit quality in Malaysia.

Overall, our findings indicate a varied range of offenses committed by auditors, leading to penalties and sanctions by the AOB. The decreasing trend of penalties and sanctions over time accentuates the evolving landscape of audit regulation in Malaysia, raising pertinent questions regarding the effectiveness of existing audit practices and the role of regulatory oversight in mitigating auditor wrongdoing. This analysis not only corroborates the findings of previous studies, suggesting a positive impact of the AOB on audit quality but also provides a detailed insight into the nature and trends of audit misconduct and regulatory actions over a significant period.

5. Conclusion

The literature indicates that the AOB has played a pivotal role in enhancing audit quality in Malaysia by imposing stricter regulatory oversight and sanctions. While the auditing profession was initially self-regulated, the introduction of the AOB has led to co-regulation, ensuring stricter adherence to auditing standards and practices. Although the impact on audit quality is perceived as positive, challenges such as increased pressure on auditors and additional costs have emerged. The nature of offenses provides insights into the areas where audit firms are most vulnerable, offering opportunities for targeted interventions to enhance audit quality. The severity of penalties indicates AOB's stance on several types of offenses, shedding light on the regulatory priorities and strategies employed to enforce compliance.

This study offers a comprehensive overview of the trends and patterns of auditor wrongdoing cases as disclosed by AOB Malaysia. The findings are instrumental for policymakers, regulators, and audit firms in understanding the landscape of auditor wrongdoing and shaping future strategies to enhance audit quality and regulatory compliance in Malaysia. Future research could focus on quantifying the AOB's impact on audit quality and exploring its long-term effects on the auditing profession and financial reporting quality in Malaysia.

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Appendix 1

Summary of Sanctions Imposed by the Audit Oversight Board from 2012 to 2023

Year	Summary of Misconduct	Audit Firm*	No. of case(s)	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
				Non-B4	Big 4	Sanctions	Fine (RM)	
2012	Failure to comply with auditing standards	AF20	1	✓		Reprimand		S.31O(4)
	Failure to comply with MIA By-law Failure to comply with International Auditing Standard (IAS) in discharging professional duty in audit of PIE	AF1	1	✓		Reprimand and monetary penalty	5,000	S.31O(4)
2013	Failure to comply with specific requirements of IAS in discharging professional duty in the audit of a Public Interest Entity (PIE)	AF4	2	✓		Reprimand for both cases		S.31O(4)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF27	1	✓		Reprimand		S.31O(4)
	Failure to comply with MIA By-law Failure to comply with IAS in discharging professional duty in the audit of PIE relating to the independence issue	AF3	1	✓		Reprimand and monetary penalty	5,000	S.31O(4)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF5	1	✓		Reprimand		S.31O(4)
	Failure to comply with MIA By-law Failure to comply with IAS in discharging professional duty in the audit of PIE relating to the independence issue	AF2	1	✓		Reprimand and penalty	10,000	S.31O(4)
2014	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF7	1	✓		Reprimand		S.31O(4)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF6	1	✓		Reprimand and monetary penalty	10,000	S.31O(4)
	Failure to comply with SCA which requires audit firm to be registered with AOB Failures to comply with MIA-By Law on the independence of the auditor	AF5	1	✓		Monetary penalty 2. Prohibited to accept any PIE as clients for 12 months starting 30 June 2014	30,000	S.31O(4)
Year	Summary of Misconduct	Audit Firm*	No. of case	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
				Non-B4	Big 4	Sanctions	Fine (RM)	
2015	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF8	1	✓		Reprimand and penalty	50,000	S.31O(3)
2017	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF9	1	✓		Penalty	75,000	S.31O(3)
2018	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF15	1	✓		Reprimand and monetary penalty	225,000	S.31O(3)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF14	2	✓		Reprimand for both cases		S.31O(3)

	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF25	1	✓		Reprimand		S.31O(3)
	Failure to comply with AAS namely ISQC 1 and IAS	AF13	3	✓		Cases 1 & 2 Reprimand and monetary penalty Case 3 Prohibited from auditing the FS of PIE for 9 months	Case 1 227,000 Case 2 81,000	S.31O(3)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF12	2	✓		Reprimand for both cases		S.31O(3)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF11	1	✓		Reprimand		S.31O(3)
	Failure to comply with AAS namely ISQC 1 and International Auditing Standard	AF10	2	✓		1. Monetary penalty 2. Prohibited to accept any PIE as clients for 12 months	Case 1 123,000 Case 2 44,000	S.31O(3)
	Failure to comply with International Auditing Standard and discharging duties as EQCR	AF10	1	✓		Prohibited from accepting any PIE for 12 months		S.31O(3)
Year	Summary of Misconduct	Audit firm*	No. of cases	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
				Non-Big 4	Big 4	Sanctions	Fine (RM)	
2019	Failure to comply with AAS namely ISQC 1 and IAS and MIA By-Law	AF20	2	✓		1. Monetary penalty 2. Prohibited from accepting any PIE for 12 months Written undertaking to AOB	Case 1 298,000 Case 2 44,000	S.31O(3)
	Failure to comply with AAS namely ISQC 1 and IAS and MIA By-Law	AF19	4	✓		For Case1, 2 & 4 Monetary penalty Prohibited from accepting any PIE for 12 months For case 3 Prohibited from auditing the FS of PIE for 12 months	Case 1 175.000 Case 2 57,000 Case 4 44,000	S.31O(3)
	Failure to comply with AAS namely ISQC 1 and IAS	AF18	1	✓		Reprimand		S.31O(3)
	Failure to comply with AAS namely ISQC 1 and International Auditing Standard	AF17	4	✓		For case 1, 2 & 4 1. Monetary penalty 2. Prohibited from accepting any PIE for 12 months Case 3 Prohibited from auditing PIE for 12 months	Case 1 45,500 Case 2 88,000 Case 4 88,000	S.31O(3)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF16	1		✓	Monetary penalty	63,000	S.31O(3)

Year	Summary of Misconduct	Audit Firm*	No. of cases	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
				Non-Big 4	Big 4	Sanctions	Fine (RM)	
2020	The firm reappointed as auditor to PIE when its recognition with AOB expired Failure to inform AOB within 10 working days due to retirement of partners	AF24	1	✓		Monetary penalty	125,000	S.31O(3) S.31N(1)(a)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF22	1	✓		Monetary penalty	50,000	S.31O(3)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF21	1		✓	Monetary penalty	47,500	S.31O(3) S.31Z(1)
	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF23	3	✓		<u>or both cases 1 & 2</u> . Monetary penalty . Prohibited from accepting any PIE for 12 months <u>or case 3</u> Prohibited from auditing PIE for 12 months	<u>Case 1</u> 175,000 Case 2 44,000	S.31O(3)
2021	Failure to comply with IAS in discharging professional duty in the audit of PIE	AF25	1	✓		Reprimand		S.31O(3)
	Failure to comply with MIA By-Law	AF26	2	✓		<u>For case 1</u> Monetary penalty for 2 breaches <u>For case 2</u> Monetary penalty Revocation of registration of the firm with AOB	<u>Case 1</u> 400,000 & 150,000 <u>Case 2</u> 50,000	S.31O(3) S.31Z(1)
Year	Summary of Misconduct	Audit Firm*	No of cases	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
				Non-Big 4	Big 4	Sanctions	Fine (RM)	
2022	Failure to comply with IAS in discharging professional duty in the audit of PIE as the firm has: Wrongly assessed the PIE's revision from the Malaysian Financial Reporting Standards (MFRS) accounting framework to the Financial Reporting Standards (FRS).	AF28	2	✓		<u>For both cases 1 & 2</u> 1. Monetary penalty 2. Prohibited from accepting any PIE for 12 months	For both case 35,000	S.31O(3) S.31Z(1)

	Failed to perform sufficient audit procedures and obtain sufficient audit evidence to support the conclusions reached on various elements of accounting estimates relating to property development costs.							
	Failure to comply with IAS in discharging professional duty in the audit of PIE as the firm for each case below: Case 1 Failed to ensure that the firm's monitoring system of quality control is operating effectively. Case 2 AOB found numerous audit deficiencies in the engagement reviews of the PIE relating to among others, revenue recognition, accuracy and existence of trade receivable and appropriateness and validity of consolidation adjustment. Case 3 Numerous deficiencies were found in the audit of PIE where the subsidiaries operate in a foreign country, particularly in the existence, accuracy and valuation of capital work in progress and current assets. Case 4 Partners have failed to sufficiently review the selected audit documentation relating to significant judgments and significant risk areas of the engagement and the basis of the conclusions reached in many items of Financial Statements.	AF27	4	✓		For case 1, 2 & 4 Monetary penalty Prohibited from accepting any PIE for 12 months Case 3 Prohibited from auditing PIE for 12 months	Case 1 227,000 Case 2 35,000 Case 4 34,000	S.31O(3) S.31Z(1)
Year	Summary of Misconduct	Audit Firm*	No of cases	Type of audit firm		Sanctions taken by AOB		Violation of the Securities Commission Act 1993
						Sanctions	Fine (RM)	
2023	Failure to comply with IAS in discharging professional duty in the audit of PIE as the firm failed to perform sufficient audit procedures to support the conclusions reached on the valuation of goodwill.	AF29	1	✓		Reprimand		S.31O(3) S.31Z(1)
	Failure to comply with IAS in discharging professional duty in the audit of PIE due to Case 1 Many audit deficiencies in the engagement review of the PIE. Case 2 Failed to sufficiently review the selected audit documentation relating to significant judgment.	AF30	2	✓		For both cases Monetary penalty Prohibited from accepting any PIE for 12 months.		S.31O(3) S.31Z(1)

Appendix 2
The List of Companies with the Number of Cases Involved is Denoted in Appendix 1

No	Year	Name of Audit Firms	Total Cases	Abbreviation in Appendix 1
1	2012	T.C. Liew & Co	1	AF1
2	2013	Aljefridean	1	AF2
3	2013	C.K. Cheah & Co	1	AF3
4	2013	STYL Associates	2	AF4
5	2013	Wong Weng Foo & Co	1	AF5
	2014		1	
6	2014	Ong Boon Bah & Co	1	AF6
7	2014	Khoo Wong & Chan	1	AF7
8	2015	Crowe Horwath	1	AF8
9	2017	Adam & Co	1	AF9
10	2018	McMillan Woods Malaysia	3	AF10
11	2018	CAS Malaysia Plt	1	AF11
12	2018	Nexia SSY	2	AF12
13	2018	Siew Boon Yeong & Associates	3	AF13
14	2018	Anuarul Azizan Chew	2	AF14
15	2018	CHI-LLTC	1	AF15
16	2019	Deloitte Plt	1	AF16
17	2019	AFTAAS Co	4	AF17
18	2019	Baker Tilly Monteiro Heng Plt	1	AF18
19	2019	Chengco	4	AF19
20	2012	UHY	1	AF20
	2019		2	
21	2020	Ernst & Young Plt	1	AF21
22	2020	Morison AAC Plt	1	AF22
23	2020	LLTH Plt	3	AF23
24	2020	UHY Hacker Young LLP	1	AF24
25	2018	PKF	1	AF25
	2021		1	
26	2021	Jamal, Amin & Partners (JAP)	2	AF26
27	2013	Ong & Wong	1	AF27
	2022		4	
28	2022	Kreston, John & Gan	2	AF28
29	2023	T.H. Kuan & Co	1	AF29
30	2023	K. C. Chia & Noor	2	AF30

Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Assessing the Impact of Public Accounts Committee (PAC) Reports on Government Accountability

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Abstract: This study examines the effectiveness of the Public Accounts Committee (PAC) in Malaysia to enrich the understanding of its role in promoting governmental accountability. Through an extensive content analysis of the PAC reports spanning from 2019 to 2022 sourced from the Official Web of Parliament PAC, issues raised by the PAC were categorized into key improvement areas. Findings unveiled 104 flagged issues, with 68 addressed effectively, while 29 remained unresolved despite agreements for action and 7 lacking government response. The government's consideration of 97 out of 104 issues, reflecting a response rate exceeding 90%, underscored the PAC's pivotal role in fostering accountability. This study presents a comprehensive analysis of the prevailing issues identified in PAC reports and their current resolution status. It offers crucial insights for legislators to enhance the efficacy of their oversight procedures. Additionally, it provides empirical data on the impact of legislative oversight on governmental operations. The findings highlight the PAC's capacity to instigate positive reforms within government agencies, thereby enhancing transparency and promoting accountable governance. Future research should explore how the composition of the PAC committees influences issue resolution and government responses, while further investigations are recommended to evaluate the effects of the PAC recommendations on governmental practices.

Keywords: *Public accounts committee, government, accountability, transparency, parliament.*

1. Introduction

In light of numerous high-profile leakages, misallocation of government funds and pervasive corruption concerns in Malaysia, such as the well-known 1MDB, Scorpene Submarine, Felda Global Ventures, Tabung Haji, East Coast Rail Link (ECRL), as well as the more recent Littoral Combatant Ship (LCS) and MySejahtera, it is apparent that a substantial overhaul is necessary, along with an urgent requirement for reform within the government's procurement and financial management systems. On a macroeconomic level, the detrimental effects of corruption in Malaysia are significant, resulting in staggering losses of RM277 billion in economic output from 2019 to 2023. This figure nearly equals the combined Gross Domestic Product (GDP) of Johor and Penang, Malaysia's two largest states (SPRM, n.d.). According to Transparency International's (TI) 2022 Corruption Perceptions Index, Malaysia ranked 61st out of 180 countries, indicating a moderate to high perception of public sector corruption. Additionally, a survey by TI found that 71% of Malaysians see government corruption as a major issue (Md Zabri, 2024).

Tackling corruption is crucial for protecting national prosperity and promoting a just and equitable society. The rising public debt and widespread financial leakages due to mismanagement and corruption, particularly within the public sector, demand immediate action. Persistent inefficiencies in ministries, government departments, government-linked companies and statutory bodies must be urgently addressed to ensure optimal use of public funds. Hence, crucial agencies, including the Auditor General's Office, the Malaysian Anti-Corruption Commission (MACC) and the Public Accounts Committee (PAC), should adopt a more proactive approach to ensuring transparency, accountability and responsible financial management. It is important to measure the effectiveness of these agencies in addressing mismanagement within government agencies, as it will help identify areas for improvement and enhance the overall integrity of public financial oversight. This study focuses specifically on evaluating the effectiveness of the PAC.

The PAC has been established in Malaysia since 1959, serving as a crucial safeguard for maintaining financial integrity. The appointed members selected at the commencement of each Parliament have the task of examining the annual audits provided by the Auditor General's Office (Padlee, 2021). Additionally, the PAC carries out inquiries into instances of financial malfeasance and ensures that government agencies are held responsible

for their fiscal decisions. Nevertheless, the primary question that persists is whether the concerns raised by the PAC are adequately addressed by the government agencies and subsequently result in the implementation of effective remedial actions. This gives rise to an empirical question that merits further examination. This research seeks to investigate whether the PAC's inquiries lead to substantial reforms and accountable financial management for assessing the true extent of the PAC's influence on shaping responsible governance. Specifically, the objectives of this study are:

- Identify the issues raised and the government sectors involved by examining a comprehensive list of the PAC reports.
- Analyse the PAC recommendations and categorize these recommendations.
- Determine the extent to which the recommendations provided by the PAC are implemented by government agencies.

2. Literature Review

The Public Accounts Committee in Malaysia

The PAC in Malaysia, as defined by Standing Order No. 77 of the Dewan Rakyat, has the responsibility to scrutinize the federal government's accounts, approved budget and Auditor General's reports (Parliament of Malaysia, 2018). The PAC's crucial function is to aid parliament in ensuring that government actions and expenditures align with parliamentary approval. It serves as a "watchdog" to safeguard public funds and resources and assess the efficiency and effectiveness of resource management by the government (Abidin et al., 2019). The existence of PAC can promote a culture of accountability (Yaakob et al., 2009). PAC originates from the traditional model of Westminster commonly implemented by Commonwealth countries. The first PAC was established in 1857 in the UK Parliament (Padlee, 2021).

Since its establishment in 1959 in Malaysia, the Chairmanship of the PAC has conventionally been occupied by a delegate from the government faction. However, a notable shift occurred in 2018 when the reins of power transitioned from Barisan Nasional to Pakatan Rakyat. This transition marked a significant departure from the norm as the Chairman of the PAC was, for the first time, chosen from the ranks of the opposition party (Padlee, 2021).

A comprehensive search was conducted in two reputable scholarly databases, namely Web of Science (WoS) and Scopus, to identify scholarly literature about the "Public Accounts Committee" within Malaysia. Findings indicated that the WoS database contained only one related article in Malaysia, while Scopus yielded a total of four articles. This finding indicates the scarcity of studies undertaken on PAC in Malaysia.

Saleh and Hasan (2015) provided a comprehensive analysis of the institutional structure of Malaysia's federal PAC and its significant contribution to enhancing accountability in the public sector. The paper explores the evolutionary history of the PAC, shedding light on its intricate linkages with the governmental framework in Malaysia. Furthermore, a detailed explanation of the powers, responsibilities, composition and operational methods of the PAC is also discussed in the study. Saleh and Hasan (2015) also cited prominent examples that have undergone scrutiny by the PAC and received considerable media attention.

Using the viewpoints of non-audit professionals who are members of the PAC, Batumalai et al. (2022) conducted research regarding the existence of audit expectation gaps within the Malaysian public sector. Their findings revealed the presence of a disparity in audit expectations between auditors in the public sector and non-audit professionals. Batumalai et al. (2022) then proposed the need to enhance the comprehension of auditing stakeholders regarding the legal and ethical responsibilities of auditors. By doing so, it aims to address the existing gap, strengthen the credibility of auditors, and increase their societal significance.

Meanwhile, the study conducted by Daud and Fraser (2015) investigated the viewpoints of auditors in the National Audit Department (NAD) and members of the PAC on the current performance-audit practices in the public sector of Malaysia. By conducting interviews with a representative sample of individuals from each cohort, their study revealed contrasting perspectives on several aspects, such as the responsibilities and skills of auditors, their impartiality, as well as the content and usefulness of audit reports. A significant divergence

arose in their separate viewpoints on the obligations of auditors in the detection of fraudulent activities.

In another study, Zakuan (2022) critically examined the extent of women's participation in the PAC. The investigation sheds light on the persistent lack of women's participation in legislative bodies, a phenomenon that remains consistent across different political contexts. As of June 2021, Malaysia's standing in terms of women's parliamentary representation was comparatively lower than that of several Southeast Asian countries. The lack of adequate female representation in Malaysia's legislative assemblies has a consequential impact on the PAC. The significance of women's participation within the PAC domain appears less emphasized due to the policy-centric nature of PAC debates, which prioritize policy-related conversations rather than gender-oriented discourse.

The study, which was carried out in the Malaysian context, fell short in its coverage of the problems raised by the PAC and the corrective actions made by the government in response. As a result, the general people's capacity to accurately assess the true efficacy of the PAC in terms of formulating solutions, enacting reforms and responsibly protecting public financial assets remained constrained. Therefore, this study aims to add to the body of knowledge already available on the effectiveness of the PAC's operations in the Malaysian context.

Roles and Responsibilities of The Public Accounts Committee

PAC plays a crucial role in ensuring accountability, transparency and efficiency in public sector operations. These functions are supported by various theoretical frameworks, including agency theory, signalling theory, assurance theory, management control theory, governance theory and confirmation theory (Cîmpan et al., 2023). Agency theory posits that public audits are essential for mitigating the agency problem, ensuring that public officials act in the best interests of public stakeholders. Signalling theory emphasizes that public audits serve as a signal of reliability and trustworthiness, which enhance transparency and stakeholder confidence in the financial information provided by public entities. Meanwhile, assurance theory suggests that public audits offer assurance regarding the accuracy and fairness of financial statements, thereby reducing information asymmetry and fostering trust.

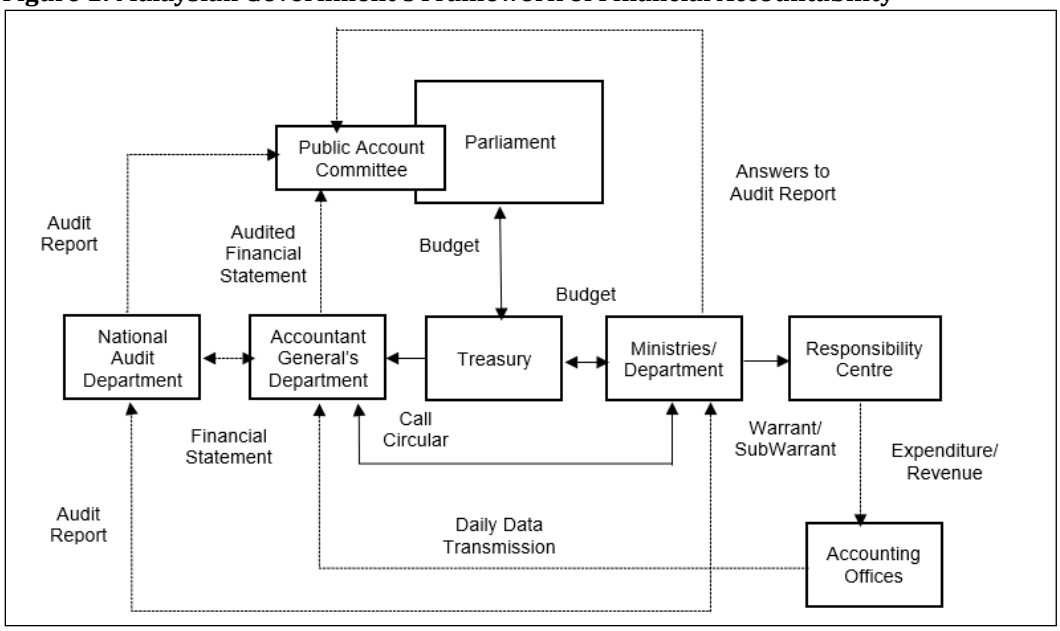
From the perspective of management control theory, public audits are vital for monitoring and controlling the activities of public entities, which further ensure regulatory compliance and efficient resource utilization. Governance theory highlights the role of public audits in promoting good governance practices, accountability, and integrity within public institutions. Finally, confirmation theory posits that public audits validate the effectiveness of internal controls and risk management processes in public organizations, instilling confidence among stakeholders regarding the soundness of these entities' operations. Collectively, these theories underscore the multifaceted value of public audits in fostering a transparent, accountable and efficient public sector (Cîmpan et al., 2023).

The primary focus of the PAC is to engage in essential activities of examining government expenditure, assessing the cost-effectiveness of public spending and ensuring government officials are held responsible for their financial management and performance (Elston & Zhang, 2022). The act of being vigilant is important in guaranteeing the prudent allocation of public funds and the timely resolution of any financial irregularities or inefficiencies within governmental processes. In the pursuit of its goal, the PAC undertakes the crucial role of examining the findings of the National Audit Department (NAD) and commencing investigations into certain domains of government spending or financial administration. The primary objective of PAC's investigations is to promote the operational efficiency and efficacy of government agencies in executing projects, hence contributing to the overall improvement of government performance (Batumalai et al., 2022). However, the effectiveness of PAC's endeavors occasionally encounters obstacles. Although the suggestions aim to stimulate enhancements, their implementation into executive action is not always guaranteed, and the limited periods for report submission can impede the quality of their findings (Lateef et al., 2021).

The Chairman assumes a crucial position within the PAC, exerting significant influence over the committee's agenda. This entails engaging in consultations with both the committee members and the Auditor General (Padlee, 2021). The PAC is widely acknowledged as a powerful legislative group that exercises significant influence in its ability to summon witnesses, obtain papers and undertake investigations for uncovering instances of financial irregularities or mismanagement. In summary, the PAC is responsible for a wide range of

functions encompassing financial monitoring, ensuring accountability, scrutinizing public accounts and investigating instances of financial impropriety.

Figure 1: Malaysian Government's Framework of Financial Accountability



(Source: Saleh & Abu Hasan, 2015)

Moreover, the PAC demonstrates its responsiveness to public concerns by actively engaging with instances that receive media attention. This illustrates the committee's dedication to researching and resolving issues about government accountability (Saleh & Abu Hasan, 2015). The committee's performance is enhanced by the facilitation of collaboration among its members through various meetings, including verification sessions and response reporting meetings. Furthermore, the PAC engages in close collaboration with other stakeholders, like the Auditor General's office, to authenticate data and effectively address issues related to corruption. Within the broader context of Malaysian administration, the PAC assumes a prominent role as a steadfast protector of accountability. It conscientiously tackles public apprehensions about bureaucratic efficacy while advocating for governmental transparency and economic prudence. The PAC's pivotal standing and its integral role within the federal government's framework of accountability can be visually depicted in Figure 1. In this framework, it becomes evident that the PAC bears the responsibility of scrutinizing the audit report and audited financial statement generated by the NAD and the Accountant General Department. Subsequently, any queries or concerns raised by the PAC necessitate a response or subsequent action from the pertinent ministry or government department.

The Public Accounts Committee Work Process

The foundation of the PAC work lies in the initial report provided by the Auditor General, which serves as their guiding document. Remarkably, a substantial 85% of PACs acknowledge that their work hinges primarily on the Auditor General's report (Wehner, 2002). However, given the constraints of time and resources, the PAC cannot delve into every account flagged by the Auditor General. Therefore, they strategically prioritize their focus on accounts involving a qualified audit opinion or those that raise more profound financial control concerns. This judicious allocation of resources ensures that their efforts are channelled towards matters of utmost significance.

Once armed with the Auditor General's report, the PAC embarks on the critical phase of conducting hearings. These hearings are the principal means by which officials from various government departments, agencies and relevant bodies are held accountable before the PAC. It is imperative that the PAC meticulously plans these proceedings in collaboration with the Auditor General to synchronize the release of their reports with parliamentary hearings. Preparing a quality hearing involves dedicated efforts from committee members, as

well as the witnesses who are summoned to appear. Typically, the summoned officials, often in the form of the accounting officer, face questions from the committee. While ministers are not usually summoned, additional individuals may also be questioned during these hearings (Parliament of Malaysia, 2017).

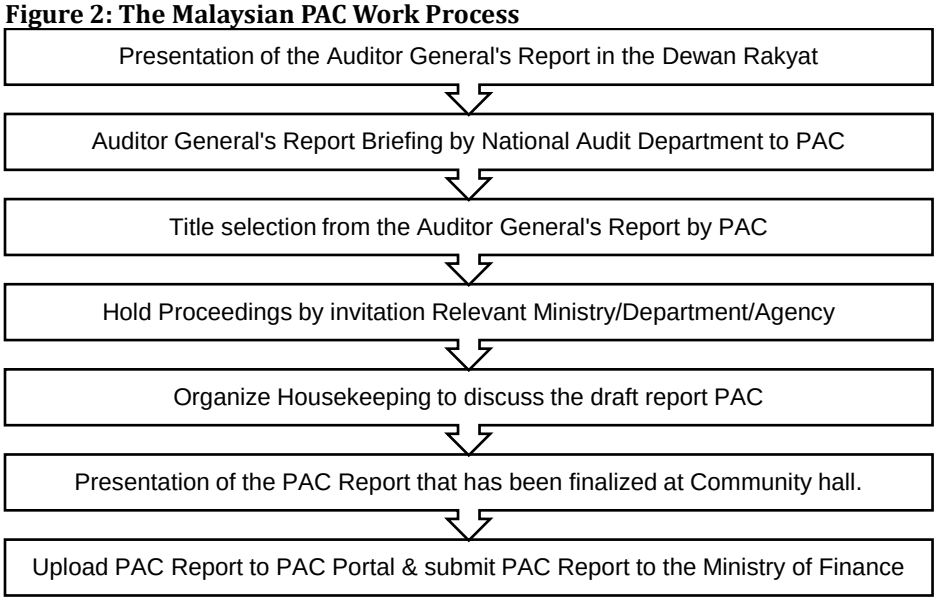
Subsequently, the responsibility of drafting a comprehensive report falls on the shoulders of the committee's chairperson. Prompt publication of the minutes of evidence from hearings and the committee's report is essential. This practice aligns with the norms in Westminster-inspired parliaments and, importantly, in Malaysia. Additionally, it is customary for committee reports to trigger a formal response from the government, which typically occurs within two to six months. Some parliaments even establish special committees to monitor the implementation of government assurances. In cases where a department or ministry rejects a PAC recommendation, they are required to explain their reasons in such a report. The decision to revisit the issue in subsequent reports lies with the PAC (Parliament of Malaysia, 2017).

