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The Integration of Technology Acceptance Model and Theory of Planned Behaviour to Determine Consumers' Intention to Use Mobile Commerce in Malaysia

Moussa Barry
Department of Business Administration, Kulliyyah (Faculty) of Economics and Management Sciences, International Islamic University Malaysia, Malaysia

Abstract: Mobile commerce has rapidly developed in the last few years. However, consumers' widespread acceptance of its transactions in Malaysia poses a significant obstacle for m-commerce suppliers. This paper proposes to examine the factors impacting mobile commerce use in Malaysia. Convenience sampling was employed to integrate TAM and TPB, and 350 surveys were collected online from customers residing in Selangor, Malaysia. The current study employed a two-stage structural equation modelling approach to investigate the research model and evaluate the hypotheses. The results show that perceived usefulness, subjective norms, and ease of use significantly impact consumers' intention to adopt m-commerce in Malaysia. In contrast, attitude and perceived behavioural control do not significantly impact the intention to use m-commerce. Hence, the findings of this paper offer significant advantages for m-commerce providers in Malaysia, particularly for firms that are working towards effectively adopting mobile commerce and enhancing consumers' willingness to utilise mobile commerce in Malaysia. The findings of this paper are advantageous for academics, marketers, policymakers, and practitioners.

Keywords: Mobile commerce, intention, TAM, TPB, Malaysia.

Introduction

The increasing utilisation of smartphone devices has improved online businesses (Sarkar et al., 2020). Nevertheless, businesses can now fundamentally revolutionise their interactions with customers. Mobile commerce, also known as m-commerce, involves using wireless devices like smartphones, cellular phones, or PDAs coupled with a network to access information and conduct transactions for goods, services, or information (Barry et al., 2024b). Nevertheless, the increasing utilisation of mobiles has influenced conventional business procedures. Wireless telecommunications have

emerged as the primary means of improving conventional infrastructure through standardised technology (Nokia, Yrjölä, &Matinmikko-Blue, 2023; Jain, Kaul, & Sanyal, 2021).

Mobile commerce, or m-commerce, refers to various activities such as mobile payments, transactions, and creating mobile applications for sharing information about items (Borambayeva et al., 2023; Gaghana& Sutomo, 2023). M-commerce acceptance is guided by ease, extensive accessibility, and social interaction (Lee et al., 2023). The obstacles and difficulties that Islamic banks encounter in mobile banking must be resolved (Yazid et al., 2023). Smartphone devices are important in mobile commerce acceptance and need to be studied (Gilstrap & Gilstrap, 2023; Barry et al., 2024d).

The objective of developing the Gallera mobile application in 2023 is to offer a convenient means of ordering meals. In addition, a study by Yazid et al. (2023) presents a customisable and adaptable usability model for m-commerce apps, emphasising various uses and potentials of m-commerce. The study by Lee et al. (2023) examines the key aspects that impact confidence in mobile shopping applications and buy intents. The study highlights the significance of user familiarity, online purchaser evaluations, and mobile app design as critical drivers.

As per the World Bank, the global mobile phone user population is anticipated to exceed 8.27 billion, with over 6.5 billion individuals utilising smartphones. The anticipated expansion of this statistic is predicted to be significant in the forthcoming years (Statista, 2022). According to the International Telecommunications Union (ITU), almost 4.9 billion people, representing 63% of the global population, used the Internet in 2021. This represents an increase compared to 16% in 2005 (ITU, 2022). As of April 2022, Internet usage reached 5 billion (63%) worldwide and 4.65 billion (93%) are social media users (Statista, 2022). Malaysia has significantly increased the number of people using the Internet and subscribing to smartphones in recent decades (Barry et al., 2024a; Barry, 2024a; Barry, 2024b). Although the Internet and smartphones have become more widely used in Malaysia, the acceptance of m-commerce is still low (Yahaya et al., 2022; Barry et al., 2024c). Furthermore, compared to e-commerce, the acceptance of m-commerce is also low (Barry et al., 2024a), despite the convenience of smartphones allowing consumers to use them at any time and place.

