GATR Journal of Business and Economics Review
GATR JOURNALS
Journal homepage: http://gatrenterprise.com/GATRJournals/JBER/vol7_2022_issue3.html
J. Bus. Econ. Review 7(3) 160 – 168(2022)

Exploring Factors Affecting the Mobile Commerce Adoption Among University Students in Malaysia

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ABSTRACT

Objective – The purpose of this study is to present a conceptual framework for implementing mobile commerce utilising the TAM model and the application of Individual-Collectivism at the Individual Level (ICAIL) as a moderating variable in the context of mobile commerce in Malaysia.
Methodology – The data for this study were collected from 550 randomly selected students from four Malaysian institutions using a self-administered questionnaire.
Findings – The study found that images significantly correlate with the perceived usefulness variable. In contrast, the relationships between subjective norm, output quality, and outcome demonstrability are not significant, and anxiety has a weak relationship with perceived ease of use, playfulness, perception of external control, and self-efficacy indicates significant relationships.
Novelty – Subjective norm is related to the image in a substantial way, whereas perceived utility does not affect behaviour. Furthermore, no significant link was found between the moderating variable, ICAIL, and perceived utility, perceived ease of use, subjective norm, or behavioural intention. This study investigated mobile commerce and the use of the ICAIL, which provides information progress for mobile commerce enterprises, service providers, financial institutions, and governments.
Type of Paper: Empirical
JEL Classification: F1, F10, F19.
Keywords: M-commerce; Technology Acceptance Model; Individual-Collectivism at Individual level; Perceived Ease of Use; Perceived Usefulness
Reference to this paper should be made as follows: Rahman, N.L.A; Azizan, F.L; Hassan, S; Ibrahim, D. (2022). Exploring Factors Affecting the Mobile Commerce Adoption Among University Students in Malaysia, *J. Bus. Econ. Review,* 7(3), 160–168. https://doi.org/10.35609/jber.2022.7.3(1)

1. Introduction

Mobile devices have facilitated the expansion of mobile commerce, allowing users to complete online transactions, and are crucial tools for businesses today (Puiu et al., 2022).

* Paper Info: Revised: October 24, 2022
Accepted: December 31, 2022
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E-commerce has created a subfield known as "m-commerce," which refers to wireless business-to-consumer (B2C) or business-to-business (B2B) transactions carried out via mobile handsets (Restianto et al., 2022). Due to the increasing prevalence of mobile commerce among Malaysian users, this sector has tremendous growth potential (Chan et al., 2022). Mobile commerce varies from e-commerce in that it is more pervasive and interactive, offers localization services, and has distinct usage patterns (Al‐Nabhani et al., 2022). To please clients, m-commerce also has substantial ramifications for service providers, who must offer efficient services based on the most crucial m-commerce adoption factors (Tarhini et al., 2019). In Malaysia, a study was done to comprehend the behaviour of prospective m-commerce clients. The amount of user adoption is obvious from the obstacles cited in this research for the adoption of mobile commerce. The content and services provided by mobile carriers, for instance, have an effect on the transaction, perceived security risk, purchasing power, and location-based services (Noordin & Sadi, 2010) (Sadi & Noordin, 2011) (Chong et al., 2012).

In this work, an integrated TAM3 model comprising TAM and TAM2 was utilised. According to (Venkatesh & Bala, 2008), TAM3 is a nomological network consist of aspects that influence how consumers adapt and employ technology. In addition, cultural variations must be taken into account in studies of m-commerce adoption because they may influence consumers' willingness to select their mobile Internet use (Moorthy et al., 2017). In the past, the implementation of UTAUT and Hofstede's cultural moderators within a mobile service acceptability framework utilising data from an East Asian country has been published (Bommer et al., 2022). In Middle Eastern nations, the moderating variable individual-level individualism-collectivism (ICAIL) was incorporated into the TAM 3 model (Faqih & Jaradat, 2015).

Due to the limited research in this area, (Zendehdel & Paim, 2015) assessed mobile technology adoption using Hofstede's cultural moderators. The study revealed a high association between social influence and the individualism and collectivism of Malaysian university students in their mobile internet services (4G). Unfortunately, a preliminary study has been undertaken on cultural factors' role in mobile commerce adoption in Malaysia. Therefore, this study focused on ICAIL in Malaysia, a nation with a rich cultural history and a wide variety of religious practices. Additional research on Malaysian consumer behaviour could benefit from the findings' context. By combining Hofstede's culture (ICAIL) with TAM3, the researchers expect to provide a more thorough explanation for why Malaysia has adopted m-commerce.