Nevertheless, the PAC's work does not culminate with the finalization of a report. The real value of these reports materializes when the government acknowledges and acts upon the issues raised, thus implementing the committee's recommendations. In a recent survey, an impressive 87% of PACs indicated that their reports are made accessible to the public (Wehner, 2002). This transparency ensures that citizens are informed about government finances and can hold their leaders accountable.

In summary, the Malaysian PAC follows a structured and systematic process, with reliance on the Auditor General's report as a cornerstone. Their rigorous hearings, meticulous reporting and government responses are all essential components of their efforts to promote accountability and transparency in the country's financial affairs. In Figure 2, the work process of the Malaysian PAC is encapsulated.

Top of Form

Figure 2: The Malaysian PAC Work Process



(Source: Parliament of Malaysia, 2017)

3. Methodology

This research was conducted via a comprehensive analysis of the PAC reports and subsequent action reports taken by government agencies within four years (2019–2022), obtained from the Official Web of Parliament PAC. The year 2019 was chosen as the starting year since the PAC reports and action reports taken by government agencies were published to the public when Pakatan Rakyat took over the government from Barisan Nasional. The results of these comprehensive content analyses are highlighted using descriptive statistics, comparative analyses and concept mapping. The categorization of issues brought up by the PAC

adheres to the classifications proposed by Benton and Russell (2013), as well as Elston and Zhang (2022). They proposed six categories of issues frequently notified by PAC to government agencies for improvement, such as issues on providing guidance and control, disclosing government positions, conducting analysis or research, improving contract management and enhancing internal management procedures, among other issues.

The primary concern typically raised by PAC pertains to issue guidance and control. The PAC requires government agencies to establish thorough policies, rules, regulations and guidelines to ensure honesty and transparency in expenditures (Benton & Russell, 2013). Secondly, the PAC recommends that government institutions distribute information to several stakeholders, such as the committee, parliament, regulators, auditors, other public sector agencies and the public, to explain previously published information and avoid any potential dissemination of false information. Thirdly, the PAC suggests that the government be transparent and honest in contract management to optimize the value obtained from outsourcing agreements (Benton & Russell, 2013).

Besides, government agencies are urged to enhance management practices within organizations, encompassing areas such as leadership, internal and external coordination, personnel recruitment, training, professional growth, task assignments, incentives, employee morale, succession planning and disciplinary measures (Benton & Russell, 2013). These endeavors function to enhance the quality, uniformity, effectiveness and stability of organizations. In addition, the PAC sometimes provides suggestions that go beyond the categories described before, covering a wide range of disciplines. Expanding on the six (6) recommendations commonly raised by the PAC, this study examines the responses of government agencies and evaluates the implementation of corrective actions.

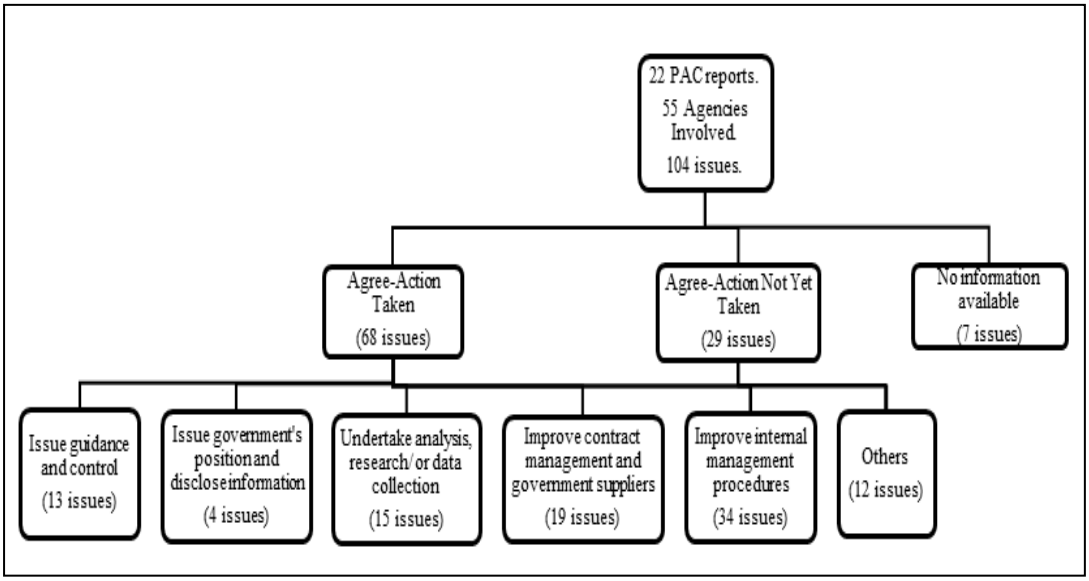
4. Results and Discussion

From 2019 to 2022, a total of 23 PAC reports were issued. There was a total of seven reports in 2019, but only six of them are accessible on the PAC website. In 2020, the number of reports decreased to five. Nevertheless, in 2021, an increase in the number of reports was observed, reaching a total of eight. Finally, in 2022, the number of reports dropped to three. The data indicates fluctuations in the committee's scrutiny of public accounts concerns in terms of concentration and severity during the indicated years. Over these four years, there have been changes in the chairman of the PAC due to alterations in the leadership of the government. The heads of government came from different political parties. According to Padlee (2021), starting in 2018, the selection of the chairman must come from an opposition party.

Appendix 1 contains an exhaustive compilation of the organizations involved in the PAC investigation between 2019 and 2022. There were a total of 36 agencies involved, which included crucial ministries such as the Ministry of Finance (MoF), the Ministry of Health (KKM) and the Ministry of Education (KPM). The incorporation of agencies from diverse sectors, including finance, defense, education and health, demonstrated a cross-sectoral strategy toward financial supervision. It indicates the committee's dedication to thoroughly examining spending in several areas. Organizations such as the Malaysian Anti-Corruption Commission have a specific emphasis on tackling corruption issues in the investigation. Furthermore, the involvement of the Federal Territories Islamic Religious Council and the Management of the Malaysian Sports School (SSM) Perlis Project highlighted the incorporation of organizations at the federal and state levels. The inclusion of crucial ministries in the PAC investigation underscored a deficiency in financial reporting and accountability within key organizations responsible for safeguarding the well-being of the populace.

Figure 3 depicts a thorough examination of 22 PAC's reports that encompass 55 agencies, revealing a total of 104 identified issues. Out of these issues, 68 have undergone actions, while 29 have had actions agreed upon but not yet put into action. The concerns mentioned by the PAC encompass matters such as providing guidance and control, disclosing government positions, conducting analysis or research, improving contract management, enhancing internal management procedures and other issues. Additionally, there were seven unresolved matters for which the government's actions remained undisclosed.

Figure 3: Responses on PAC's Reports



The primary concern highlighted by the PAC is the deficiency in internal management procedures, which has been raised 34 times. Following this is the enhancement of contract management with government suppliers by 19 times and the recommendation for the government to conduct further research and data collection before initiating any actions, projects or programs, which have been raised 15 times. Additionally, the government has been advised to enforce appropriate guidance and control, which has been raised 13 times. The comprehensive explanations for each type of concern are thoroughly covered in the subsequent sections.

Issue Guidance and Control

The PAC has raised 13 concerns regarding shortcomings in guidance and control. Among these is the Ministry of Finance's (MoF) inability to provide clear policies determining eligibility for LPG gas subsidies, which has led to losses to the country amounting to nearly RM1.7 billion. In response to the PAC's admonition, the MoF has agreed to refine the effectiveness of the LPG gas subsidy program. The PAC has also requested the MoF to ensure full compliance with the country's laws, especially in financial procedures, to enhance the orderliness and accountability of the financial administration system. This is because the MoF is responsible for the loss of KHAZANAH amounting to RM6.3 billion in 2018, marking the first loss experienced by KHAZANAH since its establishment in 1993.

Meanwhile, the Ministry of Transportation (MoT) has been reprimanded due to the lack of proper work processes and marina management. Some marinas were built but never operated or visited by sailors, resulting in a complete waste of public funds amounting to RM61.55 million. The Ministry of Home Affairs (KDN) and the Ministry of Human Resources (KSM) have then been advised by the PAC to establish a synchronized system for managing and controlling the hiring of foreign workers, ensuring data consistency from one field to another across ministries and departments.

Thus, comprehensive SOPs need to be established for the sale and disposal of DBKL-owned land. The government is also urged to adopt sustainable and equitable housing policies for the provision of affordable housing for the people. The government must ensure that each ministry responsible for combating the COVID-19 pandemic utilizes the allocated RM5.8 billion by current financial procedures to prioritize the interests and welfare of the people. The Federal Territory Islamic Religious Council (MAIWP) is also reprimanded for managing zakat funds according to Shariah regulations provided by the Federal Territory Mufti Department. Furthermore, the new Malaysia My Second Home (MM2H) program policy should be customer-friendly and competitive compared to neighboring countries. In addition, the procurement of defense equipment and supplies should prioritize the needs of the end-user, particularly the Royal Malaysian Navy (TLDM), and align with the Defense White Paper 2020–2030. All recommendations concerning policies, guidance and policies have been accepted by the relevant government agencies, and each has agreed to take corrective measures and

improvements.

Disclosing Government Positions

Only four matters were recommended by the PAC regarding disclosing government positions and disclosing information. One of them is the absence of Government representatives on the Board of Directors of Education Malaysia Global Services (EMGS) for the year 2019, even though EMGS is a Company Limited by Guarantee ("CLBG") under the purview of the Ministry of Higher Education Malaysia, which has been established since 2012. It involved issues of corporate governance and the management of grants received from the government totalling RM22.13 million. The Government, under the Ministry of Transport (MOT), was also requested to disclose the Investigation Report of the Government Administration, Procurement and Financial Investigation Committee (JKSTUPKK) No. 2/2018 concerning the Automated Enforcement System (AES).

Therefore, the Government is urged to take proactive action to finalize the purchase of COVID-19 vaccines for children (5-11 years old), including allocating reservation funds, if necessary, to ensure timely delivery of COVID-19 vaccines for children. For the last case under disclosing government positions, the Ministry of Defence (MINDEF) is requested to present progress reports on the Littoral Combatant Ship (LCS) project every three (3) months to the PAC until the LCS project is completed. All comments from the PAC received positive responses from the respective ministries, demonstrating a commitment to transparency, accountability and the willingness to address concerns raised by the PAC.

Conducting Analysis or Research

Based on the PAC report between 2019-2022, the Government, through various ministries and agencies, was requested by the PAC to conduct several studies as follows:

- MoF needs to conduct a study on the usage of LPG gas by state, category, number of users and subsidized amounts smuggled out of the country.
- MoF must conduct a study on the effectiveness of the LPG subsidy program.
- FINAS needs to implement an outcome evaluation study related to the Film in Malaysia Incentive (FIMI) program.
- MoT and the Malaysian Maritime Department should study and make decisions regarding the new direction of public marinas.
- Malaysia Stadium Corporation (PSM) should conduct a study within two years to assess the benefits derived from the redevelopment project of the existing facilities of the National Sports Complex.
- The Public-Private Partnership Unit (UKAS) needs to examine the maintenance clause requirements in the Privatisation Agreement under Public Private Partnership (PPP) through land swap to ensure that assets are maintained and utilized optimally.
- PDRM should expedite investigations into allegations of theft and misuse of user IDs in the MyIMMs system.
- KDN should renegotiate with UNHCR the settlement of registration for refugee status detainees in immigration depots nationwide.
- PR1MA must conduct due diligence in affordable housing construction in terms of location suitability, house size and market demand to avoid unsold properties and government grant losses.
- ARB should conduct an audit on cumulative losses of the Joint Fund Group (KWB), especially in investments in the development project of 56 units of Keppel Bay Properties in Singapore.
- SPRM should investigate kick-back recipients in the AES acquisition process by LTAT.
- MAMPU needs to assess the effectiveness of MyGov*Net in the Government delivery system before deciding whether to upgrade the existing system or replace it with a new system after the contract ends in 2022.
- MINDEF needs to present substantive military acquisition planning to the Parliament's Special Defence and Security Committee from time to time, involving all stakeholders for national defense readiness.
- MINDEF needs to review all options to determine the best direction for the LCS project and ensure responsible public spending.
- KKM and MoF need to review the appropriateness of awarding the MySejahtera application contract through direct negotiation made through the Cabinet Decision dated 26 November 2021.

In general, the research or analysis required by PAC indicates a need for thorough assessments and evaluations to assess the effectiveness, efficiency and impact of various government programs, initiatives and projects to guarantee transparency and accountability in the administration of public funds, resources and projects, specifically regarding subsidies, contracts and investments. Conducting these investigations is necessary to prevent financial losses, misallocation of cash and inefficiencies in government organizations and projects.

Improve Contract Management of Government Suppliers

The research findings in the PAC report also revealed various weaknesses in contract management within government agencies. The government should implement better procedures for negotiating, monitoring and enforcing contracts to ensure they are executed efficiently, effectively and in compliance with relevant regulations and standards. Good contract management will maximize the value derived from procurement activities, minimize risks and ensure that public resources are used efficiently and effectively. Here are some important suggestions from the PAC to improve the management of contracts with government suppliers:

- The government must ensure that contractors or suppliers fulfill their responsibilities and scope of work as outlined in the agreement.
- MoF needs to ensure that all direct negotiation decisions are supported by strong justifications.
- Members of Parliament (MPs) must declare their business interests to the responsible ministry if their business involves government projects.
- MoF needs to conduct due diligence accompanied by justifications before recommending companies to ministries to reduce the risk of project failures.
- Existing procurement practices that allow any contractor or company to propose other company names for limited tender purposes should be considered on a case-by-case basis.
- All agreements sealed by government agencies must follow best practices that consistently protect government interests.
- The government must ensure that all terms in any concession agreements do not disadvantage the government.
- The government needs to set a ceiling price for Sinovac vaccines sold in the Private Vaccine Market immediately and ensure that this ceiling price does not give excessive profits to suppliers.
- The National Maritime Single Point of Contacts (NMSPOC) should be promptly implemented so that information between ministries and government agencies can be synchronized and security and enforcement activities can be carried out with good coordination and monitoring.
- The government should ensure that the Pay-Per-Use concept if introduced, will benefit the government in terms of cost savings.
- Government Contract Administration should be streamlined to minimize Variation Orders (VO) to avoid project cost escalation.
- The government must ensure full government ownership of the MySejahtera application to ensure the security of users' data in the MySejahtera and ensure that the data is not misused by any party.

Overall, there is a clear emphasis by the PAC on ensuring that contractors and suppliers adhere to their contractual obligations and deliverables as specified in agreements. The necessity for strong justifications and due diligence processes, particularly in decision-making and vendor selection, indicates a commitment to mitigating risks and ensuring transparency in procurement practices. Most importantly, emphasizing for MPs to declare business interests related to government projects highlights the importance of transparency and accountability in governance and business dealings.

Enhancing Internal Management Procedures

Table 1 offers an analysis of diverse internal management flaws highlighted in the PAC's 2019-2022 reports. These issues encompassed 12 distinct categories. Notably, enforcement weaknesses within governmental agencies emerged as a predominant concern, reiterated a total of six times across the 22 PAC reports.

Table 1: Internal Management Issues Highlighted in the PAC's Reports 2019-2022.

Enforcement weaknesses	6
Non-Compliance with SOPs	5
Political interference	4
Weak financial procedures	4
Incomplete records	3
Lack of contract provision	2
Lack of maintenance and coordination between agencies	2
Ineffective internal audits	2
Lack of transparent project evaluations	2
Ministerial power abuse	2
Absence of due diligence implementation	1
Skills shortage	1

From the content analysis, it was revealed that non-compliance with standard operational procedures (SOPs) ranked as the second most prevalent issue. In addition, certain government projects were approved without undergoing the necessary assessment process. Moreover, there were instances of government procurement processes being conducted in contradiction to the prescribed procedures. Political interference can undermine the impartiality and effectiveness of enforcement efforts, leading to concerns about favoritism, corruption or inefficiency. Furthermore, deficiencies in financial procedures and incomplete record-keeping underscore shortcomings in data management and documentation practices. Such lapses can impede accountability, decision-making processes and the monitoring of performance.

The absence of contractual provisions suggests deficiencies within contractual agreements or oversight mechanisms, potentially leading to contractual disputes, legal vulnerabilities or project delays. Additionally, there is a lack of coordination and maintenance among government agencies, resulting in weaknesses within the government's administrative system. For instance, the Ministry of Home Affairs (KDN) and the Ministry of Human Resources (KSM) should collaborate in managing and regulating the hiring of foreign workers to prevent an influx of foreign workers, which could lead to the outflow of national resources. Such collaboration is crucial for ensuring effective governance and resource utilization.

Moreover, ineffective internal audits suggest shortcomings in internal control mechanisms or audit practices, which can compromise accountability, fraud detection and risk management. The absence of transparent project evaluations indicates deficiencies in project monitoring, evaluation or reporting mechanisms, impeding evidence-based decision-making, performance assessment and stakeholder accountability. Furthermore, ministerial power abuse suggests misuse or manipulation of ministerial authority for personal or political gain, thereby eroding public trust, institutional credibility and governance effectiveness. Additionally, the absence of due diligence implementation indicates gaps in risk assessment or compliance verification processes, exposing organizations to legal, financial, or reputational risks. Finally, skills shortage refers to deficiencies in human resource capabilities or expertise, which can hamper organizational performance, innovation and service delivery.

Implications and Potential Consequences of the Issues Identified

The outcomes of this study revealed numerous crucial concerns in government operations that could have substantial consequences. Failure to adhere to standard operational procedures (SOPs), intervention from political entities and the misuse of ministerial power can undermine the confidence of the public in government institutions. The erosion of trust can lead to less citizen participation, decreased voter turnout and heightened public opposition, which undermine the government's legitimacy.

Financial deficiencies, inadequate record-keeping and inefficient internal audits can result in significant financial losses and inefficiencies, further depleting public resources and causing budget overruns in

government projects. Inadequate inclusion of contractual requirements and due diligence in government projects can leave them vulnerable to legal disputes, breaches of contract and potential litigation. These issues can result in project delays, higher expenses and harm to the reputation of the project.

Inadequate governance and lack of accountability exacerbate these problems. The absence of collaboration between government agencies and ineffective assessments of projects undermine governance systems and impede mechanisms of accountability, resulting in flawed decision-making, insufficient performance monitoring and subpar delivery of public services. Furthermore, the lack of necessary skills inside government organizations presents substantial obstacles in terms of human resources, hindering the overall performance, innovation and delivery of services. On top of that, inadequacies in risk assessment and compliance verification procedures expose government projects to unforeseen difficulties, which could result in project failures, safety issues and enduring adverse effects on public welfare. Continual problems with governance and corruption can damage a nation's global standing, impacting foreign investment, diplomatic ties and overall economic stability. Addressing these concerns by implementing specific reforms is essential to improve governance, accountability and efficiency in the public sector, which includes strengthening compliance with standard operational procedures through rigorous training and regular audits, minimizing political interference by establishing clear boundaries and independent oversight bodies, as well as enhancing financial procedures and record-keeping with modern management systems and frequent audits. Improving contractual provisions and due diligence processes, fostering interagency coordination and strengthening internal audits and controls are also crucial. Transparent project evaluations, addressing skills shortages through capacity-building programs, promoting good governance practices and reinforcing legal and regulatory frameworks will further ensure accountability, transparency and efficiency in public sector operations.

5. Conclusion and recommendations

The PAC plays a vital role in maintaining financial integrity and upholding government agencies accountable. Studies conducted within the Malaysian context have been inadequate in addressing the issues identified by the PAC and subsequent actions taken by the government to address them. Thus, this study endeavors to contribute to the existing body of knowledge concerning the operational effectiveness of the PAC within Malaysia, aiming to provide a more comprehensive understanding of its impact.

This study involved a comprehensive analysis of PAC reports and subsequent actions taken by government agencies over four years (2019–2022), sourced from the Official Web of Parliament PAC. Issues raised by the PAC were categorized according to classifications proposed by Benton and Russell (2013) and Elston and Zhang (2022), encompassing six key areas for improvement. These areas include guidance and control, information disclosure, contract management transparency, organizational management enhancement, and others.

From the examination of 22 PAC reports encompassing 55 agencies, this study revealed a total of 104 issues flagged by the PAC. Among these, 68 issues have been effectively addressed through actions, while 29 have agreements for action but remained unresolved, with seven issues lacking information on the government's response. The government's response to 97 out of 104 issues, representing a response rate of over 90%, indicated a serious consideration of the PAC's recommendations by the government and related agencies, besides underscoring the significant role of the PAC in enhancing government accountability.

By delving into this investigation, this study is anticipated to provide a thorough understanding of the PAC's impact in instigating positive changes within government agencies, thereby enhancing transparency, accountability and responsible governance. The PAC can enhance the transparency and accountability of government in managing public funds by conducting regular and comprehensive audits, scrutinizing financial reports and ensuring compliance with standard operational procedures. Additionally, the PAC can hold public hearings to investigate financial discrepancies and management practices, issue detailed reports with actionable recommendations and monitor the implementation of these recommendations. By identifying and addressing irregularities, promoting good governance practices and fostering a culture of ethical behavior, the PAC plays a pivotal role in safeguarding public resources, reducing corruption and ensuring that public funds are used efficiently and effectively for the benefit of all stakeholders.

Moving forward, it is recommended that future studies explore whether the composition of PAC committees, including factors like gender representation, political party affiliations of committee members, as well as their education and professional backgrounds, influences the issues raised and the government's responses. Furthermore, detailed research should be conducted to assess the effects stemming from each admonition outlined in the PAC reports.

Acknowledgment: The authors gratefully acknowledge the financial support from Research & Industrial Linkages (PJI) and Money-Laundering Research Group at UiTM Cawangan Melaka.

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Appendix 1
Agencies involved in the Public Accounts Committee (PAC) reporting 2019-2022.

	Amanah Raya Berhad
	1Malaysia People's Housing Programme Corporation Malaysia
	Attorney General's Chambers
	Audit Committee MM2H
	Central Bank of Malaysia
	Federal Territories Islamic Religious Council
	Federal Territories Ministry
	Immigration Department of Malaysia
	Khazanah Nasional Berhad
	Kuala Lumpur City Hall
	Malaysia Global Education Services
	Malaysia My Second Home Centre
	Malaysia Stadium Corporation
	Malaysian Administrative Modernisation and Management Planning Unit
	Malaysian Anti-Corruption Commission
	Management of the Malaysian Sports School (SSM) Perlis Project
	Marine Department of Malaysia
	Ministry of Agriculture and Food Industries
	Ministry of Communications and Multimedia Malaysia
	Ministry of Defence Malaysia
	Ministry of Domestic Trade and Consumer Affairs
	Ministry of Economic Affairs
	Ministry of Education Malaysia
	Ministry of Finance Malaysia
	Ministry of Health Malaysia
	Ministry of Home Affairs
	Ministry of Housing and Local Government
	Ministry of Human Resources
	Ministry of Science, Technology and Innovation
	Ministry of Tourism, Arts, and Culture
	Ministry of Transport Malaysia
	Ministry of Youth and Sports
	National Security Council
	Prime Minister's Department
	Royal Malaysian Customs Department
	The Ministry of Works

Appendix II

Issues Investigated by Public Accounts Committee (PAC) 2019-2022

1	Security Control Activities and Enforcement in Malaysian Maritime Zones
2	Control Activities Against Foreign Workers
3	Amanah Raya Berhad
4	MySejahtera Application
5	Losses in Investments of Khazanah Nasional Berhad (KHAZANAH) Under the Prime Minister's Department (JPM)
6	Management of Educational Malaysia Global Services (EMGS)
7	Public Marina Management
8	Management of Malaysia My Second Home Program (MM2H)
9	Management of redevelopment projects for existing facilities at the National Sports Complex
10	Management of the Malaysian Sports School (SSM) Perlis Project
11	Liquified Petroleum Gas (LPG) Subsidy Management
12	Sale of Land Owned by Kuala Lumpur City Hall (DBKL)
13	Expenditure Using Zakat Fund Distribution of the Federal Territories Islamic Religious Council (MAIWP)
14	Integrated Government Telecommunication Network Services (Mygov*Net)
15	Acquisition of Second-Generation Patrol Vessels - Littoral Combatant Ship (LCS)
16	Acquisition of Land Lot 41
17	COVID-19 Vaccine Acquisition
18	Film Production Incentive Program in Malaysia, National Film Development Corporation Malaysia (FINAS)
19	PR1MA Housing Projects
20	Road Charge Collection System (RC) and Foreign Vehicle Entry Record (VEP) System Project
21	Automatic Enforcement System (AES) Project

Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Assessing and Modelling Domestic Water Consumption Behavior

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Abstract: The UNICEF predicts severe water shortages and water scarcity worldwide. According to a water resources study conducted from 2000 to 2050, Malaysia is susceptible to potential water shortages in specific regions. These projections emphasized the importance of sustainable water management practices and proactive measures to mitigate potential water scarcity. It becomes crucial for Malaysia to implement effective strategies to address this issue. Therefore, this study aims to identify factors that influence sustainable water consumption behavior (SWCB) and establish a model for understanding consumer behavior in consuming water for domestic usage. Using the prominent theory of planned behavior (TPB) and reviewing the prior literature, this paper proposes a model to assess SWCB to understand consumer behavior on the water. This study found that attitudinal predictors significantly influence the SWCB. These predictors influence consumers' motivation, engagement, and views that may influence water intention and consumption behavior. Then, consumer intention mediates the relationship between attitudinal predictors and SWCB as it will evaluate consumers' favorable and unfavorable actions. Moreover, the model also found that socio-demographic traits (gender, household size, and income level) influence SWCB. These factors are the critical variables that significantly influence the SWCB. This paper contributes to policy implementation by modelling SWCB to help policymakers and urban planners develop effective policies and strategies to address water management challenges. By considering the drivers and barriers to sustainable behavior, policymakers can design targeted interventions, provide incentives, and implement regulations that promote water conservation at the household level.

Keywords: *Domestic Consumption, Sustainability, Sustainable Development Goals (SDGs), Water*

1. Introduction

Water is an important aspect of life. This precious resource is becoming increasingly imperative. It is reported that about four billion people worldwide are facing water scarcity (Leal Filho et al., 2022). It is also projected that about 1.8 billion people worldwide will face water shortage (Padder et al., 2023). Hence, responsible stewardship is required in water usage to guarantee long-term water resource viability for both the current and next generations.

The United Nations has shared a blueprint regarding Sustainable Development Goals (SDGs) to encourage peace as well as prosperity and tackle the issue of environmental preservation. Specifically, Goal 6 seeks to provide universal access to clean water and proper sanitation, while also promoting the responsible and long-term use of these resources. The objective is to achieve a substantial improvement in water usage efficiency across all sectors by 2030, while also guaranteeing sustainable freshwater withdrawals and supply to effectively address water scarcity and reduce the number of people impacted by it.

The SDG Report 2022 highlights that the 2030 Agenda for Sustainable Development and the existence of humanity are at significant risk owing to the interconnected and heightening problems (Sadoff et al., 2020). The Report emphasises the seriousness and scope of the issues we face. All of the SDGs are being impacted by the confluence of crises, which is dominated by COVID-19, climate change, and conflicts. The combination of these factors poses a substantial threat to the progress and implementation of the SDGs, highlighting the urgent need for coordinated and comprehensive action to address these interconnected challenges.

In addition, these crises are having a domino impact on several important domains, such as the provision of food security, education, the environment, society, and a great number of similar domains (Ortigara et al., 2018). The report outlines the years of progress in eliminating hunger and poverty, enhancing health and

education, delivering vital services, and other areas. Furthermore, the report stresses the importance of addressing the root causes of conflicts, promoting peace and stability, and fostering international cooperation. Undoubtedly, water is a critical resource that connects various landscapes, populations, and economic sectors. However, inadequate water management practices and increasing water demands have contributed to a global rise in water stress (Naik, 2017). This means that many regions are facing challenges in meeting their water needs due to scarcity, pollution or inefficient allocation and usage.

Furthermore, the effects of climate change, such as rising temperatures and altered precipitation patterns, exacerbate the situation (Hulme, 2005). Droughts and floods, increasingly frequent and severe in many regions worldwide, serve as prominent and tangible indicators of the escalating impacts of these challenges.

Droughts reduce water availability, affecting agriculture, ecosystems, and communities that rely on water for their livelihoods. Crop failures, livestock losses, and water shortages can lead to food insecurity, economic losses, and social unrest. On the other hand, floods can cause devastating damage to infrastructure, homes, and lives, leading to displacement, economic disruption, and loss of life. Understanding the trend of water resources and addressing water management issues effectively would promote sustainability and resilience in water resource management (Nikolaou et al., 2020).