This paper includes variables in a conceptual framework focusing on exploring drivers of mobile commerce in Malaysia. Previous studies have primarily focused on theories including the unified theory of acceptance and use of technology (UTAUT). This study advances a novel perspective on drivers of mobile commerce in Malaysia. Prior studies have attributed considerable significance to the perspectives of smartphone subscribers. Nevertheless, this paper distinguishes itself by studying the

potential implications of smartphone consumers in embracing mobile commerce activities. Most of the population in Malaysia comprises persons who fall within the working-age demographic. In 2022, the data shows that the percentage of adults in the working-age category was 69.5%. The age group mentioned is the primary cohort that actively participates in monthly online transactions and has the biggest digital spending in the country (Abdullah et al., 2024). However, despite the potential of this population, mobile commerce adoption in Malaysia is lagging electronic commerce (Barry et al., 2024b).

Investigating the factors that drive mobile commerce among consumers in Malaysia would be beneficial for building strategic plans that effectively overcome current barriers to acceptance. Data was collected using questionnaires, resulting in a response rate of 92.10%. The researchers utilised both univariate and multivariate methods to analyse the data. The study reveals a robust and affirmative correlation between consumers' intention to utilise mobile commerce and aspects such as ease of use, usefulness, subjective standards, and perceived behavioural control. This study combines the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB). Nevertheless, the behaviour exhibited by consumers had a negligible effect on their intention to engage in mobile commerce.

This study has important implications for professionals, scholars, and mobile commerce providers who want to understand consumers' viewpoints and implement mobile commerce services in developing nations. This study contributes to the existing body of research on m-commerce by examining the link between subjective norms, usefulness, attitude, ease of use, and perceived behavioural control and their effect on the intention to use mobile commerce in Malaysia. However, determining such elements can allow mobile commerce suppliers to invest effectively in developing a viable m-commerce ecosystem nationwide. This study is crucial for marketers and policymakers as they strive to optimise the advantages of m-commerce platforms, which aligns with Bank Negara's objective in aiming for a cashless society.

Theoretical Underpinning

Technology Acceptance Model (TAM)

Several proposals have been put up to understand customers' intention to use information systems technology. The primary goal of TAM is to forecast IT usage, it also explores the usage of computer technology by end-users from different demographic groups (Davis, 1989). Hence, this study explored factors impacting customers' intention to use mobile commerce in Malaysia.

TAM has been widely used in various areas, such as m-commerce, QR code payment, mobile payment, online learning platforms, mobile shopping, mobile

banking, FinTech adoption, government IT governance, electronic money, and electronic commerce. Research continually demonstrates that individuals' views of the ease of use and usefulness of technology significantly impact their attitudes and behaviours toward its actual usage. Several factors impact technology adoption, including perceived ease of use, perceived usefulness, subjective norms, perceived interest, perceived enjoyment, or pricing etc.

Theory of Planned Behaviour (TPB)

TPB suggests that one's intentions to employ a specific behaviour are mainly persuaded by one's attitude towards the behaviour, the subjective norms related to the behaviour, and the perception of control over it. These factors are crucial in determining planned behaviours (Ajzen, 1991). Developing TPB aims to improve the accuracy of predicting outcomes based on TRA. Ajzen (1991) suggested adding perceived behavioural control to TPB. Perceived behaviour control was not incorporated as a TRA model. TPB has been employed to analyse the relationships between concepts, attitudes, intentions, and actions in several domains of human behaviour. However, previous studies have tried integrating TAM and TPB to identify the drivers of mobile commerce (Hasan et al., 2024).