2. Literature Review

Competing with their rivals in the worldwide market, most enterprises have embraced e-commerce. E-commerce is still a young industry, gradually giving way to other technologies like m-commerce, which offer more excellent value (Clarke III, 2001). The change is primarily attributable to m-distinct commerce features, which include ubiquity, personalization, flexibility, and localization (Eze et al., 2011). Mobile commerce presents several different advantages over its digital equivalent, e-commerce. Business-to-business (B2B), business-to-employee (B2E), and business-to-government (B2G) transactions, which enable businesses to engage directly with customers online, have also been major drivers of rapid expansion.

Business-to-employee (B2E) and business-to-government (B2G) transactions also enable businesses to engage directly with employees (Nemat, 2011). On the other hand, mobile commerce services make it possible for business-to-consumer (B2C), consumer-to-consumer (C2C), and business-to-business (B2B) transactions to take place. C2C stands for consumer-to-consumer, while B2C and B2B stand for business-to-consumer and business-to-business, respectively (Panis et al., 2002). Business-to-consumer (B2C) and business-to-business/business-to-enterprise (B2B/B2E) are the two different types of mobile business models, as stated by (Leem et al., 2004). B2C stands for "business to consumer," while B2B/B2E stands for "business to business" and "business to enterprise." The primary objective of business-to-consumer, or B2C, models is the direct sale of products or services to final consumers (business to business; business to

employee). Mobile commerce is the phrase academics use most frequently to characterise the interchange of wireless B2B and B2C products, services, and information at various stages of a commercial transaction (Panis et al., 2002) (Elliott & Phillips, 2004). According to (Leem et al., 2004), the B2C business model may be further classified using the middleman, information, and commerce categories.

The Theory of Reasoned Action (TRA), which explores the relationship between perception and the application of technology, served as the basis for the Technology Acceptance Model (TAM) derived from TRA. TAM investigates the relationship between perception and the application of technology. The term "the theory that studies the relationship between perception and the application of technology," abbreviated as TRA, stands for "the theory that" (Fishbein & Ajzen, 1975). This model was established to provide in-depth explanations for the reasons why individuals support or oppose the introduction of new information systems. Specifically, the model focuses on the following: (Davis et al., 1989). According to this paradigm, the degree to which an information system can be considered innovative is determined by two factors; the degree to which it is recognised as useful and the degree to which it is usable. The degree to which an individual considers a technology or system to be beneficial is referred to as the perceived utility of that technology or system. As a direct consequence, the individual will have a greater propensity to utilise the technology or the system. According to (Davis, 1989), the level of perceived ease of use is defined as the degree to which an individual believes that technology will assist them in successfully achieving their goals and make them simpler to use. This definition is based on the individual's belief that technology will make it easier for them to use.

According to (Davis, 1989), the TRA is the only factor susceptible to subjective norms' influence on the behavioural intention to use. Subjective norms have the potential to influence usage intention, the impression of technical utility, ease of use, and simplicity of use in TAM2, as stated by (Venkatesh & Davis, 2000). They developed TAM2 by modeling it on TAM to determine the relationship between the factors. This enlargement of TAM incorporates not one but two processes: cognitive instrumental processes and social influence processes (including subjectivity norm, voluntariness, and image) (task relevance, quality of results, demonstrability of results, and perceived usefulness).

These two processes are included in this model. These two processes are crucial for studying user responses to technologies and systems. Previous studies of TAM2 have investigated the additional characteristics that influence perceived utility. However, a person's appraisal of the perceived utility of a system is contingent on several elements connected to their general attitude toward computer use (Venkatesh, 2000). To fix this issue, (Venkatesh & Bala, 2008) created the TAM3 model, which anchors and modifies human decision-making to assess perceived ease of use. According to the two researchers, this model can describe the aspects that determine how an individual uses technology. Individualism-collectivism is the preference of an individual to act as an individual rather than as a collective member (Srite, M., Karahanna, 2006). In mobile commerce, ICAIL is also essential for influencing consumer perceptions and decisions. Those lacking certain traits, such as individualism, may find it challenging to make selections when purchasing online (Van Slyke et al., 2010).