Additionally, proactive efforts regarding climate change and conserving natural habitats are crucial to ensure water resource security. This includes transitioning to cleaner and more sustainable energy sources, promoting conservation and water-use efficiency measures, and encouraging awareness about water safety and stewardship (Lopez-Villalobos et al., 2022). Collective action at local, regional, and global levels is necessary to tackle these challenges effectively and ensure a sustainable and resilient water future for all.

Increasing urbanization and industrialization result in higher water requirements for domestic use, agriculture, manufacturing, and energy production (Anang et al., 2019; Flörke et al., 2013). The World Resources Institute (WRI) has examined fresh data from its aqueduct platform, demonstrating that home water consumption climbed by 600% between 1960 and 2014 despite slower growth in water withdrawals from other sectors (Novo, 2020). Additionally, improved public health and welfare standards often involve increased water usage for sanitation and hygiene purposes.

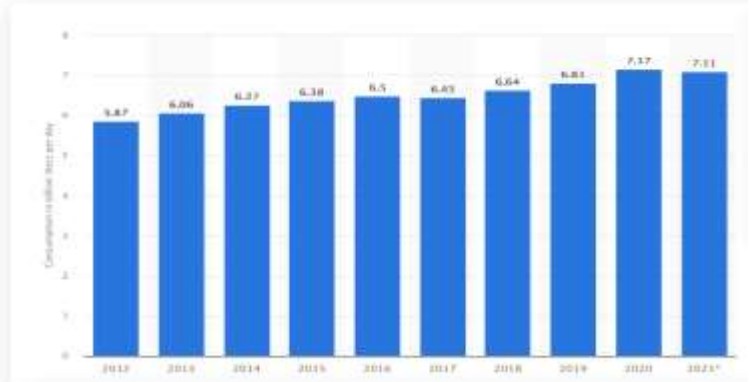
Predicting water use is essential to managing and planning for water resources. Building a highly accurate water consumption forecast model is crucial for advancing regional water resource planning and high-quality socio-economic development. To support the effective development of municipal infrastructure, adequate water demand forecasts are required due to the current water shortage. However, the rapid environmental and societal changes present a barrier to developing water consumption models (Garcés-Ayerbe et al., 2019).

Freshwater is in more demand than ever, and there is high competition for it due to rising food and energy crop demands. Due to this demand, there is now greater worry about water shortages and a decline in water quality brought on by agricultural practices (Hanafiah et al., 2019). Water demand is increasing alarmingly, causing intensity in water resource management. This puts high pressure on the water supply. This problem is intensified by the industrial activities, urbanisation and population growth. This further escalates the pressure on existing scarce water resources.

The projections from the Water Resources Study conducted for the years 2000 to 2050 highlight the expected water shortages in specific regions of Malaysia. A few states, including Perlis, Kedah, and Penang, are anticipated to face water scarcity ranging from 221 million to 246 million cubic meters (mcm). Similarly, Selangor and Melaka could experience water shortages of 1,000 mcm and approximately 200 mcm to 336 mcm, respectively.

In 2021, Malaysian domestic metered water usage accounted for about 7.11 billion litres. The figure is 5.87 billion litres in 2012. This reflects an increase of 1.24 billion litres, or about a 21% increase over 10 years (Statista, 2024). As for domestic water consumption, Peninsular Malaysia and Labuan recorded a home water consumption of 237 LCDs in 2022. Compared to 2018, the usage is only 225 LCDs. This shows an alarming increase of 12 LCDs or a 5.3% increase over 5 years (National Water Services Commission (SPAN), 2023).

Figure 1: Domestic water consumption metered water consumption in Malaysia from 2012 to 2021(in billion litres per day)



Source: Statista 2024. https://www.statista.com/statistics/796354/domestic-metered-water-consumption-malaysia/

If this is compared to the standard consumption set by the World Health Organisation (WHO), the figure diverges considerably. WHO recommended the usage of 165 LCDs. In 2022, this divergence accounted for a difference of 72 LCDs or about 44% higher than the recommended usage of WHO. Therefore, urgent effort is required to manage water resources effectively and also intensive promotion is needed towards water conservation practices to prevent water shortage and ensure sustainability (Khairi et al., 2022).

Figure 2: Malaysian domestic consumption per capita per day (LCD)

DOMESTIC CONSUMPTION PER CAPITA PER DAY (LCD)

Unit LCD	2018	2019	2020	2021	2022
Johor	216	222	229	232	216
Kedah	251	253	263	269	258
Kelantan	89	86	89	89	89
F.T. Labuan	179	179	168	202	196
Melaka	226	225	231	246	226
N.Sembilan	259	260	282	290	254
Pulau Pinang	278	281	301	308	307
Pahang	200	203	219	232	238
Perak	265	270	281	280	277
Perlis	313	315	306	313	276
Selangor	229	239	260	272	245
Terengganu	208	213	227	237	241
Pen. Malaysia & F.T. Labuan	225	230	244	251	237

Source: (National Water Services Commission, 2023); Water and Sewerage Fact Book 2022 page 45

Ultimately, it is of paramount importance to encourage water stewardship and sensible water usage. Understanding domestic water consumption behavior would provide reciprocal benefits to the water supplier and the consumers. Understanding the attitudinal predictors would improve water resource management and assist in identifying inefficiencies. Thus, corrective action and interventions could be designed to promote water savings and encourage more sustainable usage practices.

Additionally, water consumption has environmental implications, including energy consumption for water treatment and distribution, habitat degradation due to excessive water extraction, and the release of wastewater into ecosystems. Promoting sustainable consumption behavior can minimize these environmental impacts and help preserve water ecosystems and biodiversity.

Further, sustainable domestic consumption behavior models consider the linkages between water use and climate change. By promoting water conservation, reducing energy consumption related to water supply and treatment, and adopting practices that increase resilience to climate change impacts (such as drought), households can contribute to climate change mitigation and adaptation efforts.

Besides that, efficient and responsible water use would result in cost savings for households. Households can lower their water bills and achieve long-term savings by reducing water waste through behavioral changes and adopting water-saving technologies and practices. This is particularly relevant in areas where water prices are high or where water scarcity leads to increased costs for water supply (Jiang, 2009).

Promoting SWCB can have positive social and community impacts. A culture of sustainability can be built by raising awareness about water conservation and fostering a sense of responsibility among individuals and communities (Miller & Buys, 2008). This can strengthen community bonds, improve social cohesion, and contribute to communities' overall well-being and resilience (Franco & Tracey, 2019).

Finally, understanding SWCB's model helps policymakers and urban planners develop effective policies and strategies to address water management challenges. By considering the drivers and barriers to sustainable behavior, policymakers can design targeted interventions, provide incentives, and implement regulations that promote water conservation at the household level.

This paper assesses the various sustainable domestic consumption behavior models for water. It can serve as a resource for regional water consumption analysis and water resource planning and management. These models aim to understand and influence individual and household behaviors toward more efficient and responsible water use.

In addition, this paper also proposes a model to assess sustainable domestic consumption behavior for water by employing the prominent theory of planned behavior (TPB). This is crucial for promoting responsible water usage and achieving sustainable water management. This can offer valuable insights into the factors influencing individual behavior and choices. By understanding people's attitudes, subjective norms, and perceived behavioral control regarding water consumption, interventions and campaigns can be tailored to address specific barriers and promote sustainable practices effectively.

Specifically, about the local context, understanding the factors that influence water conservation behaviour is crucial because it helps us effectively promote sustainable water use and mitigate water scarcity risks. Hence, the citizens would conserve natural resources and safeguard ecosystems for future generations. This would ultimately contribute to achieving the WHO's recommended water consumption target of 165 LCDs and the 180 LCDs goal set by the National Water Services Commission (SPAN).

The remainder of the paper is as follows. The second section reviews the literature on the sustainable domestic water consumption behavior model. The third section describes the various sustainable domestic water consumption models. It then proposes a model based on the theory of planned behaviour, a prominent social psychology theory widely used to explain and predict human behaviour. Finally, discussions, conclusions, and limitations are elaborated in the final section. Recommendations are also made on the way forward for water sustainability.

2. Literature Review and Underpinning Theories

The second section reviews existing literature on sustainable domestic water consumption behaviour. It explores previous studies, research findings, and theoretical frameworks related to the topic. This section builds the knowledge base, identifies gaps in the current literature, and lays the groundwork for proposing a new model or approach.

Water Sustainability: Undeniably, for humans, water is a necessary resource. The global imbalance between supply and demand for water resources has worsened with economic development and population rise. In this regard, the demand for water resources is increasing due to factors like climate change, population growth, industrialization, and urbanization, while the limited water supply is being compromised by water pollution (Xu et al., 2020). The increasing gap between water supply and demand in recent years highlights the worsening problem of water shortage (An et al., 2021). Understanding this gap and its primary causes would significantly aid in developing an effective water protection strategy.

Freshwater is a finite resource, and because of the financial and social responsibilities that come with it, enterprises must control how it is used. The availability of freshwater resources and their equitable distribution across various sectors has become a frequent concern among decision-makers due to the effects of globalization, rapid population growth, urbanization, and climate change. Various environmental elements, including climate factors, impact water use.

Water is seen as a renewable resource with limitations. While water itself is constantly being recycled through the Earth's natural processes, the usable freshwater available to us is finite and limited (Qadri & Bhat, 2020). This is because most of the Earth's water is saline, making it unsuitable for human consumption or any other purposes without desalination, which is a resource-intensive process.

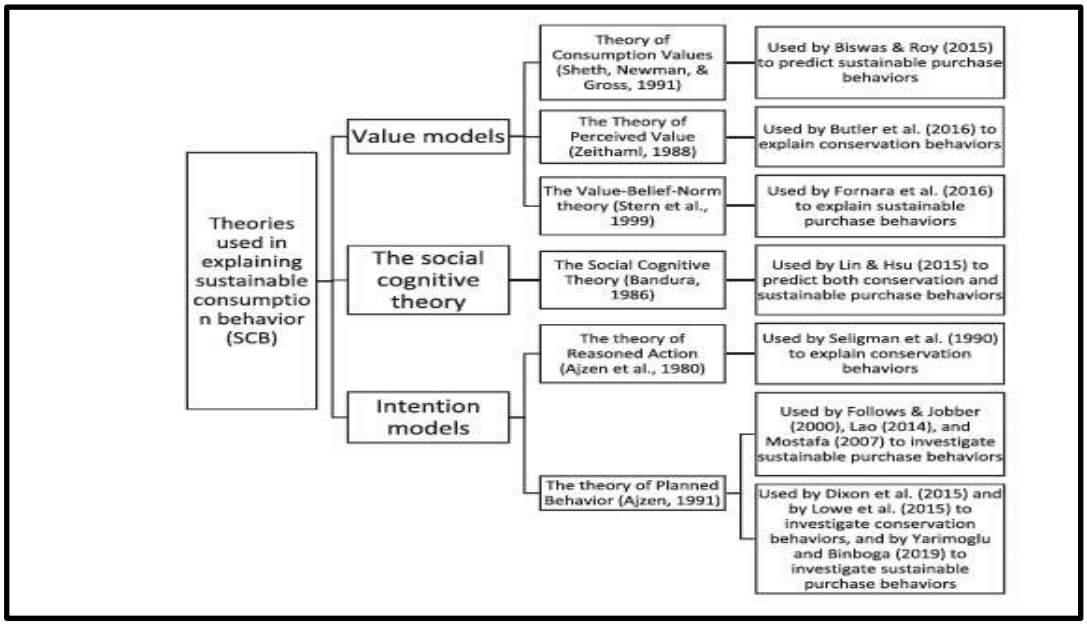
Water Consumption Pattern: Water consumption patterns refer to how water is used and consumed by individuals, households, industries, and other sectors. These patterns can vary depending on various factors, including geographic location, climate, cultural practices, socio-economic conditions, and access to water resources. The World Health Organization (WHO) defines domestic water as water used for all household purposes, including drinking, bathing, and food preparation.

As identified earlier, the domestic water consumption pattern in Peninsular Malaysia and the Federal Territory of Labuan is increasing. The levels of usage in 2018 and 2022 were 225 LCDs and 237 LCDs, respectively. This is extremely high compared to the WHO's recommendation of 165 l/c/d and the 180 LCDs target set by the National Water Services Commission (SPAN) for 2020.

Typically, the understanding of domestic water consumption patterns can assist households in identifying opportunities for water conservation, reducing wastage, and promoting sustainable water use practices. By adopting water-saving measures and technologies, individuals can contribute to water conservation efforts, reduce water bills, and ensure the long-term availability of this vital resource (Novo, 2020).

Behavioral Influence: A Conceptual Framework: The behavioral influences on water consumption refer to the factors that shape and affect how individuals and households use water. Understanding these influences is crucial for promoting sustainable water consumption practices. According to Marzouk and Mahrous (2020), sustainable consumption behavior can be analyzed using three primary models: value models, social cognitive theory, and intention models. For this study, the intention model is being adopted as it better suits the individual motivation and commitments to water conservation that further drive behavioral change. Finally, it can influence individuals to protect the environment and adopt water-saving habits. The intention model is based on two main theories: reasoned action theory (TRA) and planned behavior theory (TPB).

Figure 3: Theories used in explaining sustainable consumption behavior



Source: Marzouk and Mahrous (2020): Theories employed to explain sustainable consumption behavior

Theory of Reasoned Action: The theory of reasoned action (TRA), developed by Martin Fishbein and Icek Ajzen in the late 1960s, is a social psychology theory. It aims to elucidate and forecast human behavior by considering an individual's attitudes and subjective norms. According to the theory of reasoned action, people's behaviour is guided by their intentions, which are influenced by two primary factors which are their attitudes toward the behaviour and the subjective norms surrounding the behaviour.

Attitude (ATT) pertains to an individual's positive or negative evaluation of participating in a specific behavior. This evaluation is shaped by their beliefs about the outcomes of the behavior and their assessment of those outcomes (Untaru et al., 2016). Positive attitudes towards a behavior enhance the likelihood of intending to perform that behavior, whereas negative attitudes diminish it.

Subjective norms (SN) denote an individual's perception of societal influence to either engage or refrain from behavior (Goldenhar & Connell, 1993). It encompasses the person's beliefs about whether important others think they should engage in the behavior and the person's motivation to comply with those beliefs. Subjective norms play a crucial role in shaping intentions, as individuals tend to be more inclined to engage in a behavior if they perceive it to be expected or socially approved by others (Minton et al., 2018).

The TRA posits that intentions are the best predictor of behavior. The stronger an individual's intention to perform a behavior, the more likely they are to engage in that behavior. However, intentions are not the sole determinant of behavior, as other factors such as external constraints or limitations may also come into play (Corbett, 2002).

The TRA has been widely used in various fields to study and predict human behavior, such as health behaviors, consumer behavior, and social behavior. It has also laid the groundwork for the development of other theories, such as the theory of planned behavior (TPB), which incorporates the additional factor of perceived behavioral control. In summary, the TRA offers a framework for understanding how attitudes and subjective norms influence human behavior, highlighting the significance of incorporating both individual beliefs and social influences.

Theory of Planned Behavior (TPB) The TPB developed by Icek Ajzen is a social psychology theory that extends the earlier theory of reasoned action. It seeks to elucidate and forecast human behavior by incorporating three primary factors: attitudes, subjective norms, and perceived behavioral control.

It is important to note that the TPB expands on the TRA by adding the factor of perceived behavioral control. This addition highlights the importance of considering factors beyond attitudes and subjective norms that can affect an individual's capability to engage in a behavior (Koop et al., 2019).

Attitude (ATT) is similar to TRA, which refers to an individual's positive or negative assessment of engaging in a specific behavior. It includes the individual's beliefs regarding the consequences of the behavior and their assessment of those consequences. Positive attitudes toward a behavior enhance the likelihood of intending to perform that behavior, whereas negative attitudes decrease it (Sharma & Foropon, 2019).

Following the TRA framework, subjective norms (SN) describe an individual's perception of societal pressure to either participate in or abstain from specific behavior. It encompasses the individual's beliefs about what influential others expect them to do and their willingness to conform to those expectations. SN shapes intentions, as individuals are more inclined to intend to engage in a behavior if they perceive it as socially expected or endorsed.

Perceived behavioral control (PCB) was introduced as an additional factor in the TPB, indicating an individual's perception of the ease or difficulty of performing a behavior. This perception considers internal and external factors affecting behavior, including personal capabilities, resources, and situational constraints. Higher PCB enhances the likelihood of intending to engage in a behavior.

Intentions are seen as the immediate precursor to behavior in the TPB. The theory posits that the stronger an individual's intention to engage in a behavior, the greater the likelihood of them performing that behavior. However, the theory also acknowledges that behavioral intentions can be influenced by additional factors such as habits, past behavior, and external constraints (Ahmmadi et al., 2021).

The TPB has been extensively applied to comprehend and forecast various behaviors, encompassing health-related, environmental, and organizational behaviors. It provides a comprehensive framework integrating cognitive, social, and control factors in shaping human behavior.

For this study, TPB is employed to forecast an individual's intention to adopt sustainable water consumption behaviors. In this context, behavior is considered the primary outcome of behavioral intention, which is influenced by the individual's attitude toward the behavior, beliefs about societal norms (subjective norm), and perceptions of the ease or difficulty of behavior change (perceived behavioral control or self-efficacy). This well-established theory posits that individuals decide their behavior after considering available options.

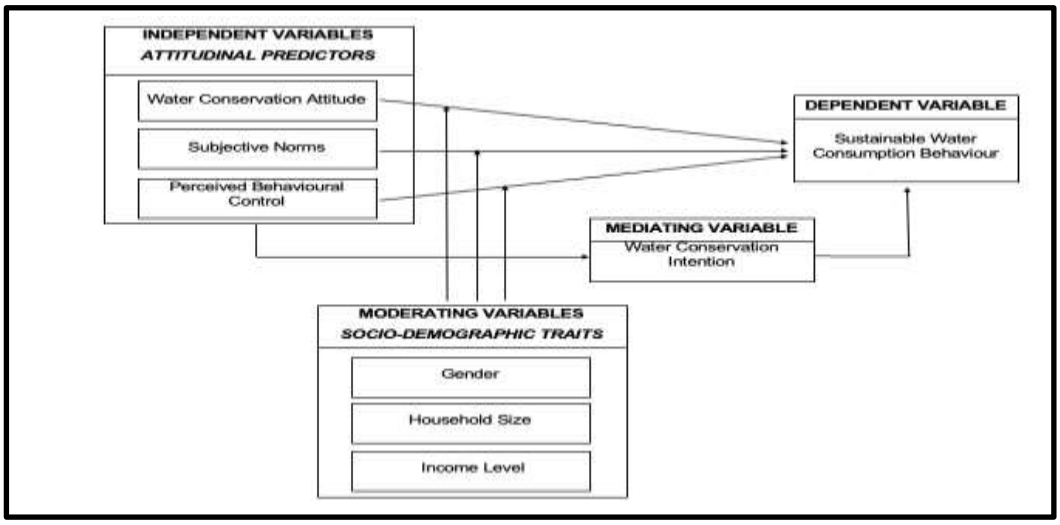
3. Models on Water Consumption

Water consumption models are vital instruments for comprehending and forecasting water utilization patterns in diverse settings, including residential, agricultural, industrial, and urban environments. These models usually include a few factors, such as population increase, economic activities, climate conditions, technological improvements, and policy changes. They assist in predicting future water demand, recognizing possible deficits, and assessing the efficacy of water conservation tactics (Wang et al., 2014).

The TPB offers a psychological framework for predicting and comprehending individual and household water usage patterns. The TPB suggests that an individual's actions are directly impacted by their intention to carry out those actions. This intention was influenced by three crucial factors namely: (1) attitudes - ATT, (2) subjective norms - SN, and (3) perceived behavioral control - PCB. By incorporating these elements, a water consumption model based on the TPB may forecast the likelihood of individuals adopting water-saving behaviors. For instance, a household that has favorable views towards water conservation senses substantial social backing for such actions and possesses confidence in its capacity to adopt water-saving strategies is more inclined to decrease its water consumption (Gregory & Leo, 2003).

This methodology can be utilized to develop focused interventions to encourage water conservation. Possible strategies could involve implementing educational campaigns to boost positive attitudes, establishing community programs to build subjective norms, and providing resources and tools to improve perceived behavioral control (Corral-Verdugo et al., 2003). The TPB-based strategy provides a comprehensive approach to promoting sustainable water use practices by addressing the psychological factors influencing behavior.

Figure 4: Sustainable water consumption behavior (SWCB) model



Source: Developed by authors

4. Findings and Discussion

Underlying the TPB models and collections from prior studies, this study presents a new model that indicates SWCB in Figure 1. Three attitudinal predictors (ATT, SN, and PCB) are included as the independent variables in sustainable water consumption behavior (SWCB) analysis. In addition, the model also tested the socio-demographic traits at the moderating variable between the attitudinal predictor and SWCB.

The first factor that influences the SWCB is the consumer's attitudes. ATT is crucial as it determines motives for conserving water (Corral-Verdugo et al., 2003). According to De Bruijn (2010), ATT is formed of two different components, which are emotional and cognitive. Based on Hassell and Cary (2007), consumers' attitudes and beliefs have been shown to positively influence SWCB, which is related to water demand. However, Aitken et al. (1994) found that attitudes negatively affect water consumption behavior.

The second factor that influences the SWCB is subjective norms (SN). The SN relates to the person's social pressure to engage or refrain from engaging in a certain behavior, such as water consumption (Ajzen, 1991; Trumbo & O'Keefe, 2001). SN is defined as perceived external approbation or behavior expectations on water (Armitage & Conner, 2001). SN has a positive influence on intentions to consume water. Nevertheless, the SN appears to have negatively influenced the consumers' intention to consume water (Yazdanpanah et al., 2016).

Then the third factor is perceived behavioral control (PCB). The PCB is defined as people's view of the simplicity and difficulty of carrying out the behavior of interest (Ajzen, 1991). Studies by Shahangiana et al. (2021) believed that PCB positively affects consumer's behavioral intentions. Conversely, Marzouk and Mahrous (2020) found that PCB negatively affects water consumption behavior since other factors can impact water consumption behavior.

Based on the model in Figure 4, water conservation intention is the mediating variable that will mediate the relationship between attitudinal predictors and SWCB. Intention indicates a favorable or unfavorable evaluation of a person's behavior in a particular circumstance (Kaiser & Scheuthle, 2003). This tells that the

way people consume water is a representation of their intentions. Intention predicts consumer's behavior to control their behavioral actions (Fishbein & Ajzen, 2011).

Moreover, this study employs socio-demographic traits as the moderating variables for the model. The socio-demographic traits consist of gender, household size and income level. Gender not only focuses on the literal meaning of women's and men's viewpoints. Other than that, their status, responsibilities, rights, and involvement in many areas are also considered. Gender diversity differs significantly when considering obtaining water resources (Upadhyay, 2005), consuming water (Caruso et al., 2015) and decision-making and policies (Kholif & Elfarouk, 2014). Next, household size can be explained when describing sustainable consumption behaviors. According to Knuth et al. (2018), household size can explain water consumption. The larger families tend to consume more water than the smaller ones since they use appliances that consume water more frequently.

In addition, Ramsey et al. (2017) stated that income, social norms, age and self-efficacy positively impact water consumption behavior. Level income can either reduce or increase water consumption depending on a person. A higher-level income might purchase more energy-efficient appliances that can save more water but habitually use the appliance more frequently. However, a lower-level income might not purchase energy-efficient appliances but have a habit of using the appliances less frequently (Shan et al., 2015).

Overall, attitudinal predictors measures by ATT, SN, and PCB significantly influence the SWCB. These predictors influence consumers' motivation, engagement, and views that may influence water intention and consumption behavior. Furthermore, consumer intention could mediate the relationship between attitudinal predictors and SWCB as it will evaluate consumers' favorable and unfavorable actions. Besides that, the model also found that socio-demographic traits, including gender, household size, and income level, influence SWCB. These traits could strengthen or weaken the direct relationship between institutional predictors and SWCB. Therefore, the attitudinal predictor, intentions, and socio-demographics are the critical variables significantly influencing water consumption behaviour to ensure sufficient water for the next generation.

5. Conclusion

The Water Resources Study for 2000 to 2050 projected the expected water shortages in specific regions of Malaysia. The northern states of Perlis, Kedah, and Penang are anticipated to face a water shortage ranging from 221 million to 246 million cubic meters (mcm). Similarly, Selangor and Melaka could experience water shortages of 1,000 mcm and approximately 200 mcm to 336 mcm, respectively. These projections and issues are important to mitigate potential water scarcity in the future. Therefore, this study aims to identify the variables that could influence and affect consumer behavior when consuming water.

It suggests exploring the motivations, attitudes, and external factors that shape people's intention to conserve water. The TPB served as the basis for understanding the relationship between attitudinal predictors and water consumption behavior. Then, consumer intention could mediate the relationship between attitudinal predictors and SWCB as it will evaluate the consumer's favorable and unfavorable actions. Besides that, the model also found that socio-demographic traits, including gender, household size, and income level, influence SWCB.

By understanding these factors, the research aims to provide insights and contribute to promoting and encouraging SWCB for a more sustainable future. Furthermore, raising awareness of the importance of water conservation can encourage responsible water use. Then, it could have an impact on individual and collective actions. This study contributes to the body of knowledge by introducing the framework on the water. This study could help other researchers in the field of water consumption across the countries. By implementing sustainable practices and managing water resources effectively, we can work towards securing water availability for current and future generations, even in the face of growing demands.

This study also contributes to policy implementation by having collaborative efforts at local, national, and international levels. The government at all levels could collaborate by providing education and outreach programs that can promote behavioral changes and instill a culture of water stewardship in communities and

industries (Flores et al., 2022). By examining the drivers and motivations associated with SWCB, this study aims to contribute to developing effective interventions and policies for achieving sustainable water resource management. By leveraging and applying the model, behavioral changes that contribute to a more sustainable and resilient water future would be encouraged.

Acknowledgment: The authors gratefully acknowledge the support and financial assistance from the Ministry of Higher Education via the Fundamental Research Grant Scheme (FRGS) (FRGS/1/2022/SS01/UITM/02/40) to conduct this study. The authors thank Universiti Teknologi MARA for their support in conducting this study.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Exploring How Sustainability Development Goals (SDGs) Influence Market Returns for Malaysian Listed Firms

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Abstract: The significance of SDGs lies in their ability to offer a comprehensive structure for tackling worldwide issues and advancing sustainable development in the realms of economy, society, and the environment. This study aims to investigate the relationship between SDGs and market returns. The final data sample of 74 firms was collected from the firm website and Eikon database from 2021-2022. The research reveals that although SDGs and market returns have no statistically significant relationship, a positive impact indicates potential appeal to investors. Moreover, adhering to SDGs demonstrates social responsibility and can yield regulatory advantages, potentially shaping frameworks and offering investors a sense of assurance in the face of environmental apprehensions. Conducting comparative studies in various geographical and market contexts, as well as longitudinal studies that monitor SDG initiatives and market returns, has the potential to deepen our comprehension of how regional disparities and economic cycles impact the connection between SDGs and market performance. Additionally, examining sector-specific intricacies may reveal industry-specific obstacles and prospects in aligning with SDGs to enhance financial performance.

Keywords: *Sustainability, stock performance, disclosure*

1. Introduction

The SDGs are a comprehensive and inclusive initiative aimed at eradicating poverty, safeguarding the environment, and promoting prosperity for all individuals by the year 2030 (Pedersen, 2018). The 17 SDGs, formulated by the United Nations in 2015, cover various interrelated social, economic, and environmental objectives to tackle significant global concerns. Originally designed as a framework for governmental bodies and international organizations, the SDGs have gained significant relevance for businesses and investors that aim to align their operations with the ideals of sustainable development. Consequently, comprehending the relationship between the SDGs and market returns has garnered significant attention and significance among the financial community.

The SDGs offer a comprehensive framework for achieving sustainable development, encompassing various domains, including poverty reduction, education, gender parity, renewable energy, and climate mitigation, among other topics (Veleva, 2021). The attainment of these objectives necessitates collaborative endeavors from various entities, encompassing governmental bodies, enterprises, non-governmental organizations, and the financial industry. Businesses are crucial in promoting the SDGs through their activities, supply networks, goods, and services. Firms may contribute to achieving the SDGs and create long-term value for shareholders and stakeholders by incorporating sustainability concepts into their business strategy and operations.