Hence, this research will combine these two theories to explore drivers of mobile commerce among Malaysian consumers. The exogenous variables in this study are attitude, perceived usefulness, subjective norms, perceived ease of use, and perceived behavioural control. The endogenous variable is the intention to use mobile commerce. The subsequent section broadly discusses the exogenous variables and their correlation with the endogenous variable, drawing upon research conducted by prior studies.

Literature Review

M-Commerce

A portable handheld device is used to perform mobile electronic commerce transactions called m-commerce (Taneja, 2021). There is no universally accepted definition of mobile commerce (Grădinaru et al. (2022). Nevertheless, scholars have endeavoured to provide a precise definition of it. Ramana et al. (2022) viewed it as any financial operation using a wireless device. Mobile phones, tablets, and laptops are commonly utilised devices for mobile commerce (Barry et al., 2024b). Mobile commerce, as described by Abdelkarim and Nasereddine (2010), is the process of using electronic devices to transfer ownership of items. It refers to transacting goods and services via a portable device (Mehedintu&Soava, 2022).

M-commerce, often known as m-commerce, is an advancement of online shopping that enables consumers to cooperate with other consumers or businesses using wireless technology without being limited by time or location (Mollick et al., 2023). Cellular telecommunications networks enable direct and indirect transactions (Jin & Youn, 2022). Mobile devicesce, as defined by Alkailani and Nusairat (2022), encompasses any transaction that occurs through a mobile device and wireless telecommunications involving the exchange of economic value.

Nevertheless, mobile commerce has witnessed substantial expansion, particularly in examining consumers' behaviour and its impact on sales (Jain & Tan, 2022). Balagué and Zhao (2021) examined how mobile social commerce has replaced online social business. El-Ebiary et al. (2021) investigated the potential advantages and obstacles linked to platforms such as Foodpanda. Generation Z is highly inclined toward embracing mobile commerce, with a specific preference for mobile apps (Puiu et al., 2022). According to Vărzaru and Bocean, (2021), the COVID-19 pandemic has expedited the expansion of m-commerce, particularly emphasising enhancing the speed of the internet. Williams (2021) highlighted the importance of convenience, usefulness, and innovation.

Intention

Multiple factors impact the propensity to accept m-commerce. The primary attributes of m-commerce that improve the probability of purchase include convenience, extensive accessibility, and social engagement (Lee, Lee, & Choi., 2023). Satisfaction, subjective norms, ease of use, and usefulness are key elements affecting the intention to use m-payment systems (Ankadhitra, Christiandy, & Tamara, 2023). The critical determinants of continuous intention in mobile payment platforms in emerging economies include performance expectancy, social influence, effort expectancy, conducive circumstances, intrinsic motivation, price value, and prior experience (Nwosu & Ike-Elechi, 2023). Gunawan et al. (2023) discovered that social and peer influence substantially impacted the intention to make purchases in electronic commerce.

Furthermore, Social influence, trust, and happiness are vital in effectively adopting m-payment systems (Ifada& Abidin, 2023). Performance expectancy, effort expectancy, conducive environment, perceived trust, and digital financial literacy significantly influence the intention of street sellers to accept m-payment systems (Nandru et al., 2023). The level of involvement in e-WOM communication on WeChat is affected by functional, hedonic, and social factors, which subsequently contribute to the intention to participate in such communication (Pang & Wang, 2023). Ankadhitra et al. (2023)

found that individuals' intention to use mobile food delivery services is influenced by their innovativeness, trust, ease of use, and perceived value.

When a consumer's interest is impacted by their intentions it becomes evident and directs it to a specific objective. Intention is typically associated with an individual's involvement in an activity, which is impacted by their belief in an object. In 1989, Davis labelled intention as the individual's probability of adopting a specific behaviour. An individual's intention affects their utilisation of technology, precisely their intention to embrace and sustain it (Venkatesh Thong, & Xu, 2012).