For this reason, TAM2 and TAM3 were incorporated into an integrated model to bridge the gap in the study. TAM2 represents the process of social influence through subjective norms and images. There was no requirement to utilise the Internet, and it was not anticipated that this would change in the foreseeable future. The TAM3 model consists of the variables perceived ease of use, self-efficacy, anxiety, playfulness, and perception of external control, as well as result demonstrability and output quality. This study omits the TAM2 and TAM3 categories subject to modification, such as experience, perceived enjoyment, and objective usability, because it only investigates the early uptake of mobile commerce among Malaysian university students. As it was presumed that the students who were the study participants were unemployed while enrolled in university, the job relevance was also removed. ICAIL was included as a moderating factor for mobile commerce uptake in this model.

3. Research Methodology

This study used self-administered questionnaires to collect data through a survey. This study employed probability sampling by selecting students from each faculty at four selected Malaysian institutions. This study split the public universities in Malaysia into four zones, representing the country's northern, eastern, central, and southern regions. Students from these regions were chosen for this research because they share similar features and can serve as a representative sample of mobile commerce users from all main ethnic groups, including Malays, Chinese, and Indians. This study's student population was proportionally drawn from four Malaysian universities.

The number 799 completed questionnaires were chosen as the sample size for this research project using the following formula: Probability sample of students equals NSP times NS divided by T, where NSP is the total number of students at each institution (USM, UMT, UKM, and UTM). Both NS and T relate to the total number of students enrolled at various universities. NS is the number of questionnaires delivered, while T is the total number of students. The duration of this survey is three months to collect all data completely. However, only 550 individuals had ever made a purchase using their mobile device. As a direct consequence, the investigation only considered the responses of 73.33 percent of the total respondents. In addition, this study included a total of 51 scale items in order to quantify the construct accurately. The scale items validated and utilised in earlier studies (Davis, 1989) (Faqih & Jaradat, 2015) (Teo & Pok, 2003) (Hsu et al., 2012) served as the foundation for the measurement items that were included in the questionnaire. The survey utilised a Likert scale with 7 points, with responses ranging from (1) strongly disagree to (7) strongly agree. In the last stage of this field study, structural equation modeling with Smart PLS 2.0 was utilised to test the model and the hypothesis.

4. Results

Content validity is the capacity of a test item to measure the notion that it is intended to assess (Hair et al., 2014). According to the definitions in the literature on multivariate analysis, all items used to measure a construct were required to have loading values greater than those of other constructs. For mutual relationships, the item's charge must be more than 0.30. The three indicators, PEC4, RES4, and ANX4, were eliminated from the mix since they did not satisfy the aforementioned loading criterion.

To achieve convergent validity, the three preferred kinds of estimations are factor loading, composite reliability (CR), and average variance extracted (AVE) (Hair et al., 2014). According to the multivariate analysis research, the loading value in Table 1 is more than 0.50 and is hence considered acceptable (Hair et al., 2014). The overall dependability of each structure was measured as having a composite value that ranged from 0.735 to 0.944, which is significantly higher than the required norms. The values of average variance extracted (AVE) ranged between 0.648 to 0.814, indicating the existence of convergent validity.

Table 1: Convergent Validity Analysis

Constructs	Item	Loading	Cronbach alpha	Composite Reliability (CR)2	AVEb
Anxiety	ANX1	0.948	0.700	0.735	0.500
	ANX2	0.555			
	ANX3	0.539			
Behavioural Intention	BI1	0.810	0.877	0.916	0.731
	BI2	0.838			
	BI3	0.886			

	BI4	0.883			
Image	I1	0.875	0.916	0.937	0.748
	I2	0.893			
	I3	0.887			
	I4	0.836			
	I5	0.832			
Individualism-Collectivism at individual level	ICAIL1	0.696	0.862	0.901	0.647
	ICAIL2	0.826			
	ICAIL3	0.850			
	ICAIL4	0.816			
	ICAIL5	0.824			
Output Quality	OUT1	0.844	0.864	0.902	0.648
	OUT2	0.845			
	OUT3	0.824			
	OUT4	0.773			
	OUT5	0.733			
Perception of external control	PEC1	0.766	0.809	0.887	0.725
	PEC2	0.893			
	PEC3	0.889			

Table 1: Convergent Validity Analysis (Continued)