The Malaysian government promotes sustainable business practices by implementing rules and activities encouraging enterprises to align with the SDGs (Isa et al., 2021). An example of these endeavors involves the integration of sustainability reporting obligations inside regulatory structures, as shown in Bursa Malaysia's directive for publicly traded firms to provide sustainability reports. Furthermore, the government offers various incentives, subsidies, and assistance programs to encourage firms to embrace sustainable practices and actively contribute towards attaining the SDGs. Moreover, partnerships among the government, corporate sector, and civil society organizations promote the exchange of knowledge, the enhancement of skills and abilities, and the establishment of optimal methods to expedite advancements toward sustainable development

in Malaysia. The government actively involves corporations in promoting the SDGs, thereby cultivating a culture of corporate responsibility and sustainability throughout the Malaysian business environment.

Although Bursa Malaysia requires firms to reveal SDG achievement in annual reports the decisions about achieving sustainability development targets are up to individual firms (Bakar et al., 2019). Nevertheless, not all firms choose not to reveal these objectives, resulting in a lack of openness. The need for more transparency surrounding a firm's sustainability activities gives rise to apprehensions over the appropriate evaluation of these practices and their possible influence on market returns. Lack of thorough transparency prevents investors and stakeholders from obtaining crucial information necessary for assessing a firm's sustainability information, such as environmental and social performance, hence impeding their capacity to make well-informed decisions. These findings highlight the significance of implementing standardized and transparent reporting methods to foster accountability and encourage the adoption of sustainable practices within the Malaysian market return.

This lack of transparency information creates asymmetry and compounds the challenges investors face in understanding and evaluating the link between sustainability efforts and market performance. Information asymmetry refers to an imbalance in access to relevant information between different parties involved in financial transactions. Non- disclosure, or the intentional withholding of crucial information, adds another layer of complexity. Consequently, the possibility of being duped by better-informed parties makes investors wary of making investments in the market (Fuhrmann, 2019). Investors may lack comprehensive data for making well-informed decisions in a landscape where some firms choose not to disclose key sustainability practices or performance metrics. This lack of transparency introduces uncertainties, which may make it difficult for investors to assess the true sustainability impact of their investment decisions accurately.

From an investor's standpoint, the SDGs information provides a structure for evaluating the sustainability achievements of enterprises and recognizing investment prospects that align with SDGs (Yaşar, 2021). Firms that successfully tackle difficulties related to SDGs are frequently in a more advantageous position to mitigate risks, attract customers, and exploit market possibilities. Furthermore, with the increased recognition of the SDGs among consumers, regulators, and investors, there is a mounting demand for enterprises to exhibit their dedication to sustainable development. Consequently, there is an increasing need to incorporate sustainability factors and impact investing, in which investors aim to achieve favorable social and environmental results in addition to financial gains. Therefore, the SDGs serve as a moral obligation and present a substantial prospect for businesses and investors to generate wealth while positively impacting a more sustainable and equitable global society.

2 Literature Review

Signalling theory

In signaling theory, the relationship between SDGs and stock market results is connected. This theory recommends companies that align their actions with the SDGs can show possible investors that they are committed to doing business in a way that is sustainable and socially responsible (Dinçer, 2024). As a result, these companies are more likely to attract socially conscious investors, leading to higher stock market returns.

Signaling theory posits that companies that integrate the SDGs into their operations can demonstrate their long-term sustainability and resilience, making them more attractive to investors (Dinçer, 2024). The SDGs include a broad spectrum of concerns, including climate change, social injustice, and responsible consumption, all of which are critical determinants of a company's long-term prosperity. This is because SDGs cover a broad spectrum of concerns, including climate change, social injustice, and responsible consumption, all of which are crucial elements that might influence a company's long-term prosperity. Hence, by proactively tackling these concerns, corporations can demonstrate their capacity to adjust and flourish in response to evolving societal and environmental expectations, ultimately resulting in increased stock market returns. In essence, signaling theory emphasizes the significance of connecting corporate practices with the SDGs to attract socially conscious investors and attain sustainable long-term growth in the stock market.

Sustainability Development Goals (SDGs) and Market Return

There are several ways in which the SDGs and Market Return are connected. The research conducted by Hansen et al., (2022) reveals that firms that actively strive to achieve objectives associated with the SDGs have superior performance compared to their counterparts in terms of innovation, market share, and financial returns. Their capacity to meet the increasing demand for products and services that are both of high quality and socially and environmentally responsible is the reason for this. Additionally, the study emphasizes that these firms frequently encounter heightened brand loyalty and reputation, as customers progressively prefer supporting enterprises that align with their beliefs and address global difficulties. Firms are reconsidering their operations, product development, and marketing strategies to ensure they align with the SDGs due to the increasing customer preference for sustainability. As a result, firms that successfully integrate these objectives into their fundamental business strategies are making valuable contributions to worldwide endeavors aimed at tackling urgent societal and environmental concerns. They are also strategically positioning themselves in a competitive market, ensuring immediate and long-term financial benefits. The presented evidence indicates that aligning with SDGs is not solely a matter of moral obligation but rather a smart business decision that has the potential to provide substantial economic benefits.

According to Bonfanti et al., (2023), firms that actively incorporate SDGs into their business practices not only anticipate and tackle potential regulatory obstacles but also substantially decrease the probability of encountering negative reactions from consumers. Adopting a proactive stance towards sustainability cultivates a favorable public perception and brand allegiance, both of which are essential for sustaining a competitive advantage. Furthermore, the aforementioned study underscores the relationship between sustainable practices and investor confidence, emphasizing that investors are progressively attracted to firms that exhibit a dedication to environmental stewardship and social responsibility. This is mainly due to the perception that these firms are more equipped to handle future challenges and regulatory changes, making them a more secure investment. Moreover, through the alignment with SDGs, enterprises can access novel market prospects and sources of income, such as environmentally friendly technologies and sustainable products, resulting in enhanced market profitability. The incorporation of sustainability into corporate strategy functions as a protective measure against diverse dangers while simultaneously stimulating financial expansion and fostering innovation. This symbiotic relationship yields advantages for enterprises, society, and the environment in equal measure.

According to Seva-Larrosa et al., (2023), firms that actively participate in practices related to SDGs not only achieve improved access to capital but also experience reduced borrowing costs. This is because firms that prioritize sustainability and social responsibility are seen as having lower risk and more operational stability, making them more attractive to lenders and investors. Moreover, their research indicates that these enterprises frequently observe a substantial enhancement in their market valuation. The increase in value can be ascribed to the expanding group of investors who prioritize Environmental, Social, and Governance (ESG) considerations when making investment choices. These investors are increasingly allocating their funds to firms that are dedicated to the SDGs, acknowledging the enduring worth and diminished risk profile linked to sustainable business practices. Therefore, through the alignment of their strategies with the SDGs, firms not only make a valuable contribution to global endeavors aimed at addressing urgent challenges but also enhance their appeal as investment opportunities, potentially resulting in increased market returns (Seva-Larrosa et al., 2023). This research strongly affirms the idea that sustainable development is not only a moral duty but also a strategic necessity that can greatly impact a firm's financial performance and appeal to investors.

The incorporation of SDGs into firm plans yields favorable consequences not just for society and the environment but also serves as a stimulus for fostering innovation and enhancing operational efficiency. Awan (2021) provides more insight into this viewpoint by emphasizing the industry's pivotal role in driving sustainable development through the use of innovative approaches in products, services, and business models. The pursuit of sustainability requires a comprehensive reconsideration of resource utilization, arguing for a transition towards technologies and processes that are more sustainable, characterized by less waste and enhanced energy efficiency. The decision to transition is not solely driven by ethical considerations but rather by strategic factors contributing to increased production and decreased operational expenses. Through the optimization of resource utilization and the minimization of waste, firms can attain a more streamlined and adaptable operational framework, resulting in not only financial savings but also a decrease in environmental

footprint. In addition, he (Awan, 2021) highlights the significance of these innovative practices as fundamental to achieving sustainable development. These practices serve as the basis for endeavors in diverse sectors to establish sustainable and resilient infrastructures. Therefore, achieving SDGs motivates enterprises to adopt technical developments and new strategies that support the global sustainability agenda and improve their market competitiveness, profitability, and long-term sustainability.

There is a positive relationship between the transparent integration of SDGs into a firm's fundamental business objectives and the cultivation of trust and loyalty among consumers, investors, and employees (Trends, 2017). Trust is derived from the firm's dedication to ethical principles and its proactive involvement in tackling worldwide issues, which aligns with the increasing customer desire for corporate accountability. Furthermore, through the alignment of firm operations with SDGs, firms showcase their ability to effectively manage risks and ensure long-term sustainability, thus enhancing their appeal as investment prospects. In contrast, there is a growing trend among employees to actively pursue employment that aligns with social and environmental goals. Consequently, firms that prioritize SDGs are more likely to attract and retain highly skilled individuals. The convergence of interests across diverse stakeholders enhances a firm's standing and bolsters its managerial adaptability. In a market characterized by frequent upheavals, firms that demonstrate adaptability and creativity through their dedication to SDGs have a competitive advantage. This enables them to effectively traverse problems and capitalize on opportunities. Hence, emphasizing SDGs not only aligns with the worldwide objective of promoting sustainable development but also ensures a firm's long-term value generation and market significance. In addition to making contributions to the global sustainability agenda, businesses can also boost their market competitiveness, profitability, and long-term viability.

3. Method and Data Collection

Sample Description and Data Collection

From Table 1 below, the initial sample for this study was 87 firms. However, some of these firms needed complete data. This means that 74 firms have enough complete data that is needed for this study. 13 firms were taken out from the initial sample. The sample represents the population if it contains at least 30 firms (Keller & Warrack, 2005). The firm selection ensures a broad representation of the market, providing insights into the diverse nature of industries in Malaysia. All financial data for the study were gathered from Datastream, a large financial database, while non-financial data were collected from the firm website. Given the dynamic nature of markets and the increasing emphasis on sustainability in contemporary business practices, the time frame of 2021 and 2022 allows for a current and relevant analysis.

Table 1: Summary of the sample

	Industrial sectors across all industries
Initial sample	87
Minus: firms that have insufficient data	(13)
The sample that has available data	74

Regression model

Regression modeling is a statistical methodology employed to establish a mathematical representation of the relationship between a dependent variable and one or more independent variables. Its primary objective is to forecast the dependent variable's value by utilizing the independent variables' values. The following is a list of the regression models used in this study:

Baseline model:

$$MRit = \beta_0 + \beta_1 SGDs_{it} + \beta_2 Control_variables + \varepsilon it$$

Where:
MR = Market Return
SDG = Sustainability Development Goals
Control_variables = Control Variables

Measurement of Variables

Market return

The market return is measured based on the dividend percentage and the difference in stock prices between P0 and P1.

$$\text{Market Return} = \%\ \text{dividend} + (P1 - P0)/P0$$

Where: -

% Dividend	=	This is the dividend yield, which is the annual dividend income expressed as a percentage of the stock's current market value.
P1	=	The stock price at a later point in time (for example, the closing price at the end of a specified period).
P0	=	The stock price at an earlier time point (for example, the closing price at the start of the specified period).

Sustainability Development Goals (SDGs)

In this research, SDGs is a dichotomous variable coded "1" if the firm discloses every sustainability development goals item and coded "0" if it does not, as stated in Table 2. From above, this research came out with an equation:

$$SDGs_i = \sum X_i$$

Where n_i = number of items expected for *I* firm, $n_i \leq 17$

X_i = 1 if the item is disclosed, whereas 0 if the item is not disclosed.

So that $0 \leq SDGs_i \leq 17$

Table 2: Sustainability Development Goals Items

No	Sustainability Development Goals Item
1	No Poverty: End poverty in all its forms everywhere.
2	Zero Hunger: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
3	Good Health and Well-Being: Ensure healthy lives and promote well-being for all at all ages.
4	Quality Education: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5	Gender Equality: Achieve gender equality and empower all women and girls.
6	Clean Water and Sanitation: Ensure availability and sustainable management of water and sanitation for all.
7	Affordable and Clean Energy: Ensure access to affordable, reliable, sustainable, and modern energy for all.
8	Decent Work and Economic Growth: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
9	Industry, Innovation, and Infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
10	Reduced Inequality: Reduce income inequality within and among countries.
11	Sustainable Cities and Communities: Make cities and human settlements inclusive, safe, resilient, and sustainable.

12	Responsible Consumption and Production: Ensure sustainable consumption and production patterns.
13	Climate Action: Take urgent action to combat climate change and its impacts.
14	Life Below Water: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
15	Life on Land: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.
16	Peace, Justice, and Strong Institutions: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.
17	Partnerships for the Goals: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Control Variables

Firms size

The amount of assets a particular firm has determines its size. Compared to smaller firms, large firms start more activities that impact society.

The following are the measurement corporate sizes:

$$\text{Size} = \log10\ (\text{total assets})$$

Leverage (LEV)

Leverage is described as the percentage change in earnings that is connected to a one percent increase in the number of production units (Alaghi, 2011). Leverage is determined by using the formula: -

$$\text{LEV} = \text{Total Debt} / \text{Total Equity}$$

Liquidity (LIQ)

The current ratio measures a firm's ability to cover its short-term obligations with its short-term assets. It indicates a firm's liquidity and ability to meet its short-term financial obligations (Eljelly, 2004).

$$\text{LIQ} = \text{Current Assets} / \text{Current Liabilities}$$

Return on asset (ROA)

The ROA formula is a financial ratio that measures a firm's profitability by evaluating how efficiently it uses its assets to generate earnings (Andesfa & Masdupi, 2019).

$$\text{ROA} = \text{Net income} / \text{Average total assets}$$

4. Results and Discussion

Descriptive statistics

Table 3: Descriptive statistics

Variables	Minimum	Maximum	Mean	Std. Deviation
MR	-0.54	3.07	0.0833	0.449
SDG	2	17	10.709	3.194
LEV	0	4.906	0.728	0.889
LIQ	0.425	18.17	2.567	2.669
ROA	-0.11	0.453	0.037	0.082
SIZE	8.196	11.26	9.503	0.748

The variables presented in the table provide key insights into various aspects of the firms included in the study. The SDGs variable ranges from a minimum of 2 to a maximum of 17, with a mean value of 10.709, indicating a significant commitment to sustainable development initiatives on average. The minimum value recorded for market returns (MR) is -0.54, indicating that the worst observed market return resulted in a loss of 54%. Conversely, the maximum value is 3.07, suggesting that the best-observed market return resulted in a gain of 307%. On average, the market returns are approximately 0.0833 or 8.33%, which means that over the period considered, the average market performance resulted in a positive return of 8.33%. The Leverage (LEV) variable ranges from 0 to 4.906, with a mean value of 0.728, suggesting a moderate level of financial leverage across the sample. Liquidity (LIQ) ranges from 0.425 to 18.17, with a mean value of 2.567, reflecting a moderate level of financial stability overall. Return on Assets (ROA) ranges from -0.11 to 0.453, with a mean value of 0.037, indicating a positive but relatively modest return on assets on average. Lastly, the Size variable ranges from 8.196 to 11.26, with a mean value of 9.503, representing the typical size of companies within the dataset. These statistics offer a comprehensive overview of the various financial and sustainability aspects observed across the firms in the study.

Correlation Coefficient

Table 3 summarizes the correlation between the independent, control, and dependent variables. It illustrates the relationship between sustainability development goals (SDGs), leverage (LEV), liquidity (LIQ), return on assets (ROA), and firm size (SIZE) is related to market return (MR).

SDGs have a significant positive correlation with SIZE (Pearson Correlation = 0.167, p = 0.078) at 10%. Thus, SDGs significantly correlate with LEV (Pearson Correlation = 0.23, p = 0.424) at 5%. This indicates a slight tendency for firms with higher commitment to SDGs to be larger. Thus, there is no significant correlation between SDGs and other variables (LEV, LIQ, ROA, and return). The p-values for these correlations are greater than 0.05, suggesting that the observed correlations could be due to random chance.

Regarding control variables, LEV has a significant positive correlation with SIZE (Pearson Correlation = 0.206, p = 0.039) at 5%, indicating that larger firms tend to have slightly higher leverage. Meanwhile, LEV significantly correlates negatively with LIQ (Pearson Correlation = -0.371, p = 0.001) and MR (Pearson Correlation = -0.310, p = 0.004) at 1%. This implies that higher leverage is associated with lower liquidity and lower returns.

LIQ has a significant negative correlation with SIZE (Pearson Correlation = -0.314, p = 0.003) at 1%. This suggests that firms with higher liquidity tend to have lower leverage and be smaller in size. There is no significant correlation between LIQ and other variables (SDGs, ROA, and MR). ROA has a significant positive correlation with return (Pearson Correlation = 0.499, p = 0.001) at 1%, indicating that firms with higher returns on assets tend to have higher returns in the market. There is no significant correlation between ROA and other variables (SDGs, LEV, LIQ, and SIZE).

Thus, SIZE has a significant negative correlation with MR (Pearson Correlation = -0.248, p = 0.017) at 5%, implying that larger firms tend to have lower returns in the market.

Table 4: Pearson's Correlation Coefficient Test

Variable		SDGs	LEV	LIQ	ROA	SIZE	MR
SDGs	Pearson Correlation	1.000					
	Sig. (1-tailed)	------					
LEV	Pearson Correlation	0.023	1.000				
	Sig. (1-tailed)	0.424	------				
LIQ	Pearson Correlation	-0.031	-.371**	1.000			
	Sig. (1-tailed)	0.397	0.001	------			
ROA	Pearson Correlation	-0.001	-.214*	0.054	1.000		
	Sig. (1-tailed)	0.496	0.034	0.323	------		
SIZE	Pearson Correlation	0.167	.206*	-.314**	-0.038	1.000	
	Sig. (1-tailed)	0.078	0.039	0.003	0.373	------	
MR	Pearson Correlation	-0.026	-.310**	0.05	.499**	-.248*	1.000
	Sig. (1-tailed)	0.413	0.004	0.335	0	0.017	------

**. Correlation is significant at the 0.01 level (1-tailed), *. Correlation is significant at the 0.05 level (1-tailed).

MR has a significant positive correlation with ROA (Pearson Correlation = 0.499, $p < 0.001$), suggesting that firms with higher returns on assets tend to have higher returns in the market. Then, MR has a significant negative correlation with LEV (Pearson Correlation = - 0.310, $p = 0.004$), indicating that firms with higher returns tend to have lower leverage.

Table 4 shows that there is no multicollinearity. It exists when a coefficient approaches +1 or -1; it indicates a robust linear correlation between the predictor and the outcome variable, signifying a significant positive or negative impact, respectively. The presence of multicollinearity can introduce distortions in these coefficients, so complicating their interpretation and perhaps resulting in inaccurate estimations.

Model Summary and ANOVA

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.584[a]	0.341	0.293	0.285

a. Predictors: (Constant), ROA, SDGs, LIQ, SIZE, LEV

The model summary presents, as stated in Table 5, key statistics that evaluate the performance of the regression model. The multiple correlation coefficient (R) is 0.584, indicating a moderate positive correlation between the independent variables and the dependent variable. The R-squared value, representing the proportion of explained variance, is 0.341, suggesting that approximately 34.1% of the variability in the dependent variable can be attributed to the independent variables in the model, which are ROA, LIQ, LEV, and SIZE.

Considering the number of predictors, the adjusted R-squared is slightly lower at 0.293, providing a more conservative estimate of the model's explanatory power. The standard error of the estimate is 0.285, signifying the average distance between observed and predicted values; a smaller value indicates a better fit. In essence, this model, with its R-squared of 0.341, indicates a moderate explanatory capability. In contrast, the adjusted R-squared considers model complexity and the standard error of the estimate gauges predictive accuracy. The associated F-test is significant ($p < 0.001$), suggesting that at least one predictor variable significantly contributes to explaining the variance in the dependent variable.

Table 6: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.87	5	0.574	7.046	<.001[b]
	Residual	5.54	68	0.081		
	Total	8.41	73			

a. Dependent Variable: MR

a. Predictors: (Constant), ROA, SDGs, LIQ, SIZE, LEV

The ANOVA (Analysis of Variance) table comprehensively evaluates the regression model's statistical significance. In this analysis, the dependent variable is "return," and the predictors encompass a constant term along with the variables ROA, SDG, LIQ, SIZE, and LEVE. The table comprises three main components: Regression, Residual, and Total.

In the Regression section, the Sum of Squares (SS) quantifies the explained variance by the predictors, totalling 2.870. The Degrees of Freedom (df) associated with the regression model is 5, reflecting the number of predictors. The Mean Square (MS) is an average measure of explained variance, calculated as 0.574. The F-statistic, assessing the overall significance of the regression model, is notably high at 7.046. Importantly, the associated p-value (Sig.) is less than 0.001, signifying a statistically significant regression model.

Regression Results

The regression analysis results provide valuable insights into the relationships between SDGs, Size, Leverage (LEV), Liquidity (LIQ), Return on Assets (ROA), and the dependent variable, market return (MR).

Table 7: Regression Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.092	0.462		2.362	0.021*
	SDGs	0.001	0.011	0.014	0.136	0.892
	LEV	-0.081	0.042	-0.213	-1.959	0.054
	LIQ	-0.016	0.014	-0.125	-1.133	0.261
	SIZE	-0.104	0.048	-0.228	-2.16	0.034*
	ROA	1.868	0.417	0.451	4.477	0.00**

a. Dependent Variable: MR

**. Correlation is significant at the 0.01 level (1-tailed), and *. Correlation is significant at the 0.05 level (1-tailed).

Table 7 shows a positive but insignificant effect between Sustainability Development Goals (SDGs) and market return (MR). The coefficient for SDGs is 0.001, and the level of significance is 0.892, which is > 0.1. The implication of such a result is multifaceted or not significant. Positively, the effect that has been noticed indicates that firms that align with the SDGs may be able to achieve some degree of financial success. Nonetheless, it is prudent to use care when drawing firm conclusions regarding the strength of this link, given the lack of statistical significance. Furthermore, the period of the analysis may have had a significant impact on the outcomes that were found. The impact of SDG-related actions may not be felt right away because they frequently entail long-term plans to promote sustainable behaviors. The more gradual and cumulative benefits of sustainability efforts on market returns may go unnoticed in a study with a short duration. The benefits of the SDGs may take time to be evident in short-term studies. Thus, investors and academics must take the time component into account.

The way the market views and comprehends the connection between sustainability and financial performance may also be a contributing factor. The beneficial benefits of SDGs may not be wholly recognized or valued by investors and market participants, which could result in an underestimation of their influence on market returns. The observed statistical insignificance may be attributed to ignorance, poor information, or skepticism over the real benefits of sustainable behaviors. Thus, initiatives to raise awareness and instruct market players on the financial benefits of sustainable business practices may have an impact on the results of subsequent studies.

Additionally, Market perception and comprehension of the connection between sustainability and financial performance may also be important factors. The beneficial effects of SDGs may be underestimated if investors and other market players do not recognize or value them to their fullest extent. The reported statistical insignificance could be attributed to ignorance, insufficient knowledge, or doubt about the real advantages of sustainable behaviors. Consequently, initiatives to raise awareness and instruct market participants about the financial benefits of sustainable firm practices may impact future research findings. The result shows inconsistency with prior studies from Martínez-Ferrero and Frías-Aceituno (2013), which expect a positive relationship between sustainability development and firm performance.

Regarding the control variables, LEV, SIZE, and ROA have a significant relationship with MR. The results show that there is a negative significant relationship between LEV and MR. This suggests that higher leverage, or the proportion of debt financing in a firm's capital structure, may be associated with lower market returns. Higher debt may result in higher interest expenses and increased financial risk, which may risk the firm's profitability and market performance (Campello, 2006). For example, if interest rates rise, a highly leveraged firm may struggle to meet its debt obligations, potentially resulting in financial distress and bankruptcy.

A negative relationship between SIZE and MR is shown in the above table. The coefficient for SIZE is negative (-0.104), indicating that smaller firms tend to have higher market returns. This is statistically significant (p-value = 0.034), which 0.034 is lesser than the rejection rule < p-value 0.05. As firms expand bigger size, they unintentionally create a corporate environment marked by increased spending and decreased savings, so limiting their growth potential (Butt et al., 2010).

There is a significant positive relationship between ROA and MR. The coefficient for ROA is positive (1.868) and statistically significant (p-value < 0.000). Firms with a higher ROA have demonstrated the ability to generate profits from their assets efficiently. This efficiency frequently indicates strong management, competitive advantages, and long-term business practices, which can attract investors and boost market returns. This is consistent with research made by Premuroso et al., (2012).

5. Conclusion and Implications of the Study

This study proves that SDGs are insignificantly related to the stock market return. Although the study does not find a statistically significant link between SDGs and market returns, it does find a significant positive effect. Firms prioritizing the SDGs perform better in the market despite the lack of statistical evidence to support this claim. This research has important ramifications for investors. The positive effect seen indicates that certain investors may view companies aligned with SDGs as potentially appealing investments, even though there may not be a statistically significant relationship between SDGs and market returns. Investors are prompted by the study to think beyond conventional measurements and take into account the wider effects of sustainable practices on a firm's overall success. For instance, a firm that is dedicated to the SDGs may be preferred by an investor who understands the long-term advantages of sustainability over one that is primarily focused on making quick money.

The favorable impact of the study thus raises the possibility of regulatory considerations, especially in light of Bursa Malaysia. Complying with the SDGs could affect regulatory frameworks in addition to being a subject of corporate social responsibility. This implies that firms implementing SDGs into their operations may profit from legislative reforms or improvements that align with sustainable activities. For instance, a business that supports the SDGs may experience regulatory favoritism and gain rewards or recognition for its dedication to sustainable development.

Then, the beneficial impact of the study raises the possibility of regulatory concerns, especially in light of Bursa Malaysia. Complying with the SDGs could affect regulatory frameworks in addition to being a subject of corporate social responsibility. This implies that firms implementing SDGs into their operations may profit from legislative reforms or improvements that align with sustainable activities. For instance, a firm that supports the SDGs may experience regulatory favoritism and gain rewards or recognition for its dedication to sustainable development.

Next, security, a top investor priority, takes center stage in this investigation. Even though the positive effect may not be immediately evident due to statistical significance, it shows that investors may feel more secure when companies adopt eco-friendly practices that align with the SDGs. Beyond just financial considerations, this also considers the potential for cost reductions through effective resource management and environmental resilience. For example, a firm that adopts eco-friendly practices may show resilience to risks associated with climate change, potentially reducing long-term financial losses.

This study casts doubt on long-held beliefs regarding the connection between market returns and SDGs. The beneficial but non-significant effect creates opportunities for more research and thought. In light of these findings, organizations, investors, regulators, and legal entities are urged to reevaluate their strategies, taking into account both the broader socioeconomic factors and the possible effects of sustainable practices on financial success.

In addition to enhancing the generalizability of results, comparative research across various market and geographical contexts could offer a more nuanced knowledge of how various market structures and areas affect the relationship between SDGs and market outcomes. Further insights into the sustainability-performance relationship and its evolution over economic cycles may be gained from longitudinal studies that monitor the progress of SDG projects and market returns over time. Examining the subtleties that vary by industry in how the SDGs affect market returns may highlight opportunities and problems unique to that sector. Scholars can contemplate exploring the subtleties of distinct industries, acknowledging that there are notable variations in the correlation between sustainable practices and financial performance among them.

Acknowledgment: We thank the Faculty of Economics and Business, University Malaysia Sarawak (UNIMAS), and The Research, Innovation and Enterprise Centre (RIEC) for financially supporting this research. Part of this research was a Bachelor of Business Management (Corporate Management) UNIMAS dissertation.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Youth Satisfaction in Online Shopping: Mapping The Nexus of Influential Factors

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Abstract: Online shopping has become a new trend and an integral part of daily life, as it involves the process of direct browsing and purchasing products and services over the Internet using a web browser. Young people constitute the bulk of online shopping customers because purchasing has become simpler, comparatively cheaper, and more comfortable. Today, most goods and services can be purchased online, where multiple options may be offered by different sellers or brand since there are no boundaries to this shopping experience. This study aimed to look into the factors that influence 270 youths to use online shopping platforms, as most young people are highly engaged with technology and digital media. This study was conducted in Sungai Petani, the biggest town in Kedah, Malaysia. The quantitative study method was employed for the data collection phase of this study. All gathered data have been analyzed using the Statistical Package for the Social Sciences (SPSS) software. Regression, reliability, and descriptive analyses were utilized to assess, verify, and explain the findings of this study. The Pearson Correlation has indicated that the variety of selections and time-saving features were significant towards youth satisfaction in online shopping. Meanwhile, two independent variables, i.e., convenience and price fairness showed a considerable relationship. This study has found that the time-saving feature was the dominant factor among four variables that have influenced youth satisfaction in online shopping.