The phrase intention to use m-commerce pertains to the probability of customers accepting the novelty (Vinerean et al., 2022). It is the probability that consumers will participate in online transactions via m-commerce (Wu & Wang, 2005). In this study, the researchers agree that intention to use mobile commerce refers to the probability of users participating in electronic purchases via a smartphone.

Attitude

TPB delineates the precise connection between beliefs and attitudes. According to this notion, an individual's assessment or viewpoint of behaviour is influenced by their readily available views. In this theory, belief pertains to the individual's subjective probability of behaviour resulting in a specific outcome (Ajzen, 1991). Several researchers have found that attitude positively influences the intention to use mobile commerce. Yasin et al. (2024) found that attitude and intention are significantly related. Similarly, Sutrisno (2024) revealed that attitude strongly predicts intention. Abdallah et al. (2024) identified attitude and ease of use as strongly predicting intention. Additionally, Wijaya (2024) revealed attitude and usefulness to influence intention significantly. These studies prove that attitude and other factors can significantly affect the intention to use mobile commerce among consumers in Malaysia.

Furthermore, a study by Ahmed and Barry (2023) and Barry et al (2024) revealed a significant link between attitude and behavioural intention. Barry and Jan (2018) and Barry (2016) also discovered that attitude is significantly associated with intention among young customers in Malaysia. Barry (2024b) also found a significant relationship between attitude and intention to use mobile commerce. However, Barry and Jan (2016) proposed a direct positive link between attitude and intention. Therefore, based on these studies, the researcher proposed the subsequent:

H1: Attitude has a positiveeffect on the intention to use mobile commerce.

Subjective Norms

Subjective norm is the influence of peers on an individual's decision to execute a specific behaviour (Ajzen, 1991). However, several researchers have examined how subjective norms influence the intention to engage in mobile commerce. In their study, Yasin et al. (2024) encountered that subjective norms significantly influence the intention of young adults in Malaysia to utilise mobile health applications. Restianto et al. (2024) found a direct link between subjective norms and intention. This correlation is influenced by user happiness, which acts as a mediator. Marpaung et al. (2024) discovered a significant correlation between subjective norms and customer satisfaction, subsequently affecting intention. Abdullah et al. (2024) discovered that subjective norms had a minor impact on mobile payment adoption among adults of working age in Malaysia. Barry (2024b) also found a significant relationship between subjective norms and intention to use mobile commerce. Therefore, the researcher propose the following:

*H2:*Subjective norm positively affects the intention to use mobile commerce.

Perceived Behavioural Control

Perceived behavioral control refers to an individual's perceived ease or difficulty associated with a specific behaviour (Ajzen, 1991). Many scholars found a positive link between perceived behavioural control and intention. Abdullah et al. (2024) found that perceived behavioural control strongly impacts the intention to use mobile payments. Restianto (2024) also discovered that perceived behavioural control is significantly associated with intention. Similarly, Yasin et al. (2024) revealed that perceived behavioural control significantly predicts intention. Allahham and Ahmad (2024) also found that perceived behavioural control significantly affects the intention to use artificial intelligence. Barry (2024b) also found a significant relationship between perceived behavioural control and intention to use mobile commerce. Therefore, based on these findings, the researcher proposed the following:

*H3:*Perceived behavioural controlpositively affects the intention to use mobile commerce.

Perceived Ease of Use

Perceived ease of use is when a consumer thinks using m-commerce is free of effort (Davis, 1989). However, scholars found perceived ease of use and usefulness to be strong predictors of intention to use mobile commerce in Malaysia. Asastani et al. (2018) revealed that ease of use significantly affects intention. Earlier in 1989, Davis discovered the same result. Similarly, Basuki et al. (2022) found that ease of use substantially links with intention. Additionally, Zuniarti et al. (2021) also discovered

that intention is strongly predicted by perceived ease of use. However, Chan et al. (2022), Anifa and Sanaji (2022), Susanti (2022), Ferdianto (2022) Widiar et al. (2023), and Lee et al. (2023) found similar results. Indicating that perceived ease of use substantially influences intention. Barry (2024a) also found a significant relationship between perceived ease of use and intention to use mobile commerce. Therefore, based on these studies, the researcher propose the following:

*H4:*Perceived ease of use has a positiveeffect on the intention to use mobile commerce.