Constructs	**Item**	**Loading**	**Cronbach alpha**	**Composite Reliability (CR)2**	**AVEb**
Perceived ease of use	PEOU1	0.874	0.847	0.898	0.691
	PEOU2	0.674			
	PEOU3	0.891			
	PEOU4	0.867			
Playfulness	PLAY1	0.896	0.769	0.791	0.510
	PLAY2	0.890			
	PLAY3	0.444			
	PLAY4	0.495			
Perceived Usefulness	PU1	0.891	0.922	0.944	0.810
	PU2	0.905			
	PU3	0.914			
	PU4	0.889			
Result Demonstrability	RES1	0.906	0.886	0.929	0.814
	RES2	0.929			
	RES3	0.871			
Self-efficacy	SE1	0.795	0.855	0.902	0.697
	SE2	0.872			
	SE3	0.816			
	SE4	0.855			
Subjective Norm	SN1	0.798	0.836	0.890	0.670
	SN2	0.828			
	SN3	0.832			
	SN4	0.814			

a: Composite Reliability: CR = (∑ factor loading)2 /{(∑ factor loading)2) + ∑ (variance of error)} b: Average Variance Extracted: AVE = (∑ factor loading)2 / {∑(factor loading)2 + ∑ variance of error)}

(Fornell & Larcker, 1981) proposed the use of the square roots of AVE as an additional way to confirm the validity of discriminant analysis (average variance extracted). If the items in the diagonal receive higher scores than the items in their corresponding columns and rows, then the discriminant validity of the outer model will be validated. In addition, AVE's square root needs to be greater than 0.50. According to the correlation matrix used for this investigation, the average extracted variance (AVE) square roots are larger than the other values in the rows and columns where they are situated. Following the verification of the convergent and discriminant validity, the construct validity of the outer model was established. As a result, it is reasonable to suppose that the results of verifying the pertinent hypothesis are accurate.

The research model that was constructed made use of R2 and included cross-validation of the redundancy test that was performed. The predictive importance of a model can be determined with the use of the blindfolding approach offered by Smart PLS software. The R2 value and cross-validated redundancy are displayed in Table 2 for perceived utility, perceived ease of use, perceived image, and perceived behavioural intention, respectively. Given that these numbers are more than zero, this demonstrates that the model is capable of making accurate predictions.

Table 2: Prediction Relevance of the Model

Constructs	Variable Type	R2	Cross-Validated Redundancy
BI	Endogenous	0.595	0.407
I	Endogenous	0.208	0.145
PEOU	Endogenous	0.568	0.365
PU	Endogenous	0.577	0.436

A single measure of fit is utilised in variance-based SEM, in contrast to the several measures of fit utilised in covariance-based SEM (GoF). The geometric mean of the average commonality and the average R2 is how the geometric mean of GoF is defined when using the following formula (for endogenous constructs). According to (Wetzels et al., 2009), the levels of GoF can range from tiny, equal to 0.1, to medium, equivalent to 0.25, and large, equal to 0.36. The GoF value was found to be 0.520 in this investigation, which, in comparison to the values found in the baseline, is a sizeable amount. The findings indicate that a sizeable portion of the model's average variance is utilised to assess the model's goodness-of-fit, demonstrating that the global PLS model is reliable.

Testing the hypothesis follows next after determining whether or not the model is a good fit for the data. PLS bootstrapping, advocated by (Hair et al., 2014), was used in the survey of the proposed model, and the Smart PLS 2.0 tool was used to conduct the testing. The results of the investigation provided evidence to support eight different hypotheses: H2, H4, H5, H8, H9, H10, H12, and H13. The findings, however, provided evidence against hypotheses H1, H3, H6, H7, and H11. Although the p-value of H11 is significant (less than 0.5), the hypothesis indicates a positive relationship, which contradicts the hypothesised negative relationship. In contrast to hypotheses H14 and H15, perceived usefulness and perceived ease of use did not significantly change the relationship between individual-level individualism and collectivism and behavioural intention (=-0.037, t = 0.804, p > 0.1). It follows that hypothesis H16 was not supported, indicating that individualism and collectivism did not change the relationship between perceived ease of use and perceived usefulness, as expected in this study at the individual level. Furthermore, hypothesis H17 shows that individualism and collectivism do not significantly impact subjective norms and behavioural intention at the individual level.