Keywords: *Online Shopping, Physical Store, Customer Satisfaction, COVID-19*

1. Introduction and Background

In the 21st century, e-commerce or online shopping has increased dramatically, not just in Malaysia but also worldwide. Due to the rapid distribution of Internet access among individuals and e-commerce usage by merchants, online shopping has witnessed significant development in recent years. Globally, customers make online purchases due to the ease of use and greater convenience compared to purchases made at physical stores. For various reasons, customers, particularly youths, have shifted their shopping trends and are choosing online shops over brick-and-mortar stores. The preference of young customers has changed mainly due to the inconsistent availability of products and products sold are restricted only to those found in the store.

Contrary to online shopping, customers find physical shopping more troublesome because it is difficult to compare product prices at one physical store to another and not all in-person shops have the items that the customers are looking for. Problems faced by physical stores are due to the high pricing of products and services compared to the comparatively competitive prices of online shops. Physical store customers typically receive discounts and offers for a short period; internet sellers, on the other hand, regularly provide their customers with higher discounts, vouchers, coupons, and gifts. Physical stores often offer a minimal range of the same or different items and brands under the same roof. However, simply clicking on one's preferences allows one to easily compare various brands and items offered by online stores.

Since the start of the COVID-19 pandemic, online shopping has become an integral part of every society, involving the direct viewing and purchasing of products and services over the internet using a web browser. Undeniably, youths constitute the bulk of online buyers. Many customers find coming to a physical store particularly tiring since they must deal with traffic, time-consuming parking, and high parking fees, resulting in a longer and more expensive purchasing experience. Thus, many youths have turned to online shopping since it is simpler, comparatively cheaper, and more comfortable.

Online shopping is also more practical because it is cashless, requires no parking charges, saves time and money, and requires less energy with no physical and time boundaries. Shopping at a physical store might

require customers to pay with cash, as not all shops allow cashless payment. The brand or product of choice could also be unavailable at the store, thus compelling the customers to visit other stores and risk spending more time and money. Customers who shop online will not face these issues because they can browse for different sellers without having to travel anywhere. Customers are able to self-check if the things they want are still available when purchasing online. More youths prefer this purchasing method because it helps them to save money and time. Online shopping is popular among youths since it requires less effort than traditional shopping (Khalil, 2014). As a result, it comes as no surprise that youths are opting for buying online these days. Additionally, physical stores are bound by specific operating times and days, which require customers to wait for them to start their business, or rush to finish their shopping before the stores are closed. In comparison, online sellers are open 24 hours a day, offering a more convenient shopping method.

According to Aćimović et al. (2020), the COVID-19 pandemic has affected every part of the global economy, including logistics, where strategies, philosophies, business models, and connections within the logistics chain are all evolving. The limitations put into effect under the Movement Control Order (MCO) ruling have resulted in most physical stores being closed. People began to buy everything online, from necessities to luxury products due to the difficulties in accessing the physical stores. This trend was proven to have increased based on the sales of high-end cosmetics that recorded a surge of 61%, driven primarily by youths (Ming Teoh, 2020). Since the spread of COVID-19 to Malaysia, there has been a significant spike in online shopping and transactions.

Bain & Company estimated that 47% of customers in Malaysia opted for Internet shopping to acquire items (Zainuddin, 2022). However, Juwai IQI's latest poll on internet purchasing during the COVID-19 epidemic demonstrated that 57% of Malaysians made more online purchases than before the pandemic started (The Star, 2021). Lazada Malaysia confirmed this report, noting a 300% increase in the number of new online retailers. (Soo, 2022). This was further supported by Mohd Uzir Mahidin, Chief Statistician of Malaysia, who stated that the growth of online sellers of products and services through online platforms, such as WhatsApp and Facebook has doubled to 54.4% in 2020 compared to only 22.5% in 2019 (BERNAMA, 2021). These reports have illustrated that during COVID-19, online shopping has directly influenced the purchasing power of youths, especially among students. Therefore, the purpose of this study was to identify the important factors that influence Malaysian youth satisfaction with online shopping. This study involved the participation of 270 young customers in Sungai Petani, the biggest town in Kedah, Malaysia based on their preference for using online platforms to shop for their necessities and wants since most youths are engaged with technology and digital media. This study aimed to provide new insights into youth satisfaction in online shopping in Sungai Petani, Kedah, Malaysia. It has uniquely focused on the impact of COVID-19 on shopping habits and used innovative data collection methods to collect data from 270 young shoppers, offering specific insights into their preferred platforms, such as Shopee, Lazada, and Go Shop. This research study could enrich the understanding of e-commerce trends in emerging markets with its substantial and diverse sample. Although there is a wealth of global research on e-commerce and online purchasing, this study aimed to fill a significant gap in the body of knowledge by concentrating on this topic based on the Malaysian context, particularly by addressing the unique characteristics, behaviors and concerns of Malaysian youth consumers.

2. Literature Review

Youth Satisfaction in Online Shopping: According to a survey by Bain & Company, a US-based business management consulting company, over 47% of customers in Malaysia have shifted to online shopping as their frequently utilized channel for acquiring their everyday products during the COVID-19 pandemic. Online shopping is not bound by physical stores, and this benefits all groups of customers, especially the youth. In this study, youth refers to individuals aged between 15 to 30 years old (Kementerian Belia dan Sukan, 2015). Youth customer satisfaction represents how the customers feel about dealing with a brand. Businesses often use customer satisfaction surveys to quantify these sentiments because they can help a company get a sense of customers' loyalty, which can help the company forecast the likelihood of customer referrals (Bernazzani, 2023). According to Biesok and Wyród-Wróbel (2011), information on customer satisfaction (both satisfactory and unsatisfactory) can assist a company in addressing difficulties linked to satisfying the stated customers' expectations. Such information may also assist the company in better understanding and addressing their customers' concerns with their perception of the provided product or the organization, resulting in increased customer satisfaction, especially among youths. Positive customer feedback, for example, can guarantee that

the product roadmap and customer support initiatives are on track. Happy customers may also suggest improving the products and services, thus assisting businesses in becoming more customer-centric (Szyndlar, 2022).

Variety of Selections: The availability of several options for specific products can influence customer satisfaction while purchasing online. Customers may require things that are not available through conventional methods due to a variety of issues. Some products may not even be accessible domestically. Therefore, as an alternative, online shopping enables these products to be shipped out from the countries of origin directly to the customers. The feature of product selection was ranked as one of the top five factors that lead to customer satisfaction when buying online (Kumar & Rao, 2015). BERNAMA (2021) stated that more than 50% of Malaysian customers performed online shopping in 2021 compared to 2020 due to COVID-19 restrictions.

In their study, Ali et al. (2010) found that Malaysia has a vast technologically savvy population, with individuals aged 15 and above able to conduct online transactions. Their study has also stressed that through online shopping, customers could window-shop various products in the utmost comfort without leaving their homes. In another study, approximately 46 out of 200 respondents (23%) agreed that the variety of selections was one of the online shopping benefits (Geetha & Elayaraja, 2019). Another study reported that youths aged between 15 to 30 years old would frequently purchase products online since there is a variety of selections; approximately 94% agreed that internet shopping offers an extensive range of items and businesses (Vishwakarma et al., 2020).

According to Kowalska (2012), youths use the Internet to make purchases, compare prices, and read other people's reviews to learn more about certain items. Kowalska stated that when a buyer chooses multiple options at once, variation may be a significant factor to consider. Conversely, customers may, for example, pick stores that sell both shoes and apparel. Variety-seeking in purchasing behavior refers to the desire for variation in one's choices for goods or services. These observations are supported by Kahn (1995), who opined that variations could occur over time, for example, when a customer selects various eateries during many visits. Suyanto et al. (2019) found that approximately 95.6% of youths believed that the virtually infinite range of goods and services available online is one of the advantages of shopping online. As previously mentioned, the number of online businesses under Lazada in Malaysia has spiked in 2021 when most youths preferred to purchase online, since it provides them with more alternatives. Up to 20% of Malaysians' weekly shopping time is reportedly spent on Shopee, another well-known and trustworthy online retailer. These situations have led to the creation of the following hypotheses:
HO: There is no relationship between the variety of selections and youth satisfaction.
H1: The increasing variety of selections is expected to encourage youth satisfaction in online shopping.

Time-saving feature: Presently, the majority of customers are looking for ways to simplify their existing purchase processes. They want to obtain things immediately without haggling over the price or quality, thus making online shopping a significant alternative to be considered. Online shopping is popular among customers because it saves time; online transactions can be performed at any time, 24 hours a day. Customers do not need to spend hours shopping for a small selection of things, which saves them time as well. According to Arisah et al. (2016), over 67% of the respondents agreed that engaging in Internet shopping saves time and could be done at any time. When things are purchased online, customers save time since they avoid having to rush to a physical shopping center and deal with traffic issues enroute to their destination (Vasudevan & Arokiasamy, 2021).

Additionally, going to a physical store could cause customers to spend more time dealing with traffic congestion. The widespread availability of the internet and its inexpensive cost have encouraged youths to be more active online. According to Vishwakarma et al. (2020), most youths make online purchases due to the extensive range of available items and the convenience of shopping, which saves their time. According to Shahzad (2015), online shopping is a time-saver for two reasons; first, the perception that analyzing and selecting a product online takes less time compared to buying in actual stores; and second, young customers believe that buying online is not a waste of time. These situations have led to the creation of the following hypotheses:

HO: There is no relationship between time-saving and youth satisfaction.
H1: More time-saving features are expected to enhance youth satisfaction in online shopping.

Convenience: Convenience is the primary factor driving customers' continuous online purchases, according to Raman (2019). Perceived convenience is one of the main advantages of online buying, and it has a big impact on customers' opinions towards it. The lives of many people have been transformed by online purchasing and selling. Virtual stores allow customers to purchase from the comfort of their homes without the pressure of a salesman while online marketplaces give customers new and more convenient platforms for exchanging nearly all sorts of products and services. One of the main reasons why so many people prefer online versus traditional shopping is that it is more convenient, and saves time and effort (Shanthi & Desti, 2015). Customers engage in a trade-off process when they are willing to pay more for convenience or forgo convenience in exchange for lower prices. It suggests that customers will value a more convenient service more than one that is less convenient.

Shopping over the Internet is not only convenient, but it also consumes less energy and may save money on travel expenses. Approximately 72.6% of youths preferred online shopping, as they do not have to deal with crowds at physical stores. The remaining 60.4% preferred online shopping because it allows them to locate things they could not buy in a nearby physical store (Mokhtar et al., 2020). As a result, more convenience would lead to greater satisfaction (Ngoc Thuy, 2011). Online shopping enables people to acquire anything they want using the digital environment from their comfort zone. It is simple to conduct online purchases because no matter how busy a customer is, online stores will always be open and ready to serve (Noordin, 2020). The majority of respondents believe that online shopping is convenient, and the price of a product in an online store is often lower than in a physical store. The people also believe that internet stores and sellers are reliable.

Harn et al. (2006), customers shop online because it gives them limitless options and gives them access to more information to help them make wiser judgments. Customers who are constantly busy frequently find that purchasing products online is more convenient because these sites can accommodate their specific requirements. According to Al-Jahwari et al. (2018), convenience is the most crucial factor in online shopping. They found that the percentage of convenience was 56.7% more than the percentage of the attractiveness of website designs, which was 43.3%. These results demonstrated that one of the most critical factors impacting customer satisfaction, including among youths, was the convenience of online shopping.

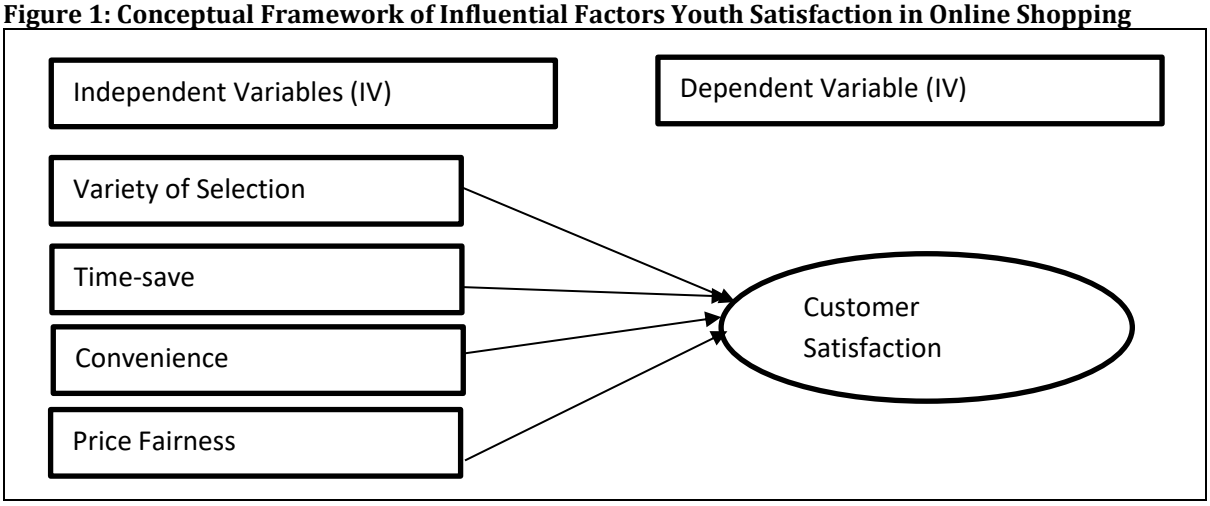
According to Suyanto et al. (2019), most youths were persuaded to try online shopping for the first time by their classmates. Since the respondents are part of the Internet generation, their classmates would typically introduce them to the advantages and conveniences of online shopping. The respondents indicated that purchasing anything from any place is no longer an issue. Youths from Surabaya, for example, would not have to go to Yogyakarta to buy books, since they can order, acquire, and receive the books they want in only a few days by using the website of a well-known bookstore in Yogyakarta. These situations have led to the creation of the following hypotheses:
HO: There is no relationship between convenience and youth satisfaction.
H1: Perceived convenience is expected to increase youth satisfaction in online shopping.

Price Fairness: Lee et al. (2011) described price fairness as a customer's judgment and associated emotions of whether the gap between a seller's price and the price of a competitive party is reasonable, acceptable, or justifiable. Pricing perceptions have a direct impact on consumer happiness, whereas price fairness has an indirect impact. Customer satisfaction is greatly impacted by the price's fairness as well as how it is established and delivered (Hanif et al., 2010). The second most significant factor that encourages people to make purchases online is the competitive prices and discounts offered by online merchants. The fundamental driver for people to shop online is to save money since internet businesses offer lower prices than traditional retailers. Due to the higher maintenance costs associated with physical storefronts as opposed to online sites, sellers could not always provide the same deals in their physical stores as they do online. Sellers have discovered that an online site, rather than a physical store, may suit customers' demands for lower costs. Good online sellers then pass the savings on to their customers by lowering the price of their goods (Gomez, 2021).

According to Zhao et al. (2021), customers' purchasing decisions are influenced by their price perception and how they feel about the price of a product. Understanding how customers arrive at their pricing perception and satisfaction are the primary purposes of marketing. It is essential to compare costs and select the best items before paying. Customers can compare the price of an item they wish to buy by searching on several relevant sales sites before purchase. Online shopping is highly cost-effective and buyer-friendly since sellers frequently offer discounts of up to 50% during a specific time as well as vouchers for delivery fees to avoid high transportation costs when customers must visit the stores on their own (Halimy, 2021). These situations have led to the creation of the following hypotheses:
HO: There is no relationship between price fairness and youth satisfaction.
H1: Price fairness is expected to influence a high level of youth satisfaction in online shopping.

Based on the previous discussions, a conceptual framework is developed, as shown in Figure 1.

Figure 1: Conceptual Framework of Influential Factors Youth Satisfaction in Online Shopping



3. Methodology

This study employed the quantitative data collection technique. The collected data were analyzed using statistical methods known as the Statistical Package for the Social Sciences (SPSS) software. The regression, reliability, and descriptive analyses were utilized to assess, verify, and explain the findings of this study. The total population of youths in Sungai Petani was estimated at 147,700 (Malaysia Youth Data Bank System, 2022). Online questionnaires were distributed among 370 youths in the biggest town of Kedah, Malaysia (Sekaran, 2003). However, the response rate was only 73%, which indicated the participation of 270 respondents. A 60% response rate is acceptable and sufficient to support an accurate measurement, according to Fowler (2014). Youths in Malaysia can be defined as individuals between 15 and 30 years old (BERNAMA, 2023). The purposive sampling method was used to collect data from youths who perform online shopping. Purposive sampling is a non-random sampling technique, in which researchers deliberately select participants based on specific characteristics or criteria relevant to their research objectives. These respondents were purposely approached for this study by asking their specific criteria (i.e., youth between 15 and 30 years old, and have online shopping experiences).

An online questionnaire was distributed in June 2022 using the Quick Response (QR) code and WhatsApp application. The researchers steered the distribution of the online questionnaire at youth hotspots, especially the shopping malls in Sungai Petani. In this study, the questionnaire was divided into five sections. Section A covered the background of the respondents, while Section B addressed their participation in online shopping. Section C addressed the factors being studied, namely, the variety of selections, time-saving features, convenience, and price fairness in online shopping. All items in Sections A, B, and C used the Likert scale with five options. Data were collected and examined using the Statistical Package for the Social Sciences (SPSS) software, version 26. Descriptive analyses were conducted to gauge the characteristics of the respondents.

Pearson Correlation Coefficient and Multiple Regression Analysis were used to test the hypotheses mentioned in the previous sections.

4. Findings and Discussion

A total of 270 respondents participated in this study by answering the questionnaire distributed online. Table 1 below lists the demographic profile of the respondents.

Table 1: Demographic Profile of the Respondents

Items		Frequency	Percentage (%)
Gender	Male	140	51.9
	Female	130	48.1
Age of respondents	15–18 years old	36	13.3
	19–22 years old	125	46.3
	23–26 years old	72	26.7
	27–30 years old	37	13.7
Occupation	Student	169	62.6
	Working	85	31.5
	Unemployed	16	5.9
Name of Online Shopping Websites	Shopee	238	88.1
	Go Shop	8	3.0
	Lazada	17	6.3
	Others	7	2.6
Frequency of Online Shopping	Weekly basis	22	8.1
	Monthly basis	186	68.9
	Once in 6 months	58	21.5
	Once in a year	4	1.5

Table 1 shows that 51.9% (140) of the respondents are male and 48.1% (130) are female. The results illustrated that the number of male youths who preferred online shopping was higher than female youths in Sungai Petani, Kedah. Additionally, 13.3% (36) of the respondents were between 15 and 18 years old, 46.3% (125) were between 19 and 22 years old, 26.7% (72) were between 23 and 26 years old, and 13.7% (37) were between 27 and 30 years old. The results also indicated that 169 respondents (62.6%) were students, 85 (31.5%) were employed, and 16 (5.9%) were unemployed.

The results also showed that out of 270 respondents, 238 of them (88.1%) prefer to shop through Shopee. The rest of the respondents chose Lazada (6.3%), Go Shop (3.0%), and other websites (2.6%). A total of 22 respondents performed weekly online shopping, while 186 among them prefer to shop online every month, 58 once in six months, and the remaining four respondents rarely shop online, only once a year.

Table 2: Descriptive Analysis of Youth Satisfaction in Online Shopping

Dependent Variable	Mean
I am really satisfied when purchasing online.	4.00
I am comfortable purchasing items through online shopping.	4.08
I have a strong internet connection to conduct online shopping.	4.21
I am pleased with my internet purchase experiences.	4.04
I am overjoyed to continue purchasing online again.	4.06

I think online shopping ensures that the goods are delivered on schedule.	3.83
I love to reward myself by going online shopping.	4.11
I love online shopping because of my previous experiences.	4.03
I think shopping online is safe to complete the transaction.	3.76
I prefer to purchase online because it makes my life easier.	4.17

Table 2 shows the mean values of variables related to customer satisfaction in online shopping among the youths in Sungai Petani, Kedah, as identified in Section B of the questionnaire. Based on the interval scale, the mean value of each item was identified. The mean of the first question of this section was 4.00, and the second question had a mean value of 4.08. The third question obtained a mean of 4.21, while the means of the fourth and fifth questions were 4.04 and 4.06, respectively. The mean of the sixth question was 3.83, while the mean of the seventh question was 4.11. The mean values for the last three questions were 4.03, 3.76, and 4.17, respectively. Overall, two items scored a mean of less than 4.00, but eight items showed a high level of customer satisfaction. These results demonstrated that most respondents agreed with the items in the questionnaire regarding youth satisfaction with online shopping.

Examining the relationship between the variety of selections and youth satisfaction in online shopping at Sungai Petani, Kedah
HO: There is no relationship between the variety of selections and youth satisfaction.
H1: The increasing variety of selections is expected to encourage youth satisfaction in online shopping.

Table 3: Result of Pearson correlation between the variety of selections and youth satisfaction in online shopping at Sungai Petani, Kedah

Variable	R-Value	P-Value	Decision
Variety of selections	0.706	0.000 ($p < 0.05$)	H_a is accepted

As shown in Table 3, the nexus between the variety of selections and youth satisfaction in online shopping has a Pearson Product-Moment Correlation Coefficient of 0.706 ($r = 0.706$). According to Sekaran and Bougie (2010), it is considered moderately significant if the correlation coefficient, R, is between 0.30 and 0.49. If the R-value is close to ± 1, it is said to be a perfect correlation, i.e., when one variable increases, the other variables will tend to increase or vice versa. The Pearson Correlation value showed a significant relationship between the two variables. Thus, the null hypothesis that there is no relationship between the variety of selections and youth satisfaction was rejected and the directional hypothesis would be supported.

Examining the relationship between saving time and youth satisfaction in online shopping at Sungai Petani, Kedah
HO: There is no relationship between timesaving and youth satisfaction.
H1: More time-saving features are expected to enhance youth satisfaction in online shopping.

Table 4: Result of Pearson Correlation between timesaving and youth satisfaction in online shopping at Sungai Petani, Kedah

Variable	R-Value	P-Value	Decision
Timesaving	0.766	0.000 ($p < 0.05$)	H_a is accepted

Table 4 shows that the value of the Pearson Product-Moment Correlation Coefficient is 0.766. When the number is close to 1, it is said to have a perfect correlation, meaning that when one variable is increased, the other variable tends to increase if positive or decrease if negative. In addition, the significant p-value of 0.000 ($p < 0.0001$) proved a nexus between saving time and customer satisfaction. The Pearson Correlation value showed a significant relationship between the two variables. Thus, the null hypothesis that there is no relationship between time-saving and youth satisfaction was rejected, and the directional hypothesis would be supported.

Examining the relationship between convenience and youth satisfaction in online shopping at Sungai Petani, Kedah
HO: There is no relationship between convenience and youth satisfaction.
H1: Perceived convenience is expected to increase youth satisfaction in online shopping.

Table 5: Result of Pearson Correlation between Convenience and Youth Satisfaction in Online Shopping at Sungai Petani, Kedah

Variable	R-Value	P-Value	Decision
Convenience	0.705	0.000 ($p < 0.05$)	H_a is accepted

Table 5 shows that the value of the Pearson Product-Moment Correlation Coefficient is 0.705 ($r = 0.705$). If the correlation is close to 1, it is considered a perfect correlation, indicating that when one variable increases, the other tends to increase if it is positive or decrease if it is negative. The link between convenience and youth satisfaction was also demonstrated by the significant p-value of 0.000 ($p < 0.0001$). This value showed that there was a significant correlation between the two variables, as indicated by the Pearson Correlation value. Thus, the null hypothesis that there is no relationship between convenience and youth satisfaction was rejected and the directional hypothesis would be supported.

Examining the relationship between price fairness and youth satisfaction in online shopping at Sungai Petani, Kedah

Table 6: Result of Pearson Correlation between price fairness and youth satisfaction in online shopping at Sungai Petani, Kedah

Variable	R-Value	P-Value	Decision
Price Fairness	0.671	0.000 ($p < 0.05$)	H_a is accepted

Table 6 shows that the value of the Pearson Product-Moment Correlation Coefficient is 0.671. A perfect correlation occurs when the number is almost 1, implying that as one variable increases, the other tends to increase if it is positive or decrease if it is negative. The Pearson Correlation value, therefore, demonstrated that there was an essential link between the two variables. The hypothesis that there was a considerable correlation between price fairness and youth satisfaction was thus acknowledged. Therefore, the null hypothesis that there is no relationship between price fairness and youth satisfaction was rejected and the directional hypothesis would be supported.

Table 7: Multiple Regression Analysis for dominant factors that have influenced youth satisfaction in online shopping at Sungai Petani, Kedah

Variables	Unstandardised Beta	Standardized Beta	t- Value	P- Value	Decision
Variety of Selections	.350	.313	4.662	.000	Based on the Beta value, time-saving is the most influential factor.
Time-saving	.583	.553	7.190	.000	
Convenience	.018	.017	.185	.853	
Price Fairness	-.047	-.046	-.552	.581	

Table 7 shows the results for the most influential factors of youth satisfaction in online shopping. The table shows that the Beta value for a variety of selections is 0.313, while the value for time-saving is 0.553, and for convenience is 0.017. However, the Beta value for price fairness was -0.046. Therefore, time-saving was the most influential factor that has affected the satisfaction of young customers in online shopping. The significant value for time-saving was equal to 0.000, which showed that this factor was the most influential in this study. The results of this study have indicated that satisfaction with the time-saving factor will increase the level of youth satisfaction in online shopping at Sungai Petani, Kedah.

5. Conclusion

In conclusion, this research has provided better insight into the most influential factors that have contributed to the level of youth satisfaction in online shopping at Sungai Petani, Kedah. This study has demonstrated the strong nexus between online shopping and youth satisfaction based on identified factors that is variety of selections, time-saving (the most influential), convenience, and price fairness. Based on the variables of a wide range of options, time savings (which is the most important), convenience, and price fairness, this study has shown a substantial correlation between youth happiness and online shopping. Online shopping has the potential to significantly increase customer satisfaction among younger customers by offering a better platform, greater selection, more conveniences, and better pricing. This study has also proven that the factors contributing to online shopping's satisfaction level among youths in Sungai Petani are relevant and are thus, accepted. This study has contributed more to the knowledge and literature of youth experiences and their preferences in making decisions for online shopping. The findings can help online store tycoons and merchants be more aware of their target customers and improve their business strategy to generate higher income. This study has been very helpful to the government in exposing the factors that can affect customers' decisions and preferences when they purchase online, particularly youth. This in turn can help sustain the country's economic growth.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Online Student Engagement and Entrepreneurial Intention: Mediating Role of Individual Entrepreneurial Orientation

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Abstract: Using new digital technology in education has become a reality everyone must accept with the development of Education 5.0. Moreover, online learning is no longer alien to most university students after the COVID-19 pandemic. Currently, the traditionally practical-focused entrepreneurship course is also available online. However, little extant literature has investigated student engagement in online learning, particularly for entrepreneurship courses. Therefore, this paper aimed to establish a new model to show how student engagement in online learning affected individual entrepreneurial orientation (IEO) and entrepreneurial intention (EI). This paper employed the online student engagement (OSE) model, the concept of IEO and the Theory of Planned Behavior (TPB) in developing the research model. The data were analyzed using partial least squared-structural equation modeling (PLS-SEM). The results indicated that IEO positively affected two elements of OSE, namely emotion and participation. A positive relationship was found between IEO and EI. It further found that IEO mediated the relationships between emotion and EI as well as between participation and EI. Therefore, it concluded that IEO was a crucial determinant of EI and it enhanced the relationship between OSE and EI. This paper produced both literature and practical outcomes. Literary, it produced a new model which explained the relationships among OSE, IEO and EI. Practically, it identified critical factors that higher education institutions could take into consideration in developing student entrepreneurs. It was also critical in supporting Malaysian governmental agendas that focused on developing competitive entrepreneurs, such as the Economic Transformation Program (ETP) and Malaysia Education Blueprint 2015-2025 (Higher Education).

Keywords: *Engagement, Entrepreneurship, Intention, Students, University*

1. Introduction

Due to the COVID-19 pandemic, most universities have switched from traditional classroom methods to advanced online approaches. Nevertheless, the use of online learning was undoubtedly not new because it was already a new trend in Education 4.0. In the more current Education 5.0, learning through new digital technology is no longer a trend but a reality that everyone has to get used to (Sydle, 2022). As Education 5.0 emphasizes students' social and emotional development (Sydle, 2022), it is important to research the effects of online learning on students' personal and psychological development.