*H5:*Perceived ease of use has a positiveeffect onperceived usefulness.

Perceived Usefulness

TAM suggests that the perceived usability of a technology directly impacts its perceived value. These impressions are additionally shaped by extrinsic variables such as confidence in the system, environmental support, social impact, gender, and age. The main factor is the perceived usefulness. Davis (1989) found that the perceived usefulness of something had a more significant impact on behaviour changes than the perceived ease of use. People mostly use technology for their functionality rather than relaxation (Davis, 1989). Perceived usefulness refers to an individual's evaluation of how much a feature technology will enhance job execution (Davis, 1989).

Various academics have continuously shown a strong and straightforward connection between perceived usefulness and intention. Perceived usefulness is positively associated with the intention to engage in mobile purchasing (Chan et al., 2022). Ferdianto (2022) showed that perceived usefulness is positively linked with intention. Anifa and Sanaji (2022) found that perceived usefulness is a strong predictor of intention. Similarly, WidiarYuniarinto, and Yulianti (2023) discovered that perceived usefulness positively influenced intention. Lee et al. (2023) revealed that perceived usefulness has a significant link with the intention to use mobile commerce. Ligaraba et al. (2023) found that the perceived usefulness of a product influences people's intentions to purchase it and use it again. Susanti and Alamsyah (2022) found that usefulness is the strongest predictor of intention. Yu and Huang (2022) studied the relationship between the perceived usefulness of m-payment and mobile gaming on commerce platforms. They identified a direct association. Barry (2024a) also found a significant relationship between perceived usefulness and intention to use mobile commerce.Consequently, the researcher proposed the following:

*H6:*Perceived usefulness has a positiveeffect on the intention to use mobile commerce

*H7:*Perceived usefulness mediates between perceived ease of use and intention.

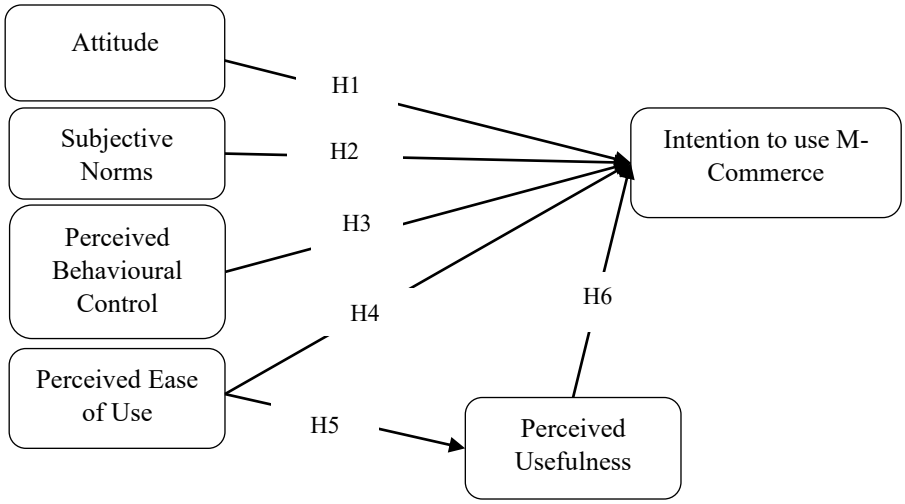

Figure 1.Conceptual framework of intention to use m-commerce

Research Methodology

Sampling and Data Collection

This study comprises people residing in Selangor who are 18 years and above and possess smartphones, selected by the convenient sample approach. It focuses on surveying people in Selangor, with a particular emphasis on the high number of people who are 18 and above, own smartphones, and conduct mobile commerce (Barry et al., 2024a; Barry et al., 2024d).