5. Discussion

The study has indicated that the findings demonstrate eight (8) supported hypotheses H2, H4, H5, H8, H9, H10, H12, and H13. The results showed the t-values and p-values by using bootstrapping technique for H1 until H7. The findings show a strong and beneficial relationship between behavioural intention and subjective norm. This discovery is similar to other research findings (Faqih & Jaradat, 2015). The assumption is that users want to participate in the activities if they believe the referent thinks this conclusion should strongly support them. In addition, this study's results indicate a strong and positive correlation between perceived usefulness and behavioural intention and reported simplicity of use. This implies that respondents prefer to make purchases using online applications because they are more convenient, and it also suggests that they are more inclined to embrace mobile commerce in the future. It is supported by (Faqih & Jaradat, 2015), who also agreed that people would be more inclined to use m-commerce if they consider it easier to use and useful. Consequently, this argument is supported.

In addition, this model demonstrates a favourable association between self-efficacy and perceived external control and reported ease of use. The findings indicate that mobile operator workers assist students in overcoming technological challenges, such as downloading and installing applications on a smartphone. The study's results suggested that the gamification element is significant and advantageous in influencing perceived usability. The findings are congruent with those of (Hackbarth et al., 2003), who found that the level of youthful playfulness is greater than that of earlier generations. Consequently, the more playful a person is with m-commerce, the more likely they are to experiment with mobile interactions, as they positively view their usability.

The current result demonstrates that perceived usefulness is not a crucial predictor of behavioural intention. The findings can be explained by the fact that students choose to use social media for entertainment and that the system will not boost their job performance. As a result, they are not adopting mobile commerce for business transactions, which is anticipated to negatively influence each employee's performance. In addition, this study asserts that subjective norms have a small effect on perceived utility, which is consistent with the findings of previous research (Faqih & Jaradat, 2015). Without a doubt, if the students consider the system to be ineffective, they may not view its adoption as beneficial and worthwhile.

The study's findings also support the thesis that perceived utility is not empirically changed by output quality or the demonstrability of results. This is because of a number of limitations, such as the incapacity of the mobile commerce system to be implemented and achieve its employment goals, the low screen resolution of mobile devices, and the sluggish connection to their mobile networks at their various universities. To facilitate consumer adoption of m-commerce, it is essential to provide mobile applications with sufficient output and enhanced systems. In addition, students will not engage in mobile commerce if the demonstrability of results implies that the system is deficient. To address this issue, mobile commerce providers should improve the system's quality to achieve high outcomes demonstrability and make it more user-friendly.

Taking into account the moderating context of this investigation, the results reveal no moderating link between perceived usefulness, perceived ease, and ICAIL-related behavioural intention. This is likely due to the fact that regardless of their amount of collectivism or individuality, Malaysian students tend to adopt m-commerce in a similar manner. This finding contradicts a previous study conducted in Middle Eastern countries, which found that ICAIL had a stronger moderating influence on the relationship between perceived utility and behavioural intention for collectivism than for individualism (Faqih & Jaradat, 2015). This study revealed that a person's intention to adopt m-commerce is not contingent on their capacity to make an independent, logical choice. Moreover, this study revealed that cultural and moral variations account for the disparate adoption rates of information technology in the East and West. Therefore, Malaysian students

who are either extremely individualistic or extremely collectivist tend to behave similarly when using their mobile devices for m-commerce.

6. Conclusion

The researchers were able to grasp an appropriate model that can be utilised to analyse the causes of mobile commerce adoption among university students in Malaysia based on the discussion of pertinent theories from prior studies. Additionally, this study has shown that Emerging nations provide a theoretically sound framework for the TAM3 model with culture. In addition, contrary to how it is regarded in this study, individualism-collectivism at the personal level had no modest influence on the adoption of m-commerce. This study expands our awareness of the several crucial elements that may have an impact on mobile commerce customers' behavioural intentions, which is essential for marketers at companies that provide this service. In addition, the study will aid financial services in implementing mobile commerce by illuminating the difficulties and behavioural patterns of Malaysian youth.

Last but not least, additional research is required in the context of mobile commerce due to the limitations of the current study. First, to generalise the findings of the current study, other people may be employed as respondents in future studies. In the future, additional factors such as perceived risk and trust may influence the adoption of m-commerce. Future studies can use a qualitative method, such as an in-depth interview, to collect relevant characteristics that may be associated with the adoption of m-commerce and to acquire a more profound knowledge of how consumers perceive the adoption process in m-commerce.

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