As Meyer (2014) mentioned, the effects of student engagement on learning required further study. Since online learning is different from traditional ways of learning, and many universities have adopted online learning opportunities, there is a need to investigate further student engagement in online learning (Redmond et al., 2018). It is known that online student engagement (OSE) is a key component in making sure students can study and perform well in their online classes. However, OSE is considered a relatively new concept in studies of student engagement, and literature is scarcely available.

Furthermore, the study of student engagement should look into specific courses or subject domains (Whitney et al., 2019). Therefore, it is viable to look into the influence of student engagement in online learning on the course outcomes of a specific course. Entrepreneurship has long been offered as a core or elective course or subject by many universities. In entrepreneurship education, Mavrina and Mingaleva (2017) suggested that it should have both theoretical and practical aspects to allow the learners to gauge knowledge and skills. However, the emergence of new digital technology in learning and the widespread COVID-19 have transformed the delivery method of entrepreneurship courses to online methods. Students' engagement in an online entrepreneurship course and, its effects on the course outcomes and intention towards starting a new venture

remained unknown. Specifically, questions such as "How does OSE affect individual entrepreneurial orientation (IEO) and EI among university students?" remained unanswered. Due to the above-mentioned gaps, this study aimed to suggest a model to study the direct and indirect relationships between OSE, IEO and EI. Particularly, this study was important in providing new insights into students' online learning flexibility, ability and outcome of entrepreneurial online courses in the Malaysian context. Furthermore, it also sheds light on ways to enhance the online learning experience among Malaysian students.

2. Literature Review

Online Student Engagement (OSE): A well-accepted definition of student engagement is still lacking (Dixson, 2015). According to Kuh (2003, p. 25), student engagement is defined as "the time and energy students dedicate to educationally sound activities both within and outside of the classroom." Student engagement is a crucial element in education because it determines collegiate quality and student success (National Survey of Student Engagement, NSSE, 2020). Furthermore, when students are well-engaged in their learning, it would ensure that learning outcomes can be attained successfully (Collaço, 2017).

It is undeniable that the education world is entering a new era after the establishment of Education 5.0; which emphasizes on utilization of new digital technology to provide more humanized teaching to students for improvement in life and society (Sydle, 2022). In addition, the widespread COVID-19 pandemic around the globe has also propelled the role of online education. Although student engagement has long been studied by many researchers, studies about student engagement in online learning are still limited. In addition, evaluating student engagement at the institutional or course level is a challenging task for higher education institutions (Mandernach, 2015). Since online learning is very different from traditional classroom learning, it is possible to examine OSE in more detail.

To study OSE, Dixson (2015) has developed a model that comprises four components, they are skills, participation, emotion and performance. According to the model, students' emotional engagement in learning could be developed over time as a result of their efforts exerted in learning and interactions with other students. Previous research has effectively demonstrated the relationship between online learning engagement and academic performance. For instance, correlation was found between student engagement and learning outcomes (Bolliger & Halupa, 2018). The finding was supported by Rajabalee et al. (2020) in which top performers had greater levels of engagement than low performers. Moreover, student satisfaction was proven to be influenced by components of OSE such as behavioral, emotional and cognitive engagement (Kucuk & Richardson, 2019).

In terms of entrepreneurship learning, its outcomes could be measured by several indicators such as the demonstration of entrepreneurial orientation, increase in EI and number of actual business startups. Based on the discussion in the previous paragraphs, it could be said that OSE influences learning outcomes such as a person's entrepreneurial orientation and EI.

Individual Entrepreneurial Orientation (IEO): Entrepreneurial orientation (EO) has long been studied by many researchers as a firm-level construct that influences a firm's performance. As described by Lumpkin and Dess (1996), EO consists of five dimensions, namely autonomy, innovativeness, risk-taking, proactiveness and competitive aggressiveness. Although EO has been widely recognized as a firm-level construct, some researchers urged that it could be treated as an individual construct (Bolton & Lane, 2012; Robinson & Stubberud, 2014).

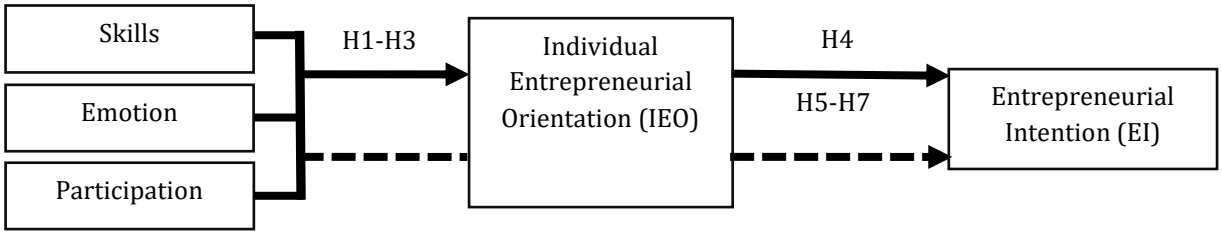
IEO has been investigated by researchers from various countries. Some of them treated IEO as a unidimensional construct, while others considered it as a multidimensional construct. Specifically, Koe (2016) found that two dimensions of IEO, which were proactiveness and innovativeness significantly influenced students' EI. In addition, Koe et al. (2021) found that risk-taking and pro-activeness positively and significantly influenced university students' intention to take up technology-based entrepreneurship. To date, various studies have obtained different results on the effects of elements of IEO on EI. Therefore, the influence of IEO on EI indeed required further examination.

Entrepreneurial Intention (EI): Ajzen (1991) mentioned in the Theory of Planned Behavior (TPB) that intention could be a good indicator of a person's behaviors. Since intention could predict a person's actual behavior, it is believed that EI is a good antecedent of entrepreneurial behavior. As Hisrich et al. (2017, p.16) described, EI is a "motivational factor that influences individuals to pursue entrepreneurial outcomes".

Studying EI is considered viable because the process of becoming an entrepreneur is a planned behavior and it requires an intention to happen (Krueger et al., 2000). Throughout the years, researchers have identified various factors that influence an individual's EI. One of the triggers that stimulates EI is entrepreneurship education. Students learned various entrepreneurial thinking, knowledge, skills, and practices through entrepreneurship courses. Previous studies supported that individuals who have completed entrepreneurship courses or training exhibited a certain level of EI (e.g.: Keat et al., 2011; Farashah, 2013; Asimakopoulos et al., 2019). Specifically, Mavrina and Mingaleva (2017) pointed out that the entrepreneurial thinking and skills that students learned from entrepreneurship training helped to encourage them to take up entrepreneurship. Alshebami et al. (2020) also concluded that students gained the desired attitude and self-efficacy from the entrepreneurship courses that they attended; the attitude and self-efficacy subsequently affected their EI.

The Proposed Model and Hypotheses: As discussed in the previous section, OSE could affect the learning outcomes of entrepreneurship courses, such as IEO and EI. It is believed that if students were given effective entrepreneurship education, they would acquire entrepreneurial qualities, show interest in being entrepreneurs, and intend to become entrepreneurs. Although Dixson (2015) has suggested four elements in his model, this study only took into account skills, participation and emotion. This was because students who participated in this research had not yet received their results at the time of the study. Moreover, IEO was treated as a unidimensional construct. As such, the following research model (Figure 1) was suggested.

Figure 1: Research Model



Using the segmentation approach in theorizing the mediation effect, the following hypotheses are suggested to guide this study:

H1: Skills positively influence IEO.
H2: Emotion positively influences IEO.
H3: Participation positively influences IEO.
H4: IEO positively influences EI.
H5: IEO mediates the relationship between skills and EI.
H6: IEO mediates the relationship between emotion and EI.
H7: IEO mediates the relationship between participation and EI.

3. Research Methodology

This study employed a quantitative research method using a survey. The quantitative method was deemed appropriate because all variables in this study were measurable and quantifiable. It carried out a causal relationship or hypotheses investigation because there were seven hypotheses suggested to test the relationships among OSE, IEO and EI. Since the survey method was employed, this study was performed in a natural setting with very minimal interference from researchers. In terms of a unit of analysis, the individual student was required to provide the required information. Data was collected through a cross-sectional time horizon in which data collection was performed only once.

The population comprised all full-time undergraduate students in a Malaysian public university who had

registered and completed the course Principles of Entrepreneurship, which was conducted via the "open and distance learning" (ODL) method. In this study, the ODL was considered a non-traditional teaching and learning method, in which it provided a flexible, multiple access and multiple modes of learning through an online learning system to learners (Centre for Innovative Delivery and Learning Development, CIDL, 2024). There were 681 elements in the population. In terms of sample selection, a simple random sampling method was employed to ensure that each element of the population had an equal chance of being chosen to be a subject in the sample (Sekaran & Bougie, 2016). First, the academic department provided a list of all the students enrolled in the course. Next, using the random number produced by the random number generator, the subject was chosen from the list. Last, 300 students were chosen at random by referring to Krejcie and Morgan's (1970) sample size determination table. It was done so because a sample size of at least 248 subjects was required for a population of 700. Although 300 sets of questionnaires were sent out, 290 valid responses were successfully gathered.

An electronic self-administered questionnaire was developed as the research instrument of this research. It was deemed suitable for this study because all respondents were attending the classes online. To ensure its reliability and validity, items used in measuring OSE (17 items), IEO (10 items) and EI (6 items) were adapted from Dixson (2015), Bolton and Lane (2012) and Liñán and Chen (2009) respectively. For the 17 items of OSE, respondents were asked to rate their experience of the course for behavior, thought or sensation, based on a five-point rating scale with 1 denoting "not at all characteristic of me" to 5 denoting "very characteristic of me". Whereas for the items of IEO and EI, respondents had to determine how agreeable or disagreeable they were using a five-point rating scale, with 1 representing "strongly disagree" to 5 representing "strongly agree". Before the mass distribution of the questionnaire, it was face-validated by two academic experts and pre-tested with 30 respondents. The internal consistency analysis revealed that it was considered reliable with Cronbach's alpha values ranging from 0.767 to 0.884.

4. Findings and Discussion

Preliminary Analysis: From the data cleaning process, it was found that there was no missing data because respondents were required to answer all questions. Furthermore, it is important to assess the common method bias (CMB) to avoid underestimation or overestimation of relationships between variables and ambiguous conclusions (Memon et al., 2023). Therefore, this study employed Harman's Single Factor to statistically assess CMB. The result indicated that the total variance was 47.24%, which was lower than the threshold of 50%; hence, common variance bias did not exist.

Respondents' Background: At the end of the data collection period, this study successfully obtained 290 completed and usable responses from 300 questionnaires that were sent out to the sample subjects. Hence, it produced a pretty remarkable response rate of 96.67%. The high response rate could be due to data being gathered with assistance from academic staff and also class representatives. Regarding the information on respondents' backgrounds, it was discovered that females (f=238; 82.07%) made up a large portion of respondents. The respondents were enrolled in the Faculty of Business and Management (f=235; 81.03%) and the Faculty of Hotel and Tourism Management (f=55; 18.97%). As for the studying hours that respondents spent on the course, the majority of them studied for two to less than three hours on average per week (f=92; 31.72%). Meanwhile, a total of 250 respondents (86.21%) completed one to two exercises per week.

Measurement Model Assessment: Convergent validity, internal consistency reliability and discriminant validity were used in this study to evaluate the measurement model. Values of factor loadings, composite reliability (CR), average variance extracted (AVE) and Cronbach's alpha (α) are summarized in Table 1. Hair et al. (2014) stated that factor loadings of more than 0.708 need to be taken into account when assessing them. However, Hulland (1999) suggested that if AVE is greater than 0.50, loadings of at least 0.40 can be maintained. Therefore, item Emotion 3 was the only one removed because of its poor loading (loading=0.251); while all other items were retained. Since the α values were higher than 0.70, they were considered dependable. Furthermore, all CR and AVE values were regarded as acceptable because all CR values were higher than 0.70 and, all AVE values were greater than 0.50, (Hair et al., 2014). Therefore, the findings showed that this study had obtained convergent validity, indicator reliability, and internal consistency reliability.

Table 1: Item Loadings, Composite Reliability, Average Variance Extracted, Cronbach's Alpha

	Loading	CR	AVE	α
Skills		0.855	0.559	0.841
Skill1	0.706			
Skill2	0.609			
Skill3	0.771			
Skill4	0.824			
Skill5	0.782			
Skill6	0.774			
Emotion		0.916	0.798	0.915
Emotion1	0.913			
Emotion2	0.874			
Emotion4	0.880			
Emotion5	0.905			
Participation		0.878	0.617	0.874
Part1	0.645			
Part2	0.823			
Part3	0.765			
Part4	0.872			
Part5	0.808			
Part6	0.780			
IEO		0.936	0.631	0.935
IEO1	0.736			
IEO2	0.700			
IEO3	0.779			
IEO4	0.806			
IEO5	0.833			
IEO6	0.806			
IEO7	0.806			
IEO8	0.851			
IEO9	0.814			
IEO10	0.799			
EI		0.961	0.828	0.958
EI1	0.867			
EI2	0.912			
EI3	0.912			
EI4	0.935			
EI5	0.939			
EI6	0.893			

The discriminant validity of this study was further assessed by using Fornell and Larcker's criterion (Table 2), cross-loading criterion (Table 3) and Heterotrait-Monotrait ratio of correlations (HTMT) (Table 4). First, Table 2 demonstrates that Fornell and Lacker's Criterion was fulfilled because all square roots of AVEs (diagonal) were greater than the correlations (off-diagonal) of all constructs. Subsequently, Table 3 displays loadings for

the assigned constructions were greater than those for all other constructs. Finally, Table 4 shows that all HTMT values fell below the 0.85 criterion. The outcomes confirmed that discriminant validity had been attained. As a result, the measurement model was accepted as legitimate and dependable, allowing for the evaluation of the structural model.

Table 2: Fornell And Larcker's Criterion

	Skills	Emotion	Participation	IEO	EI
Skills	**0.748**				
Emotion	0.707	**0.893**			
Participation	0.733	0.729	**0.785**		
IEO	0.610	0.692	0.648	**0.794**	
EI	0.550	0.655	0.457	0.619	**0.910**

Table 3: Cross-Loading Criterion

	Skill	Emotion	Participation	IEO	EI
Skill1	**0.706**	0.549	0.429	0.417	0.497
Skill2	**0.609**	0.430	0.334	0.299	0.353
Skill3	**0.771**	0.583	0.546	0.453	0.414
Skill4	**0.824**	0.661	0.597	0.503	0.436
Skill5	**0.782**	0.637	0.637	0.519	0.434
Skill6	**0.774**	0.712	0.669	0.498	0.346
Emotion1	0.683	**0.913**	0.602	0.643	0.576
Emotion2	0.761	**0.874**	0.659	0.598	0.581
Emotion4	0.705	**0.880**	0.677	0.625	0.522
Emotion5	0.737	**0.905**	0.667	0.603	0.665
Part1	0.623	0.606	**0.645**	0.458	0.517
Part2	0.570	0.500	**0.823**	0.441	0.263
Part3	0.510	0.555	**0.765**	0.501	0.307
Part4	0.598	0.586	**0.872**	0.523	0.263
Part5	0.565	0.492	**0.808**	0.506	0.326
Part6	0.585	0.625	**0.780**	0.591	0.461
IEO1	0.500	0.548	0.502	**0.736**	0.467
IEO2	0.462	0.469	0.460	**0.700**	0.534
IEO3	0.465	0.526	0.452	**0.779**	0.469
IEO4	0.449	0.558	0.463	**0.806**	0.553
IEO5	0.532	0.570	0.524	**0.833**	0.508
IEO6	0.455	0.526	0.517	**0.806**	0.428
IEO7	0.459	0.498	0.571	**0.806**	0.406
IEO8	0.525	0.601	0.592	**0.851**	0.511
IEO9	0.525	0.606	0.522	**0.814**	0.502
IEO10	0.462	0.574	0.539	**0.799**	0.521
EI1	0.609	0.685	0.489	0.641	**0.867**
EI2	0.452	0.552	0.387	0.530	**0.912**
EI3	0.526	0.625	0.420	0.555	**0.912**
EI4	0.463	0.579	0.410	0.549	**0.935**
EI5	0.474	0.558	0.381	0.564	**0.939**

EI6	0.453	0.557	0.389	0.519	**0.893**

Table 4: Heterotrait-Monotrait Ratio Of Correlations

	Skills	Emotion	Participation	IEO	EI
Skills					
Emotion	0.829				
Participation	0.837	0.815			
IEO	0.676	0.746	0.712		
EI	0.611	0.696	0.494	0.649	

Structural Model Assessment: A bootstrapping approach was used in this study to evaluate the structural model using a 5000 resample. The outcomes of the structural model assessment are presented in Table 5. As shown, the absence of lateral multicollinearity was ascertained using the inner variance inflation factor (VIF). This was proven by the VIF values that were less than 5.0, ranging from 1.000 to 3.286. Thus, there was no lateral multicollinearity problem (Hair, et al., 2014).

Table 5 also illustrates the results for the four direct hypotheses suggested in this study. The findings demonstrated that the relationships between emotion and IEO ($\beta = 0.454$, $t=5.656$, $p<0.05$), participation and IEO ($\beta = 0.300$, $t=4.598$, $p<0.05$) and, IEO and EI ($\beta = 0.619$, $t=16.784$, $p<0.05$) recorded t-values higher than 1.645 and significant at less than 0.05 threshold of significance. Therefore, the findings supported the hypotheses H2, H3 and H4. However, the skill was found not to have any significant relationship with IEO ($\beta = 0.023$, $t=0.305$, $p>0.05$) with t-values lower than 1.645 and significant at more than 0.05 level of significance. As such, H1 was not supported. The results further indicated that OSE elements such as skill, emotion and participation accounted for 52.30% of the variance in IEO, as shown by the R^2 value of 0.523. In addition, it was also found that 38.30% of the variance in EI was explained by IEO based on the R^2 value of 0.383.

This research observed Cohen's (1988) rule for impact size (f^2) in generating R^2. It was recommended that effects could be minor ($f^2=0.02$), medium ($f^2=0.15$), and large ($f^2=0.35$). As such, skill ($f^2<0.001$) and participation ($f^2=0.077$) had small effects while emotion had a medium effect ($f^2=0.134$) in generating R^2 for IEO. In addition, IEO accounted for a large effect ($f^2=0.621$) in generating R^2 for EI. Furthermore, this study utilized Q^2 in investigating the model's predictive usefulness. As found, the Q^2 values for IEO and EI were 0.507 and 0.350 respectively. Since both Q^2 were greater than zero, this showed that the models had considerable predictive significance.

Table 5: Path Coefficient (Direct)

	Beta	SE	T-value	Decision	VIF	f^2	R^2	Q^2
Skill -> IEO	0.023	0.077	0.305	Not supported	3.286	0.001	0.523	0.507
Emotion -> IEO	0.454	0.080	5.656*	Supported	3.240	0.134		
Participation -> IEO	0.300	0.065	4.598*	Supported	2.449	0.077		
IEO -> EI	0.619	0.037	16.784*	Supported	1.000	0.621	0.383	0.350

* Significant at <0.05

Table 6: Path Coefficient (Indirect)

	Beta	SE	T-value	Confidence Interval Bias		Decision
				LL	UL	
Skill -> IEO -> EI	0.014	0.048	0.303	-0.059	0.096	Not supported
Emotion -> IEO -> EI	0.281	0.056	5.066*	0.190	0.373	Supported
Participation -> IEO -> EI	0.186	0.040	4.662*	0.121	0.254	Supported

* Significant at <0.05

Table 6 summarizes the path coefficient for mediation analysis. Note that the 95% bootstrapped confidence interval bias obtained for paths emotion-IEO-EI and participation-IEO-EI were [LL=0.190; UL=0.373] and [LL=0.121; UL=0.254] respectively. Since they did not straddle a zero in between LL and UL; thus, IEO significantly mediated the relationship between emotion and EI ($t=5.066$, $p<0.05$) and, participation and EI ($t=4.662$, $p<0.05$). As such, H6 and H7 were supported. However, a zero straddled in between LL and UL for the path skill-IEO-EI [LL=-0.059; UL=0.096]; hence, IEO did not significantly mediate the relationship between skill and EI ($t=0.303$, $p>0.05$). As such, H5 was not supported.

Discussion: The direct paths analyses showed that emotion and participation positively affected IEO and, that IEO influenced EI positively. The results supported Kucuk and Richardson (2019), in which emotional engagement was an important element in OSE. It proved that if students put in greater effort and desirability in learning entrepreneurship knowledge, especially in an online learning environment, they could have a higher orientation towards entrepreneurship. Online learning requires students to be independent and self-disciplined, thus emotionally engaged in learning is important. Furthermore, entrepreneurship is a process which requires individuals to actively interact with others. The findings showed that the participation of students in the online learning process successfully shaped their entrepreneurial orientation. Indeed, various types of interactions such as online discussions and forums help students to know each other better, provide support in learning and further enhance their understanding of the course. In addition, the positive relationship found between IEO and EI in this study supported Koe (2016) and Koe et al. (2021). It is well understood that a person's entrepreneurial abilities and capabilities would affect he or she in exhibiting intention towards entrepreneurship. This is further explained by the reasons why many higher learning institutions are providing entrepreneurship education and courses to their students.

In terms of indirect paths analyses, the mediation test pointed out that IEO was significant in mediating the relationships between emotion and EI, as well as between participation and EI. The significant mediation results further emphasized the importance of IEO in enhancing EI among students. This suggested that if students can engage in the online entrepreneurship course and gain sufficient entrepreneurial knowledge, they will develop entrepreneurial qualities and intentions. Therefore, developing entrepreneurial abilities and capabilities is crucial in training new entrepreneurs.

5. Conclusion and Implications

The purpose of this paper was to suggest a model for investigating the relationships among OSE, IEO and EI. Based on the literature review, OSE adopted in this study consisted of three elements which were known as skills, emotion and participation. Meanwhile, IEO was treated as a unidimensional construct. Based on the results, it can be concluded that components of emotion and participation in OSE were important in developing an individual's IEO, while IEO also influenced a person's EI. Furthermore, IEO was unneglected in enhancing the relationship between IEO and EI.

This study is significant because it sheds light on important factors in bolstering EI. There are two main expected contributions of this paper. It examines an integrated model that explains the relationships among OSE, IEO and EI. In particular, the model provides new insights into the effect of OSE in entrepreneurship research. It also examines IEO, which is a relatively new aspect of entrepreneurship study. Practically, this paper highlights some crucial factors in boosting EI among youths, especially university students. It helps the management of higher education institutions to encounter challenges in offering entrepreneurship courses through online platforms. In addition, it supports the government agendas and policies in developing a greater number of young entrepreneurs in Malaysia. Specifically, the model is relevant to Malaysian policies such as Malaysia Education Blueprint 2015-2025 (Higher Education) or MEB (HE) which focuses on developing students' entrepreneurial skills and supporting student-owned enterprises. It also supports the effort to develop young entrepreneurs carried out by various agencies such as Majlis Amanah Rakyat (MARA), Perbadanan Usahawan Nasional Berhad (PUNB) and Institut Keusahawanan Negara (INSKEN). It is hoped that this paper could assist universities and the government of Malaysia to develop more competitive young entrepreneurs.

Acknowledgment: The authors would like to express their deepest appreciation to Universiti Teknologi MARA (UiTM), Cawangan Melaka for supporting this study.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Evaluating the Impact of Usability Components on User Satisfaction in Educational Board Games using the MEEGA+ Framework

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Abstract: Conventional instructional methods often fail to achieve significant learning outcomes and user satisfaction, making educational board games (EBGs) a dynamic and engaging alternative. This study aims to analyze the impact of usability components (aesthetics, learnability, and operability) on user satisfaction in EBGs using the MEEGA+ framework. A purposive sampling technique was used to select bachelor's degree students enrolled in the Personal Financial Planning (PFP) subject. A quantitative study was conducted using self-administered questionnaires, and the data were analyzed using SPSS version 29.0. The findings indicated that usability components (aesthetics, learnability, and operability) significantly influenced user satisfaction in EBGs for PFP students. The study suggests incorporating game-based learning into curricula to enhance understanding and satisfaction. It also highlights the importance of usability components in EBGs, providing a theoretical framework for future research in game theory, cognitive, and pedagogical approaches.

Keywords: *Usability, User Satisfaction, MEEGA+, Educational Board Game (EBG), Personal Financial Planning.*

1. Introduction

Over the years, there has been a significant evolution in educational practices (Onofrei & Ferry, 2020; Qiao, Yeung, Zainuddin, Ng, & Chu, 2023). Traditional teaching methods, which often involve lectures, textbooks, and teacher-centered instruction, have been widely used for centuries and have shaped the foundation of education (Tadayon & Pottie, 2020). However, the landscape of education is changing rapidly due to a deeper understanding of cognitive science and the recognition of diverse learning styles (Gilliam, Hill Jaworski, Sparrow, Jones, & Jagoda, 2019). In recent decades, there has been a shift towards more student-centered and active learning approaches (Hendrix, Hojnoski, & Missall, 2020; Onofrei & Ferry, 2020; Wong, 2018; Qiao et al., 2023; Vlachopoulos, Jan, & Buckton, 2020).

These approaches emphasize engagement, collaboration, and critical thinking to enhance the learning experience (Gilliam et al., 2019; Mao, Cui, Chiu, & Lei, 2022). This shift has raised questions about the effectiveness of traditional teaching methods in meeting the evolving needs of today's students. However, the quality of education is significantly contingent upon the level of student satisfaction. When students are satisfied with their learning experiences, they are more likely to be engaged, motivated, and successful (Lin et al., 2021). Lower satisfaction, on the other hand, can lead to disengagement, reduced learning outcomes, and attrition. Furthermore, an overemphasis on memorization and assessment-centered learning can create a stressful environment, detracting from the joy of learning and reducing overall satisfaction. To enhance student satisfaction in the realm of education, a new approach has been introduced, characterized by an experiential perspective (Poole et al., 2019). Incorporating this perspective into education has led to the emergence of an innovative tool, the educational board game (EBG).

EBGs serve as interactive learning tools, allowing users to explore, experiment with, and reflect upon traditional teaching methods in a simulated classroom setting (Barbara, 2019; Gkogkidis & Dacre, 2020; Wong, 2018). EBGs provide a dynamic approach to learning, blending entertainment with education to engage learners of all ages (Tan et al., 2022). Users take on dual roles as educators and students, making decisions about teaching methods within the game, much like educators do in real classrooms (Hou et al., 2023). Users can directly apply theoretical knowledge in a practical setting, improving comprehension and retention (Ramos et al., 2023). This comprehension reinforces user satisfaction as they witness their progress and increased knowledge. Furthermore, active participation keeps users' attention and interest, directly influencing user satisfaction.

An EBG with aesthetic appeal is designed with visually engaging elements that stimulate interest and foster a conducive learning environment (Sun, 2023). The EBG incorporates clear instructions, intuitive mechanics, and progressive levels of complexity that scaffold the learning process. It employs pedagogically sound approaches, such as providing informative feedback and utilizing scaffolding techniques, to optimize knowledge acquisition (Azizan et al., 2018). Moreover, the game's content is aligned with educational objectives, fostering a seamless integration of learnability and operability into the gameplay experience (Cooke, 2016). Enhanced learnability results in more efficient learning experiences and higher user satisfaction. In contrast, operability refers to how easily players can engage with the game. It entails user-friendly interfaces, accessible rules, and intuitive game dynamics that minimize cognitive load and maximize user satisfaction (Daud, Osman, Abu Yazid, Md Taib, & Mohd Nor, 2021).

EBGs have been implemented to influence learning activities across various fields, such as environmental science, accounting, history, parenting, cultural studies, and libraries (Barbara, 2019; Begy, 2017; Cardinot & Fairfield, 2022; Fjaellingsdal & Klockner, 2020; Tadayon & Pottie, 2020). However, studies in EBG focused on Personal Financial Planning (PFP) are lacking in assessing the effectiveness of EBG in improving personal finance knowledge and financial behavior. Additionally, a notable research gap in the study of EBG and user satisfaction lies in the limited exploration of the specific design elements and mechanics for the PFP subject. While there is a growing interest in assessing overall user satisfaction, there is a need for more in-depth investigations into game features (e.g., game mechanics, aesthetics, feedback systems) that have the most significant impact on user satisfaction. Furthermore, the application of the MEEGA+ framework to enhance user satisfaction is limited in the empirical studies that rigorously evaluate the effectiveness of usability components, including aesthetics, learnability, and operability in EBGs for improving user satisfaction.