Data was gathered using survey questionnaires distributed online fromMayto August 2024 via a Google form. The link to the survey's form, accompanied by a description clarifying the purpose of the study, was sent to the intended respondents via various social media platforms, including Facebook, Instagram, TikTok, and WhatsApp. The selection of these platforms was based on their extensive adoption in Malaysia. The hyperlink was available to the target demographic for three months, enabling participants to appropriately complete the questionnaire by clicking the provided link or scanning the QR code. Respondents had the option to participate in the poll voluntarily. Following a three-month data collection period, duplicate or erroneous answers were eliminated to maintain the integrity of the dataset. 380 questionnaires were collected, generating 350 usable responses from diverse smartphone users.

Research Instruments

The questionnaire employed in this research is categorized into two parts:Part AandPart B.Part A of the questionnaire sought to collect demographic information

from the participants.Part Bincludes five variables that impact consumers' intention to use mobile commerce. These components include perceived usefulness, attitude, perceived ease of use, subjective norms, and perceived behavioural control. The survey instrument consisted of 31 items. A five-point Likert scale was employed to evaluate the degree of agreement or disagreement with each topic, ranging from 1-strongly disagree to 5-strongly agree. The participants were provided with information regarding the study's objectives and were instructed to complete the survey only if they were familiar with or had utilised a mobile commerce system. Voluntary participation was required, and meticulous attention was given to gathering and analysing the data. After analysing the filled-up surveys, the data was examined to determine if it followed a normal distribution. When conducting data analysis using factor analysis, it is necessary to test for multicollinearity, homoscedasticity, and linearity assumptions.

Research Model

Hypothesis testing determines the validity of the proposed relationships stated in H1, H2, H3, H4, H5, and H6. A two-stage SEM is utilised to assess the correlation between the exogenous and the endogenous variable. However, the measurement scale for each instrument is an interval scale, and the analysis using Structural Equation Modelling is conducted based on the factor loading obtained from the exploratory factor analysis.

Resultsand Discussion

Demographic Profiles of the Respondents

Thedemographic profilesof the participants are displayed in Table 1 below. The table shows that 50.9 % (178) are males, while the female responses were 49.1% (172). Most respondents are Malaysians (74.9%) aged between 24 and 29 (31.1%). In addition, most of the respondents are single (67.4%) and have a bachelor's degree (52.6%).

Table 1.Demographic Characteristics of the Respondents

Demographic variables		Research Sample (n = 350)	
Gender	Male Female	Frequency	Percentage (%)
		178 172	50.9 49.1
Age	18 – 23 24 – 29	91 109	26.0 31.1

	30 – 35 36 – 41 42 – Above	65 49 36	18.6 14.0 10.3
Nationality	Malaysian Non-Malaysian	262 88	74.9 25.1
Marital Status	Single Married	236 114	67.4 32.6
Level of Education	Diploma Bachelor Master PhD	21 184 97 48	6.0 52.6 27.7 13.7

Source: Authors' Computation

Reliability Test

The data distribution exhibits a range of skewness values, ranging from -1.656 to +0.143. Similarly, the kurtosis values range from -1.347 to 4.645. Given that the skewness and kurtosis coefficients are below ±3 and ±10, the entire dataset may be inferred to follow a normal distribution (Kline, 2011). Table 2 displays the findings of the reliability test. The variables tested in the study showed Cronbach's alpha values vary between 0.843 and 0.904. All variables obtained a score beyond 0.60, indicating their reliability (Hair et al., 2010; Barry, 2024a; Barry, 2024b).