In summary, this study aimed to examine the effects of aesthetics, learnability, and operability on user satisfaction in EBGs for the Personal Financial Planning (PFP) subject. The findings are significant for educators and researchers as they can improve the quality of education, making it more dynamic, engaging, and user-friendly for students. There is a gap in the research that necessitates broader studies involving various instructional methods and interactive tools to better understand their effectiveness and determine best practices for enhancing learning outcomes and user satisfaction.

2. Literature Review

Educational Board Game (EBG): EBGs have experienced a surge in popularity within the field of education in recent years, owing to their unique ability to offer engaging and immersive learning experiences (Christopoulos & Mystakidis, 2023). These games, often designed with educational objectives in mind, combine entertainment with structured learning, creating a powerful tool for educators to engage students dynamically and interactively (Rogerson et al., 2018).

Many studies have investigated the effectiveness of board games in enhancing learning outcomes (Laski & Siegler, 2014; Carter et al., 2014; Cutumisu et al., 2019). Board games can aid in various disciplines and abilities (Lo & Chen, 2023). Bayeck (2020) suggests that board games serve as venues where individuals can acquire a variety of skills, including mathematics. Board games promote various types of interactions, including creative thinking, teamwork, and computational thinking (Tsortanidou, Daradoumis, & Barberá, 2021). Additionally, playing board games can simplify complex concepts and processes (Ezezika, Fusaro, Rebello, & Aslemand, 2023).

One of the standout features of EBGs is their innate capacity to motivate and engage players (Morais & Silva, 2023). Unlike traditional teaching methods that may struggle to maintain student interest, board games captivate learners through their inherent element of play. The competitive or cooperative nature of games, combined with the desire to achieve victory or solve challenging puzzles, fuels motivation (Crabb & Heron, 2023). This intrinsic motivation can result in increased perseverance and a willingness to overcome obstacles, thereby enhancing the learning process (Ab Rahman et al., 2017).

The adaptability of EBGs is another compelling aspect. These adaptations involve modifying game mechanics, objectives, and content to align with specific learning goals (Chen & Chi, 2022). This flexibility allows educators

to leverage existing, well-designed games to create customized educational experiences that cater to diverse subjects and age groups (Anggraeni, Affandi, Wahyudin, Paramitha, & Ramadhan, 2022).

Board games also offer a multifaceted experience that goes beyond mere entertainment (Vasconcelos, Sousa, Ferreira, & Pinheiro, 2022). They provide opportunities for social interaction, intellectual stimulation, emotional engagement, and a sense of achievement. These factors collectively contribute to heightened player satisfaction. According to Jansuk and Choochumpang (2022), the use of the inquiry-based learning approach known as the 5E method, along with the incorporation of board games, resulted in a very high level of student satisfaction.

The MEEGA+ Assessment Model: An Innovative Approach to EBG: The MEEGA+ Assessment Model represents an innovative approach to evaluating educational games. This comprehensive framework, designed for both digital and non-digital games like card and board games, has significantly advanced educational assessment. It allows for swift evaluation with minimal disruption to instruction, offering valuable feedback without necessitating in-depth knowledge of educational theory, measurement, or statistics from educators (Petri, Von Wangenheim, & Borgatto, 2016; Petri, Von Wangenheim, & Borgatto, 2017; Petri, Gresse von Wangenheim, Ferreti Borgatto, 2017). Developed in response to the evolving landscape of education and the need for more engaging and effective assessment methods, this model seamlessly combines assessment and EBG principles to create a comprehensive approach to evaluating the effectiveness and user satisfaction (Petri et al., 2016; Petri et al., 2017).

In recent years, game-based learning (GBL) has seen extensive use in educational contexts. Compared to traditional methods, GBL enhances learning effectiveness and boosts motivation by creating a positive and informative learning environment (Eltahir, Alsalhi, Al-Qatawneh, AlQudah, & Jaradat, 2021). MEEGA+ offers a compelling exploration of the synergy between GBL and the dynamic world of EBG (Petri et al., 2016; Petri et al., 2017). This study delves into the MEEGA+ assessment model, a contemporary framework designed to evaluate the effectiveness and user satisfaction of EBGs. It unveils fresh perspectives on how board games can harness game-based learning to enrich the educational experience (Haoran, Bazakidi, Zary, 2019). This research is expected to offer significant insights into the dynamic educational landscape, where educational board games are emerging as crucial tools for engaging and educating learners across diverse subjects and disciplines (Calderón & Ruiz, 2015; Petri et al., 2017). Presently, MEEGA+ stands out as one of the most widely utilized evaluation models (Borges, Juy, De Andrade Matos, Angelo Silveira, & Darin, 2020; Wang, Zhang, & Hong, 2023; Xinogalos & Satratzemi, 2022).

At present, the MEEGA+ model is among the most extensively utilized evaluation frameworks in practice (Borges, Juy, De Andrade Matos, Angelo Silveira, & Darin, 2020; Wang, Zhang, & Hong, 2023; Xinogalos & Satratzemi, 2022). It has been recognized for its potential to enhance engagement and motivation in educational settings. By infusing elements like challenges, rewards, competition, and interactivity inspired by games into educational activities, game-based learning captivates students and encourages active participation in the learning process (Sari, Fadillah, Al Hariri, Habibi, Mega, 2022). The MEEGA+ model offers a valuable tool for game developers, educators, and researchers to assess the quality of educational games, facilitating their enhancement and promoting effective and efficient practical application (Petri et al., 2016; Petri et al., 2017; Wang et al., 2023; Xinogalos & Satratzemi, 2022). Measurement within the MEEGA+ model involves the collection of quantitative and qualitative data on student performance, participation, and outcomes (Borges et al., 2020; Petri et al., 2016; Petri et al., 2017). This data provides valuable insights into the effectiveness of instructional methods and the level of student involvement, shedding light on areas that may need improvement.

The MEEGA+ assessment model, recognized for its effectiveness, is utilized to evaluate game quality, focusing on learner usability and experience post-gameplay of educational games (Petri et al., 2016; Petri et al., 2017). Evaluation goes hand in hand with measurement, allowing educators to assess the impact of EBG elements on learning outcomes (Borges et al., 2020). This includes examining whether EBG strategies enhance content retention, problem-solving skills, and overall student satisfaction (Borges et al., 2020; Eltahir et al., 2021; Wang et al., 2023; Xinogalos & Satratzemi, 2022). This approach can effectively assess and improve the educational experience, leading to enhanced learning outcomes (Sari et al., 2022). The model's ability to combine game-

based learning with measurement and evaluation techniques has been shown to increase student engagement, motivation, and overall satisfaction with the learning process (Sari et al., 2022; Wang et al., 2023).

Usability in EBG: Enhancing the User Satisfaction: Usability in EBG refers to the design and functionality of the game interface and components, aiming to ensure that players can interact with the game effectively and intuitively. It encompasses several key dimensions, such as aesthetics, learnability, and operability. According to Yang and Kopcha (2022), aesthetics play a crucial role in capturing and retaining players' attention. It is also evident that the added aesthetics and story attract players' attention and increase their motivation to play the game (Yang & Kopcha, 2022). A visually appealing game design with engaging graphics, well-chosen colors, and immersive artwork can draw players into the learning experience (Rahimi & Kim, 2021). Visual elements should align with the educational content and create a cohesive and immersive environment. Consistency in design contributes to a polished and professional appearance, enhancing the overall user experience.

Learnability focuses on how easily players can understand and navigate the game. Tutorials, tooltips, and clear instructions can aid in the learnability of the game (Chen & Chi, 2022). Ensuring that players can easily access guidance and assistance when needed can reduce frustration and support effective learning. Ramadhan et al. (2022) highlighted that learnability forms the user's initial impression and significantly enhances their satisfaction. Operability concerns the functionality and ease of interaction within the game (Martins & Mota, 2022). Player actions and decisions should result in logical outcomes, promoting a sense of agency and control. Minimizing lag or technical issues contributes to a seamless gaming experience.

Player satisfaction in EBGs is a critical outcome that reflects the overall quality of the gaming experience (Bangalee, Oosthuizen, Perumal-Pillay, Suleman, & Walters, 2021). EBGs should align with specific learning objectives. Satisfaction increases when players perceive that they have gained knowledge, skills, or problem-solving abilities through gameplay (Chang, Hu, Kuo, Nguyen & Chuang, 2022). The game's educational impact is a crucial determinant of overall satisfaction. Player satisfaction is often tied to achievement and progress within the game. Tracking progress, earning rewards, and experiencing a sense of accomplishment enhance satisfaction levels, motivating players to continue their educational journey (Bangalee et al., 2021; Tan & Mogali, 2022).

Hypotheses Development: The MEEGA+ framework identifies critical factors influencing usability and player experience, including aesthetics, learnability, and operability (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). Player usability plays a crucial role in determining user satisfaction during learning activities involving EBGs (Barbara, 2019; Begy, 2017; Ben Itzhak et al., 2023; Byusa et al., 2022).

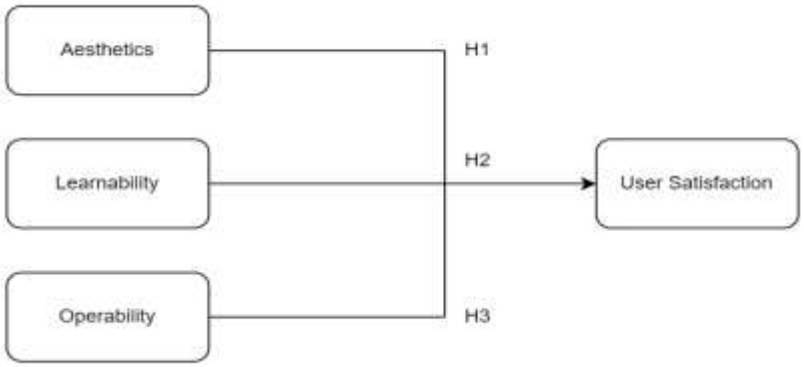
The relationship between aesthetics and user satisfaction in EBGs is multifaceted (Hsieh, 2020). Aesthetics, including game board design, artwork, and components, play a pivotal role in drawing players in, sparking initial interest, and setting the stage for engagement (Rogerson, Sparrow, & Freeman, 2022). When aesthetics align with educational content, they foster immersion, making the learning experience more enjoyable and emotionally satisfying (Razami & Ibrahim, 2022). Aesthetics can also impact motivation and long-term engagement, encouraging players to explore and learn more (Vecchio & Greco, 2023). Aesthetics, as a key factor affecting player usability, is vital in defining a game's overall attractiveness (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). Additionally, aesthetics creates positive first impressions, influencing users to approach the educational content with enthusiasm (Katsaounidou, Vrysis, Kotsakis, Dimoulas, & Veglis, 2019). This initial positivity sets the tone for the entire learning experience, enhancing overall satisfaction. Aesthetically pleasing games foster higher player engagement, motivating active exploration and investment in acquiring knowledge and skills. Therefore, we hypothesize that:
H1: Aesthetics and user satisfaction are significantly related when playing EBGs

Learnability is another critical element influencing user satisfaction (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). Learnability is pivotal for user satisfaction in EBGs because it directly affects the player's ability to engage with the educational content (Srivastava & Monga, 2023). The relationship between learnability and user satisfaction in EBGs is fundamental to creating an effective learning experience (Kontiza, Liapis, & Jones, 2020). High learnability ensures accessibility by providing clear instructions and an intuitive learning curve, removing barriers, and fostering immediate engagement. High learnability reduces frustration,

promoting a positive gaming experience and increased satisfaction (Kurisu, Okabe, Nakatani, & Moriguchi, 2021). Ultimately, easy learning motivates users to invest effort, leading to a sense of accomplishment and satisfaction (Juan & Chao, 2015). In summary, learnability enhances accessibility, reduces frustration, promotes a positive learning experience, and boosts motivation, all vital for user satisfaction in EBGs. Thus, our next hypothesis is:
H2: Learnability and user satisfaction are significantly related when playing EBGs

Operability and user satisfaction are vital when crafting EBGs (Daud, Osman, Abu Yazid, Md Taib, & Mohd Nor, 2021). Operability refers to how easily players engage with the game's rules and components, including the clarity of rules, accessibility, quality of materials, adaptability, and feedback mechanisms (Wehrle, Wiens & Schultmann, 2022). User satisfaction, on the other hand, hinges on engagement, learning value, replicability, positive social interaction, and achievement (Machado, Lima, Florido, & Silva, 2021). The review of the literature emphasizes the important link between operability and user satisfaction in EBGs. Operability, which denotes the ease of interaction with the game interface, is essential for fostering a positive gaming experience (Wehrle et al., 2022). Research findings emphasize that operability impacts the educational effectiveness of these games, with intuitive controls and clear instructions enhancing learning and satisfaction (Wang & Lee, 2022). In conclusion, optimizing operability is essential for EBGs to effectively serve as tools for both learning and enjoyment, ensuring a valuable experience for users. Therefore, the following hypothesis is developed:
H3: Operability and user satisfaction are significantly related when playing EBGs

Figure 3: Proposed Research Framework



3. Method

Sample and Procedure: The present study's sample comprised bachelor's degree students taking the Personal Financial Planning (PFP) course at the Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Cawangan Melaka, Kampus Bandaraya Melaka. Using quantitative methods and empirical data, the study aimed to establish cause-and-effect relationships and make predictions based on tested hypotheses (Brant, Haas-Haseman, Wei, Wickham & Ponto, 2015). Purposive sampling was employed to gather data from 200 full-time students enrolled in various programs, including Finance, Human Resource Management, International Business, Marketing, and Office Management, from a total of 581 students. An online survey method was used, featuring multiple-item questionnaires. Participants received links to the questionnaire via Google surveys, which utilized a five-point Likert scale from one (strongly disagree) to five (strongly agree).

Measures: The survey items measured respondents' satisfaction with usability components (aesthetics, learnability, and operability) and overall user satisfaction, based on the framework developed by Petri et al. (2016). Derived from the MEEGA+ model, aesthetics components included two items assessing the visual appeal and attractiveness of the game. Learnability was gauged using a three-item scale, focusing on the ease of understanding the game, clarity of instructions, and how quickly students could master the gameplay mechanics and concepts. Operability was assessed through a two-item scale evaluating the game's functionality, including the responsiveness of controls. User satisfaction, the dependent variable, was measured using a four-item scale from Petri et al. (2016).

Data Analysis: The study's findings were presented in two segments. Initially, descriptive statistics, correlations, and reliability analyses were discussed. Subsequently, hierarchical multiple regression models were tested, and hypothesis testing results were presented. The analyses were performed using SPSS 29.0, covering descriptive statistics, correlations, reliability, and hierarchical multiple regression.

4. Findings

Self-reported questionnaires were administered online to 200 respondents. Table 1 reveals that of the 200 respondents, 69% were male and 31% were female. The ethnicity of the respondents revealed that 100% were Malays. The program distribution of respondents showed that 60% were from Finance, 18.5% from Marketing, 17.5% from Human Resource Management, and the remaining 2% from International Business and Office Management.

Table 1: Profile of Respondents (n=200)

Criteria	Category	Total	Percentage
Gender	Male	62	31%
	Female	138	69%
Ethnicity	Malay	200	100%
	Bumiputera Sabah	0	0%
	Bumiputera Sarawak	0	0%
Programme	Finance	120	60%
	Human Resource Management	35	17.5%
	International Business	4	2%
	Marketing	37	18.5%
	Office Management	4	2%

Descriptive statistics, correlations and reliabilities: The reliability and validity of all items were thoroughly tested. Ensuring the stability and consistency of the study's instrument is vital (Sekaran & Bougie, 2013). The constructs extracted from this analysis showed excellent reliability, with Cronbach's Alpha (α) values exceeding 0.70, as recommended by Nunnally and Bernstein (1994). As indicated in Table 2, variables with a Cronbach's Alpha of 0.70 or higher were retained. The reliability of all variables ranged from 0.756 to 0.838, surpassing the acceptable threshold of 0.70, indicating sufficient reliability.

Table 2: Results of Reliability Analysis

Variables	Statements	α Cronbach's Alpha
Aesthetics	The game design is attractive (interface, graphics, cards, boards, etc.) (AESI)	
	The text font and colors are well-blended and consistent (AES)	0.832
Learnability (LEA)	I needed to learn a few things before I could play the game (LEA1)	
	Learning to play this game was easy for me (LEA2)	0.756
	I think that most people would learn to play this game very quickly (LEA3)	
Operability (OPE)	I think that the game is easy to understand (OPE2)	0.838
User Satisfaction	Completing the game tasks gave me a satisfying feeling of accomplishment (SAT1)	
	It is due to my effort that I managed to advance in the game (SAT2)	0.776
	I would recommend this game to my colleagues (SAT4)	

Table 3 presents the mean, standard deviation (SD), and correlations among the four constructs. Among all the variables, aesthetics received the highest mean value of 4.608 (SD=0.451), while learnability recorded the lowest mean value of 4.452 (SD=0.401). Additionally, Pearson's correlation values indicated a positive correlation between usability components (aesthetics, learnability, and operability) and user satisfaction when playing EBGs. The significant correlation value of 0.000 highlighted the importance of this relationship, indicating a moderate effect, as the value fell between 0.4 and 0.7.

Table 3: Mean, SD and Correlation Results

Constructs	Mean	SD	1	2	3	4
Aesthetics	4.608	0.451	1.00			
Learnability	4.452	0.401	0.490**	1.00		
Operability	4.523	0.463	0.458**	0.708**	1.00	
User Satisfaction	4.511	0.386	0.455**	0.562**	0.596**	1.00

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

Regression Analysis: Table 4 illustrates that aesthetics, learnability, and operability positively impacted user satisfaction in EBGs. Specifically, the study's objective revealed that the direct influence of usability components (aesthetics, learnability, and operability) accounted for approximately 42% of the variance in user satisfaction. Numerous factors influence human behavior in social science fields like psychology, sociology, and education, leading to lower R-squared values (Frost, 2017). R-squared values in the range of 42% can still be considered meaningful and acceptable, as indicated by previous studies in the field of education (Martínez-Jiménez et al., 2021; Wai & Tran, 2022). The beta coefficients for the three independent variables ranged from 0.184 to 0.356, thus supporting H1, H2, and H3. The results in Table 4 show that operability was the most important variable influencing user satisfaction, followed by learnability and aesthetics. In summary, this study has supported all three tested hypotheses.

Table 4: Regression Analysis Results

Predictors	User Satisfaction			
	Beta	Std. Error	t	Sig. Level
Constant	1.498	0.264	5.685	0.000
Aesthetics	0.184	0.054	2.901	0.004
Learnability	0.220	0.077	2.757	0.006
Operability	0.356	0.065	4.545	0.000

Note: R Square = 0.420; F=47.254; $p < 0.05$

5. Discussion and Conclusion

The survey results in this study emphasize the impact of usability on user satisfaction in EBGs. The data indicate that aesthetics, learnability, and operability are vital for enhancing user satisfaction. The study produced compelling results, highlighting the significant influence of these usability components on user satisfaction in EBGs. The MEEGA+ assessment model, adopted in this study, provided an objective and comprehensive framework for quantifying these elements. It was found that aesthetics, encompassing visually pleasing design elements, exhibited a strong and positive correlation with player satisfaction. EBGs with appealing aesthetics not only capture players' attention but also contribute to heightened emotional engagement and immersion (Fjællingsdal & Klöckner, 2020). A visually attractive game enhances the player's experience, making it more enjoyable and immersive (Srivastava & Monga, 2023). By assessing these factors objectively, the study established a concrete link between aesthetics and player satisfaction.

The findings of the study validate the hypothesis of a positive correlation between learnability and user satisfaction. Learnability pertains to the ease with which players understand the game's rules, mechanics, and objectives (Martindale & Weiss, 2020). EBGs that are intuitive and offer clear tutorials or instructions tend to provide a smoother learning curve for players (Yannakakis & Togelius, 2018). This reduces frustration and allows players to enjoy the game from the beginning, leading to higher satisfaction levels (Marques Netto,

2022). The MEEGA+ assessment model's ability to evaluate the learning process objectively, such as tracking the time it takes for a user to understand the game mechanics, contributed to confirming this relationship.

The study also found a strong relationship between operability and user satisfaction. Operability denotes the ease with which players can manage and interact with the game, encompassing the responsiveness of controls, the intuitiveness of menus, and the overall user interface (Lin & Lai, 2016). Games that offer responsive controls and a user-friendly interface enhance the player's sense of agency and control, leading to increased satisfaction (Swab, Cogan, Pret, & Marshall, 2021). Players are more likely to enjoy a game when they feel in command of the gameplay. The MEEGA+ assessment model's ability to objectively measure the efficiency and effectiveness of player interactions and control mechanisms was instrumental in confirming the link between operability and user satisfaction.

The study on EBGs and the use of the MEEGA+ framework offers both theoretical and practical implications. Theoretically, it advances gamification and learning theories by emphasizing the impact of gamification elements and analytics on motivation, engagement, and education. Practically, this research informs the development of game design guidelines, curriculum integration, teacher training, and inclusive design, enhancing the effectiveness of educational board games. This emphasizes the importance of data-driven design for the ongoing enhancement of educational tools, ultimately resulting in a more engaging and effective learning experience.

However, the study observed certain limitations. Firstly, the research focused narrowly on usability components such as aesthetics, learnability, and operability, overlooking other variables that can influence user satisfaction in EBGs, such as individual learning styles and interface design. Secondly, the sample was restricted to bachelor's degree students enrolled in Personal Financial Planning (PFP) courses, which may limit the generalizability of the findings. Future research should broaden the sample to include individuals from diverse backgrounds, institutions, and varying levels of financial literacy to enhance the study's applicability. Lastly, the exclusive use of a quantitative approach may have missed qualitative insights into the user experience. Future research should adopt mixed-methods approaches to comprehensively explore user experiences in educational board games and how the MEEGA+ framework can cater to a broader array of user profiles.

In conclusion, this study, utilizing the MEEGA+ assessment model, has unequivocally established a strong and positive relationship between usability components and user satisfaction in the context of EBGs. The findings confirm the critical role these elements play in shaping the overall gaming experience and user satisfaction. Aesthetically pleasing designs not only capture players' attention but also foster emotional engagement and immersion, resulting in heightened satisfaction levels. Learnability, assessed through intuitive mechanics and clear instructions, significantly influences satisfaction by smoothing the learning curve and reducing player frustration. Additionally, operability, encompassing responsive controls and user-friendly interfaces, enhances player agency and control, leading to increased satisfaction. These conclusive results underscore the paramount importance of prioritizing aesthetics, learnability, and operability in the design and development of EBGs, offering actionable insights for game developers and educators seeking to create more engaging and effective learning tools. As a result, this study contributes substantially to the enhancement of educational gaming experiences and their potential to facilitate effective learning outcomes.

Acknowledgment: The authors would like to thank Universiti Teknologi MARA (UiTM) Cawangan Melaka for supporting this article.

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Information Management and Business Review (IMBR)
Vol. 16, No. 2, June 2024 (ISSN 2220-3796)

Teaming Up for Success: A Case for Collaborative Teaching in Malaysian Strategic Management Courses

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Abstract: In higher education, research has repeatedly demonstrated the efficacy of collaborative learning as an educational technique. Higher education can benefit from using collaborative learning as an educational technique since it can raise student engagement, improve learning outcomes, and prepare them for future collaborative work settings. Today's varied and dynamic learning environment may make it impractical for traditional lecture and tutorial formats to fulfill the demands of every student. Thus, this study looks into how well collaborative teaching works for bachelor's degree students in a strategic management course. Based on the interactive questions from the industry panel, the study will specifically look at how collaborative teaching approaches affect students' capacity to apply theoretical concepts to real-world circumstances. Open-ended questions served as the basis for the thematic analysis used in this qualitative study. For a collaborative teaching session on strategic management, an industry panel was invited to give a talk. 308 bachelor's degree candidates enrolled in a 13-class course on strategic management made up the study's sample. Twice a week, before the session (preliminary survey) and during the session (session survey), data were gathered. For data processing, NVIVO version 14 software is utilized. Three categories comprise the results of the study: (1) pre-session findings; (2) in-session findings; and (3) post-session results. Each group of phases offered a response to the primary goal of the study through the use of a set of questions that were given to students via a gamification platform.

Keywords: *Collaborative Teaching, Students Learning, Corporate Social Responsibility, Sustainability*

1. Introduction

In today's rapidly changing business environment, the field of strategic management has gained significant importance. Corporations are facing increasing complexity and uncertainty, making it essential to develop effective strategies to stay competitive. To address this need, universities have recognized the importance of equipping students with the necessary skills and knowledge in strategic management. However, the challenge lies in designing a curriculum that effectively integrates theory and practice while aligning with the university's goals (Mnguni, 2019). Strategic efforts are needed to combine the objectives of the university and those for the entire program while at the same time systematically improving existing courses or planning.

Research suggests that strategic curriculum planning is one approach that can help universities achieve these objectives. By aligning teaching and learning practices, universities can ensure that students acquire the skills they need for their future careers and beyond (Li, 2022). This effort involves improving existing courses and designing new courses that address the needs of stakeholders. One pedagogical approach that has shown promise in achieving these goals is through collaborative teaching. Collaborative teaching involves the active participation of students and instructors working together in a mutually beneficial learning environment (LaForce et al., 2017). This approach fosters student engagement, critical thinking, and problem-solving skills, vital in strategic management. Furthermore, collaborative teaching can enhance students' ability to apply theoretical concepts to real-world situations, encouraging them to work in teams and engage in interactive discussions.

Research has consistently shown that collaborative learning is an effective instructional strategy in higher education. Collaborative learning is a valuable instructional strategy in higher education that can enhance student learning outcomes, improve engagement, and prepare students for future collaborative work

environments. For instance, studies have highlighted the benefits of collaborative learning in higher education, such as enhancing student learning outcomes (Heller, 2022), improving task performance, reducing errors, and providing a positive collaboration experience (Upadhyay, 2023). Collaborative learning not only prepares students for teamwork in future careers but also fosters peer-to-peer learning, cultivates new skills, and improves performance (Forbes, 2020). Moreover, collaborative learning has been associated with increased student engagement, which can lead to improved learning outcomes (Ramdass & Nemavhola, 2018).

Traditional class lectures and tutorials may not be a practical approach to meeting the needs of all students in today's diverse and dynamic learning environment (Makhura et al., 2021; Goold et al., 2007). Students come from different backgrounds and have unique learning styles, making it crucial to provide them with various methods to engage with the material. For example, in a collaborative teaching setting, students may be divided into small groups and assigned different topics to research and present to the class. This practice allows them to develop their research and presentation skills and learn from their peers, exploring different aspects of the subject matter.

However, collaborative teaching methods may not be suitable for all students, as some individuals may thrive more in a traditional lecture-based format that allows for focused individual learning and reflection. Additionally, it can be challenging to coordinate resources, justify instructors' assessments, and get the right industrial instructors to contribute to collaborative teaching. Furthermore, implementing collaborative teaching methods requires careful planning and coordination among instructors to ensure all students are actively engaged and contributing to the learning process. Additionally, providing additional support and resources for students who struggle with working in a collaborative environment may be necessary, such as offering individualized guidance or alternative learning opportunities.

Therefore, this research investigates the effectiveness of collaborative teaching in a strategic management course among bachelor's degree students. Specifically, the research will examine how collaborative teaching methods impact students' ability to apply theoretical concepts to real-world situations based on the industrial panel's interactive questions.

2. Literature Review

This section discusses the challenges related to collaborative teaching, the theory related and the effectiveness of students learning.

Challenges of Collaborative Teaching

Collaborative teaching brings about several challenges that need to be addressed to ensure its effectiveness. One of the main challenges is the coordination of resources. In a collaborative teaching setting, instructors must ensure all students can access the necessary materials and technologies to engage in group work. This pedagogy can be particularly challenging in online or blended learning environments where students may be geographically dispersed and have different technological capabilities. Furthermore, instructors must justify their assessments in a collaborative teaching setting. They must establish clear criteria for evaluating group work and ensure that individual contributions are recognized and assessed fairly. Another challenge is finding the right industry instructors to contribute to collaborative teaching. Finding industry instructors willing and able to participate in collaborative teaching can be challenging. These industry instructors often have busy schedules and may not have the resources or expertise to contribute to collaborative teaching effectively.

Moreover, time constraints and limited opportunities for interaction can also present challenges in collaborative teaching. In online or blended learning environments, students may face limited time availability and scheduling conflicts, making coordinating with their peers for collaborative projects difficult. In addition to these practical challenges, student engagement is a crucial factor to consider in collaborative teaching. Research has consistently shown a positive correlation between student engagement and academic achievement across various educational settings (Luo et al., 2023; Mallik, 2023, Zhang, 2022; Satuti et al., 2020). The engagement level of students can be influenced by various factors, such as their motivation towards the learning process, their sense of belonging, and their ability to participate in collaborative activities actively.

Furthermore, the transition to remote or online learning due to the COVID-19 pandemic has introduced additional challenges to collaborative teaching. The sudden shift to online learning has disrupted the familiar learning environment and presented students with numerous hurdles to overcome. Students have encountered difficulties adjusting to new online learning platforms, dealing with the absence of face-to-face interactions, and managing the technological aspects of remote education (Barrot et al., 2021; Seguerra et al., 2021). Additionally, among the challenges students face in collaborative teaching is the lack of social interaction and reduced opportunities for peer-to-peer and peer-to-teacher engagement. As Salas-Pilco et al. (2022) state, student engagement is defined as the degree of participation and involvement that students have in their learning process. Educators and institutions need to understand and address these challenges to optimize student engagement during and after the pandemic. The effectiveness of collaborative teaching among bachelor's degree students in the strategic management subject is a topic that warrants investigation.

Collaborative Teaching on Student Learning

Transitioning from a bachelor's to a master's degree involves changes in requirements, teaching formats, and expectations, as highlighted by Sjöblom et al. (2024). This transition signals the need for effective teaching methods that prepare students for higher academic levels. Collaborative teaching has long been recognized as valuable in promoting student learning and engagement. By fostering collaboration and active participation among students, students can develop higher-order thinking skills, enhance their problem-solving abilities, and deepen their understanding of the subject matter. Collaborative teaching facilitates academic growth and cultivates important social and interpersonal skills essential for success in the professional world. Through collaborative activities, students learn how to communicate effectively, collaborate with diverse individuals, and negotiate and constructively resolve conflicts. Studies have highlighted the positive impact of collaborative learning on student engagement and achievement (Scager et al., 2016). Collaborative learning strategies, such as promoting student collaboration in small groups, have been found to optimize individual and collective learning outcomes (Le et al., 2017). Additionally, collaborative learning has been associated with benefits such as the development of students' communicative abilities, autonomy, creative thinking skills, and cooperation abilities (Chyzhykova, 2021).

In the context of strategic management, collaborative teaching can be particularly impactful. Strategic management requires students to analyze complex business scenarios, make informed decisions, and develop effective strategies. Students can actively exchange ideas, challenge assumptions, and collectively problem-solve by engaging in collaborative projects and discussions. This collaborative approach allows students to understand strategic management concepts better and apply their knowledge in real-world situations. Furthermore, collaborative teaching in the strategic management subject can also foster critical thinking skills. Collaborative teaching has been linked to the enhancement of critical thinking skills among students by improving the quality of learning experiences (Ramasamy et al., 2022).

Students are exposed to different perspectives and alternative solutions by engaging in discussions and collaborative activities. This approach encourages them to think critically, evaluate information, and make informed decisions. Research has shown that when students are intellectually engaged, they are more likely to be motivated and actively involved in their learning process. Implementing collaborative teaching practices can also foster deeper levels of understanding through interdisciplinary connections and meaningful interactions, contributing to students' social and emotional intelligence development (Supriyadi, 2021). Collaborative teaching also provides an opportunity for students to develop important teamwork skills that are highly valued in the professional world. For instance, effective communication, task coordination, and conflict resolution skills. Implementing collaborative teaching methods in the strategic management subject can have several positive outcomes for students.

Relevant Theories on Collaborative Teaching

Collaborative teaching, also known as team teaching, involves multiple educators working together in the classroom to deliver instruction (Apandi & Rahim, 2020). The theory of collaborative teaching is underpinned by various frameworks and models. For instance, goal orientation theory serves as a foundational framework for explaining the outcomes of collaborative teaching and learning (Novicevic et al., 2003). This theory emphasizes the importance of aligning faculty goals to minimize conflicts and enhance the quality of collaborative teaching experiences. Moreover, sociocultural praxis and self-study of teaching, rooted in

sociocultural theory, play a significant role in shaping collaborative teaching practices, particularly in the context of special education (Morfidi & Samaras, 2015). This approach focuses on continuous professional development, open communication, and interaction among teachers to improve the education of students with special needs. In the realm of professional development, sustained collaborative subject-based groups supported by facilitators have been shown to enhance teacher learning (Wood et al., 2017). By utilizing a model of instructors' conceptions of teaching and a variation theory of learning, critical features of teaching necessary for effective learning are identified, emphasizing the importance of collaborative learning environments. Furthermore, collaborative teaching extends beyond the classroom, as evidenced by collaborative practices between universities and industries (Roslim et al., 2022). These collaborations involve planning, implementing, and evaluating teaching strategies to bridge the gap between academic knowledge and industry requirements.

3. Methodology

This research was conducted qualitatively by using thematic analysis based on open-ended questions. An industrial panel was invited as the speaker for virtual collaborative teaching on the strategic management session. The industrial panel holds a senior managerial position in a renowned multinational company in Malaysia. Subsequently, the last chapter of the subject was selected, entitled Business Ethics, Environmental Sustainability, and Corporate Social Responsibility. All of the five teaching instructors for the strategic management course agreed to select the topic as the theme since it is a current concern in business today. Marmat (2021) points out that education in business ethics contributes to establishing a robust ethical business environment, which can help prevent corruption and support sustainable growth. The sample of this study consisted of 308 bachelor's degree students enrolled in a strategic management course with 13 classes. The data was collected twice a week before (preliminary survey) and during the session (session survey). NVIVO version 14 software is used to run the data. The initial survey was conducted to seek the students' profile, expectations, and prior understanding of the chapter. Meanwhile, the second data collection was made to seek an understanding of the overall chapter from the students. Data was collected through interactive questions and gamification prepared by the industrial panel.

4. Findings of the Study

The study's findings are broken down into three categories: (1) pre-session findings; (2) in-session findings; and (3) post-session findings. Using a set of questions distributed to students via a gamification platform, each category of phases provided an answer to the study's main objective The pre-session clarified the students' prior knowledge and expectations for the seminar's topic. The sessions then continued with a focus on three important topics: corporate social responsibility, sustainability, and business ethics. The post-session discussions included, among other things, a discussion of the students' reflections and feedback on the overall seminars.

Pre-Session Findings This section focuses on the findings of pre-sessions or preliminary surveys before collaborative teaching begins. The speaker has given the questions earlier to get the feedback from the students. The objective of these pre-sessions is to identify students' background and student's prior knowledge of topics that were discussed in collaborative teaching.

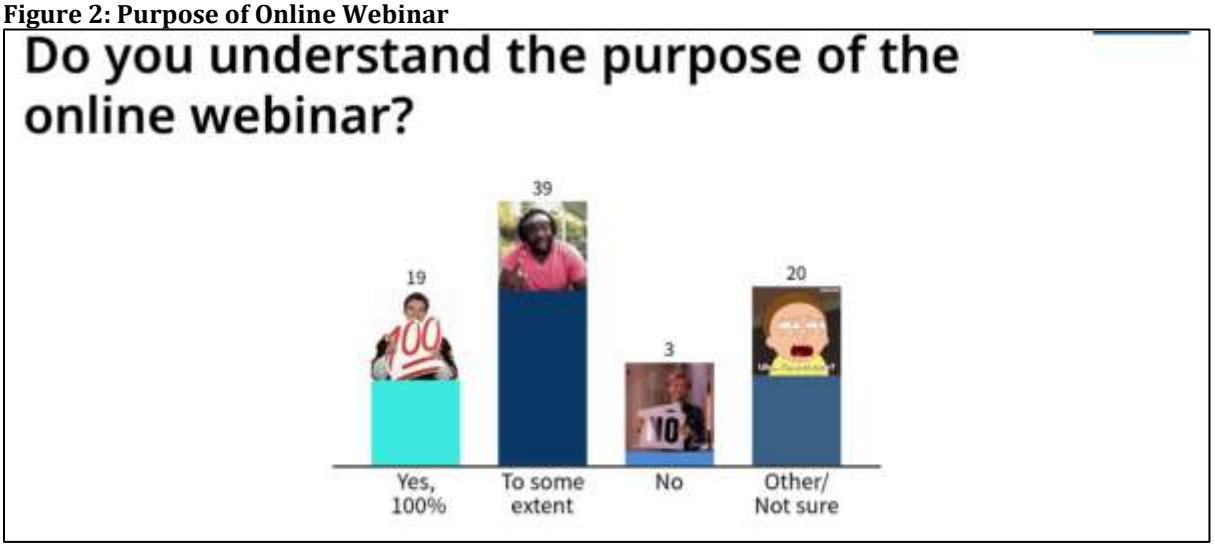
Field of Study

The first question in this pre-session is about the field of study. The speaker wants to know the student's background in the study. So that the speaker can cater to his respondent attractively. Based on Figure 1, findings revealed that the majority of students were from the field of Business and Management which covers Investment, Banking, Digital Marketing, Finance and Business Studies

Figure 1: Field of Study

Next questions regarding the purpose of the online webinar. This question is more on the speaker wants to know whether students acknowledged the purpose of collaborative teaching later

Figure 2: Purpose of Online Webinar



Based on Figure 2, findings revealed that the majority of students were total of 39 students answered to some extent which shows students either understand or do not understand the purpose of the online webinar. This is because based on the advertised poster gives a little insight to the students about the purpose of this online webinar. Meanwhile, 20 students answered other or not sure, 19 students answered yes and only 3 students answered no for the online webinar. This shows that the students are not very aware of the topic and the purpose of this webinar before the session begins.

Student's Understanding of the Topic

Students have also been asked about their understanding of the topic consisting of business ethics, environmental sustainability and corporate social responsibility.

Table 1: Student's understanding of the topic

Topics	Yes
Business ethics	3.2
Environmental sustainability	2.9
Corporate social responsibility	2.9

Table 1 shows student's understanding of the topic that will be discussed later. Based on the table, the majority of students understand the topic of business ethics compared to environmental sustainability and corporate social responsibility. Students understand about the topic of business ethics as it is very synonymous in student's lives compared to the sustainability and corporate social responsibility topic.

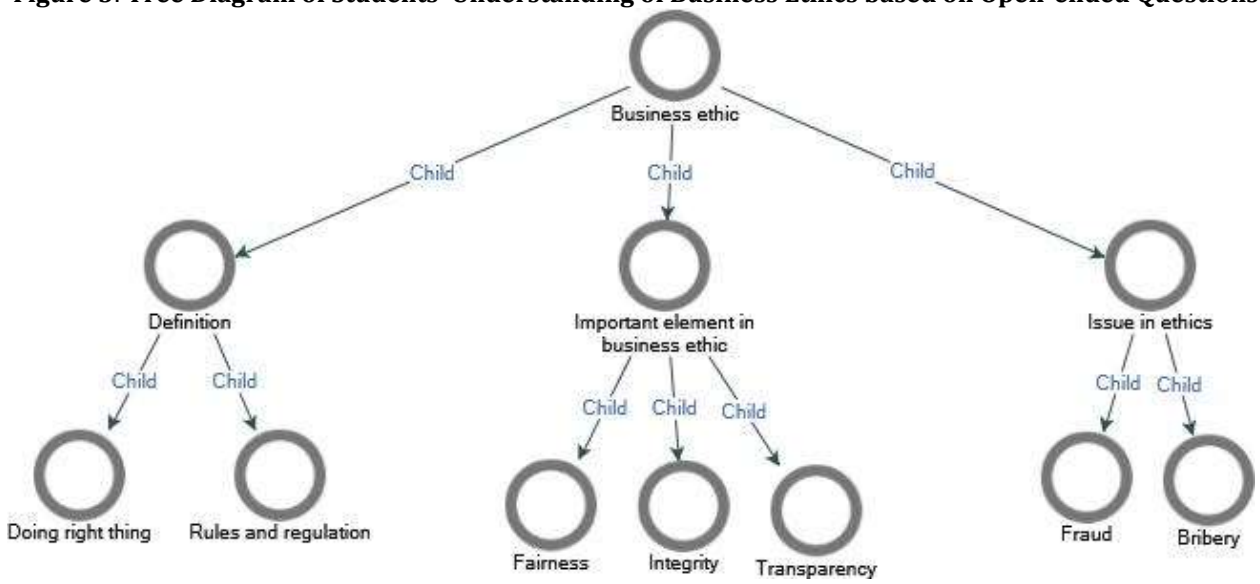
In-Session Findings

This section focuses on the findings of in-sessions in which students learned about three crucial subjects: business ethics, sustainability, and corporate social responsibility (CSR). Students actively engaged with the speaker during the in-session workshop by responding to several questions via the interactive game. The primary objectives are to examine the level of student comprehension of the subject matter and to determine how engaged the students are with the subject matter. This is crucial to ensure that students understand the concepts behind all three of these topics and can use their knowledge in the classroom.

Business Ethics

As the first topic of discussion, students were questioned about their prior knowledge of business ethics, including issues and their importance. The tree diagram based on the NVivo analysis illustrated the student's interpretation of what business ethics meant (Refer to Figure 1). Students expressed their opinions based on open-ended questions, and their findings can be categorized into three main themes: (1) the definition of business ethics; (2) key components of business ethics; and (3) issues related to business ethics.

Figure 3: **Tree Diagram of Students' Understanding of Business Ethics based on Open-ended Questions**



(Source: Authors)

Definition of business ethics

Students understand the concept of business ethics to encompass two distinct perspectives: upholding moral principles and adhering to legal guidelines. Acting morally is a reflection of one's personal beliefs and ability to

distinguish between good and wrong. Individuals' behavior and actions are governed by rules and regulations and breaking them might result in penalties. The following viewpoints from students are discussed:

Doing the right thing and avoiding the wrong thing

Nine (9) out of the students defined business ethics as "doing the right thing and avoiding the wrong thing" or "acting morally". Informants claim that conducting business ethically can assist them in avoiding unethical or unlawful behavior. To help the business owner make the right decision-making, the informant also emphasized the importance of instilling a good moral standard in the organization. Every employee must be taught to take responsibility for their wrongdoings and be instilled with this strong moral code as part of the organization's culture. Here's how one may interpret their statement:

"The standard of morally right and wrong conduct in business"
"Do something right and legal, don't do something bad and illegal"
Morally right or wrong in conducting business
"Acts of right and moral"
"Do things right"
"Moral principle"
"Moral in business"
"Do the right thing"
"Ethical leadership: Setting an example through ethical decision-making, promoting ethical decision-making, promoting an ethical culture within the organization, and holding individuals accountable for unethical behavior"

Comply with the rules and regulations.

In addition, twelve (12) informants view business ethics as related to the compliance of the rules and regulations. There will be repercussions for breaking the laws and regulations, which will set everyone's actions and behavior on the right path. In addition to these guidelines and principles in business ethics, there are other components such as company policies, business processes, business conventions, and code of conduct that all employees are expected to follow.

"Rules and regulations must be followed throughout the business"
"Code of Conduct"
"Implementing appropriate business policies and practices"
"Rules and regulations in business"
"Something that we must abide"
"Company policy"
"Business policy"
"Legal conduct"
"Rules that have to be followed"
"Business policy"
"Business custom"

Key components of business ethics

Next, students also emphasized three (3) key components of business ethics, which include (1) transparency; (2) fairness, and (3) integrity. The significance of these three components lies in their demonstration of the company's integrity towards its customers and their accountability for all its actions.

Transparency

Based on the findings, students claim that transparency promotes open communication, honesty and information sharing, which they believe is essential to business ethics. These days, a lot of companies employ reporting to give their stakeholders information about their organization, including financial performance and Corporate Social Responsibility (CSR) initiatives. They have decided to disclose their actions to all relevant parties, including their clients, by being open, and transparent about what they are doing. By doing this, they raise public confidence in their business in addition to the company's reputation.

"Transparency and accountability: maintaining open communication, disclosing information truthfully, and taking responsibility for one's actions and their consequences"
"Honesty"

Fairness

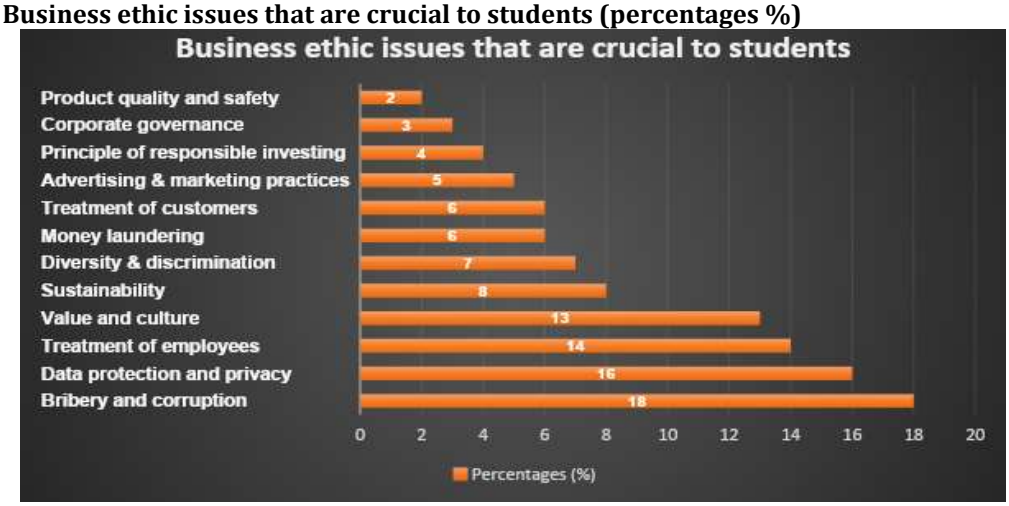
Students have also identified fairness as the idea that everyone should be treated equally and given equal opportunities in the business world, free from discrimination. Fairness and treating everyone with respect are important aspects of a strong business ethic that can support a great work environment in the company. Furthermore, regardless of background, everyone should be treated equally. Customers, for instance, should be entitled to the same quality of goods and services from the company. The statement of students can be viewed as follows.

"Discrimination"

"Fairness and equity: Ensuring equitable treatment of all individuals involved in business transactions, without discrimination and favoritism"

This is consistent with other findings of the study presented in Figure 4: it is noticeable that students regard employee treatment as the third most important issue in company ethics. When it comes to treating employees appropriately, business ethics are also regarded as being crucial. Since employees are the foundation of any successful business, they should be treated respectfully. If they are content and receive fair treatment, they will be loyal to and diligent in their job for their organization. Since they will shortly start their real working lives, students expect to be treated well by personnel.

Figure 4: **Business ethic issues that are crucial to students (percentages %)**



Integrity

Lastly, the student mentioned integrity as another important aspect of business ethics. Every company needs to take responsibility and accountability for all of its actions. Every business decision they make will have consequences for both human lives and the environment. Furthermore, companies must uphold strong stakeholder trust to sustain their business activities in the long term.

"Promoting conduct based on trust and integrity"

"No prejudice"

Issues Related to Business Ethics

Based on the findings, students identified bribery and fraud as the two main business ethics-related challenges. This is concerning since the student also linked business ethics to bribery, demonstrating the persistence of this problem in our nation. This is also in line with Figure 4's results, which show that the majority of students (18%) considered bribery and corruption to be the two main issues with business ethics. The reputation and image of the organization as well as the moral and ethical development of its personnel may suffer significantly if bribery remains a problem in the business world. People's faith in commercial companies will likewise diminish. The student's statement is shown below.

"No bribery in business"

"Policies regarding fraud, discrimination and bribery"

Sustainability

Students were first asked to answer with the first thought that emerged to mind when discussing the topic of sustainability. Assessing students' comprehension of sustainability-related ideas based on what they have read and learned in class is crucial. During the in-session, the speaker asked the students for their opinions, which were then displayed on a screen with a keyword search. Every time a student responds to a question, the answer is made visible. Figure 3 illustrates how the majority of students recognized the connection between sustainability and environmental protection, including going green, preserving resources, and minimizing harm to the environment. This is obvious given that students frequently associate protecting the environment with the sustainability of organizations, which are now held accountable for any negative environmental effects of their operations.

Figure 5: Word Search of Sustainability

In addition to the environment, sustainability also focuses on society and the economy. These components are each distinctively tied to one another and act as one another's support systems. Students learned how the environment can support steady and favorable social and economic growth, if people continue to act in a long-term manner to preserve the environment. As a result, it could aid in eradicating social inequalities and fostering faster economic growth.

Students were also questioned about the advantages businesses might experience from implementing environmental sustainability. The government's initiatives to save the environment, address social inequities, and promote economic growth have received widespread industry support. Based on Table 2, the majority of students agreed that among the benefits that businesses receive are improvements in TFCD reporting and corporate citizenship/reputational benefits. Businesses that made a greater effort to preserve the environment were viewed more favorably by the public, which ultimately improved their profitability. According to the findings, students demonstrate a prior understanding of the reporting that disclosed the environmental impact of the businesses' operations.

Table 2: Benefits those businesses received after employing sustainable-related strategies

Benefits	Strongly agree
Task Force on Climate-related Financial Disclosures (TFCD) reporting is required by law or regulation	4.2
Corporate citizenship/reputational benefits	4.1
Climate-related issues are material for the company	4.0
Peers are implementing the recommendations	4.0
Investors are requesting climate-related information	3.9
Senior management made it a priority	3.6
Overall means	**3.96**

Only two (2) items, however, were found to be below the overall means based on the information: (1) investors are requesting climate-related information, and (2) senior management made it a priority. This is reasonable given that the input from the students is likely to reflect their present understanding, observations, and experiences.

Corporate Social Responsibility (CSR)

When students were asked about the ideas of Corporate Social Responsibility (CSR), they described community, responsibility, and helping people. Students held the opinion that since businesses have benefited greatly from community support, they need to return the favor. Companies should not ignore social issues that affect their community because they are closely related to them and can play a critical role in helping to resolve them. Among the social issues that need to be focused on in our society are poverty, student dropout due to poor families and other issues. Some businesses went beyond what was necessary by giving locals jobs. They can raise their standard of living in addition to earning more money because of this.

Figure 6: **Word Search of Corporate Social Responsibility (CSR)**

Subsequently, the importance of Corporate Social Responsibility (CSR) within businesses was also posed to the students. Based on Table 3, the majority of them recognized that CSR could have positive impacts on both consumers and employees, enhance life quality, and promote environmental and social goals. Businesses may win over people's hearts and entice devoted clients to select their goods and services by engaging in CSR initiatives. Appropriate company ethics will also foster joyful workplaces and contribute to the well-being of their staff.

Table 3: Importance of CSR in business

Benefits	Strongly agree
Positive impact on employees and consumers	4.4
Create a competitive advantage in the marketplace	4.0
Improving the quality of life	4.2
Take into account environmental and social goals	4.2
Essential aspects of business, not just voluntary choice	4.0
Overall means	**4.16**

The idea that corporate social responsibility (CSR) is vital has an overall favorable response rate of 4.0 from students. Only two (2) items are slightly below the average means of 4.16: (1) Create a competitive advantage in the marketplace; and (2) Essential aspects of business, not just voluntary choice. This demonstrates how students view corporate social responsibility (CSR) as having a greater impact on the welfare of their stakeholders, particularly the community, consumers, and employees.

Table 4: Students' perceptions of differences between the 20th and 21st centuries related to corporate social responsibility

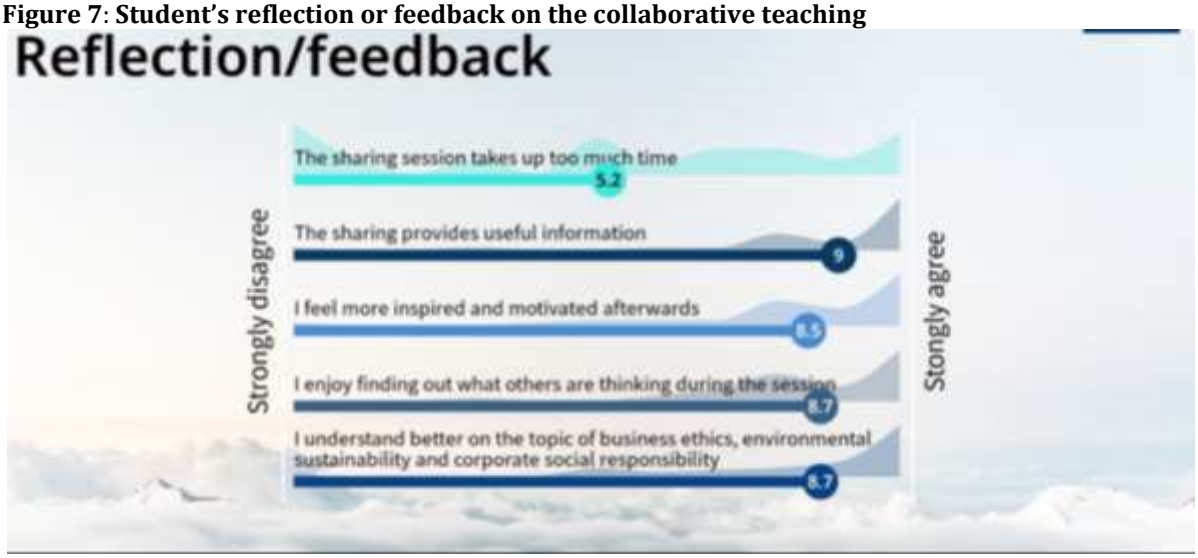
Aspects	21 Centuries
Promotional and marketing	3.7
Supply chain integrity	3.7
Accessibility and availability	3.6
Value creation	3.5
Responsiveness	3.5
Good governance	3.4
Charity and philanthropy	3.4
Stakeholders' engagement	3.3

Based on Table 4, promotional and marketing as well as supply chain integrity have the highest number of the differences between 20th and 21st centuries regarding corporate social responsibility. It is followed by accessibility and availability, value creation, responsiveness, good governance, charity and philanthropy and stakeholders' engagement. Different techniques of promotional and marketing as well as different supply chain management techniques from time to time are among the aspects students choose the answer.

Post-Session Findings

This section focuses on student's reflections on collaborative teaching. Findings are based on the level of student agreement to the questions given.

Figure 7: **Student's reflection or feedback on the collaborative teaching**



Based on Figure 7, findings reveal that the majority of students agreed with the answer "the sharing provides useful information". It follows with the answer "I enjoy finding out what others are thinking during the session" and "I understand better the topic of business ethics, environmental sustainability and corporate social responsibility". Then, the findings followed by the answer "I feel more inspired and motivated afterward" and lastly "The sharing session takes up too much time". Based on the findings, collaborative teaching provides useful information with better explanation and justification on the topic of business ethics, environmental sustainability and corporate social responsibility. The gamification activities throughout the session have given clearer understanding and information to the students.

5. Conclusion and Recommendations

In conclusion, collaborative teaching among bachelor's degree students in the context of a strategic management subject can be an effective approach to enhance learning outcomes and student engagement. By incorporating cognitive load theory and behavioral theories, instructors can optimize the instructional design and reinforce desired behaviors. Furthermore, the findings of this study suggest that collaborative teaching can promote active learning, critical thinking, and knowledge construction. Based on the research findings, it is recommended that educators and instructors in the field of strategic management consider implementing collaborative teaching approaches in their classrooms. This would create opportunities for students to actively engage with their peers, deepen their understanding of the subject matter, and develop important skills such as teamwork and communication. In addition to the recommendations mentioned above, it is also important for educators to consider the social contexts of the anticipated learners. For example, factors such as cultural backgrounds, language proficiency, and prior experience with collaborative learning may influence the effectiveness of the approach.

Therefore, educators need to establish a positive and inclusive learning environment that takes into account the diverse needs and abilities of the students. Moreover, the concept of self-determination theory should be taken into consideration when implementing collaborative teaching. This theory suggests that intrinsic motivation plays a significant role in fruitful learning. To enhance intrinsic motivation, instructors should identify motivating factors for their learners and incorporate them into the module. These motivating factors can include autonomy, relatedness, and competence. By giving students, a sense of autonomy and choice in their learning, fostering positive relationships and connections within the classroom, and providing opportunities for students to demonstrate their competence and skills, instructors can promote intrinsic motivation and engagement in collaborative learning activities. Students learn to work effectively with others from diverse backgrounds, developing social skills like active listening, empathy, and conflict resolution. While the lecturers with different strengths can combine their expertise to create more comprehensive and engaging lessons. This can lead to a deeper understanding of the material for students. Collaborative learning

environments require teamwork and communication where students work together on projects or discussions, encourage them to analyze information and explain the ideas based on their different perspectives.

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