Table 2.Reliability Analysis

Variable	Cronbach's alpha	Number of items
Attitude	0.843	4
Subjective Norms	0.851	4
Perceived Behavioural Control	0.863	6
Perceived Ease of Use	0.904	7
Perceived Usefulness	0.871	6
Intention	0.848	4

Source: Authors' computation

Factor Analysis

Factor analysis refers to a statistical method employed to identify and understand a study's underlying structure of variables. Factor analysis is a statistical technique that simplifies many items into a smaller set of essential factors that include all the variables. The variable structure is assessed and analysed in a specific context using

reliable tests, such as factor analysis, to verify if each construct shares a similar underlying concept. Therefore, the example elucidates the correlation between variables. This study utilises the KMO measure of sampling adequacy to produce components and evaluate the authenticity of the items. Kaiser (1974) suggests a minimal criterion of 0.5. The findings are average if they fall between 0.5 and 0.7, acceptable from 0.7 to 0.8, excellent from 0.8 to 0.9, and outstanding if they exceed 0.9. The KMO result obtained in the study is exceptionally high (0.915), as indicated in Table 4.

The current research applies a data-reduction technique to limit the number of items utilized in this investigation. Consequently, factor analysis is utilised to reduce the number of items to a smaller group of fundamental elements while minimising the loss of information. In this study, the factor loading for the rotation matrix is regarded as critical and fixed at 0.5. Any score below this threshold is deemed unimportant and should be excluded from the analysis (Hair et al., 2010). The result indicates that all items had values higher than 0.5, suggesting that all variables are significant. Additionally, the Eigenvalue results indicate that the survey questions were strongly associated with seven distinct factors, collectively explaining 67.743% of the total variance.

KMO and Bartlett's Test of Sphericity

The KMO and Bartlett's Test were employed to evaluate the scales' unidimensionality level (see Table 3). The results specify that the KMO value is 0.915, within the recommended threshold range of 0 to 1, as Field (2009), Barry and Haque (2024),and Barry et al. (2024d)suggested. The p-value for the Sphericity Tests is below 0.001, showing statistical implication. Thus, the factor analysis encounters the condition.

Table 3.KMO and Bartlett's Tests

KMO and bartlett's test		
KMO Sampling Adequacy Measurement		0.915
Sphericity Test	Approx. Chi-Square	6791.371
	Degree of Freedom	435
	Sig.	0.000

Source: Authors' Computation

Convergent and Discriminant Validity

The composite reliability (CR) and average variance extracted (AVE) were used to assess the reliability, convergent validity, and discriminant validity. It is advised that the CR should exceed 0.7, and the AVE should be higher than 0.5 to demonstrate substantial dependability (Hair et al., 2010; Barry et al., 2024d). The CR should be greater than the AVE to establish convergent validity. Furthermore, the combined AVE of the variables should be greater than the correlation value to demonstrate discriminant validity. The results from Table 4 demonstrate that the AVE for each construct was greater than 0.501, while the CR exceeded 0.816. This suggests that the structures were sufficiently reliable and precise. Moreover, all the structures displayed indicate acceptable discriminant validity, as indicated by the square root of the AVE being more significant than their correlation coefficients (see Table 4).

Table 4.Convergent and Discriminant Validity

	CR	AVE	MSV	ASV	SN	PEU	ATT	INT	PU	PBC
SN	0.860	0.677	0.416	0.249	0.823					
PEU	0.906	0.580	0.490	0.375	0.474	0.762				
ATT	0.856	0.613	0.468	0.347	0.557	0.638	0.783			
INT	0.817	0.528	0.416	0.338	0.645	0.640	0.574	0.727		
PU	0.832	0.502	0.490	0.352	0.409	0.700	0.684	0.586	0.708	
PBC	0.868	0.525	0.343	0.234	0.356	0.586	0.470	0.436	0.539	0.724

Source: Authors' computation

Structural Equation Model (SEM)

The study model was analysed using SPSS AMOS 24. The adequacy of the model's fit was evaluated by employing five SEM fit indices. The results show that the fit indices do not meet the requirement. Therefore, a few modifications were needed to meet this requirement. However, based on the modification indices, some items are correlated INT1-INT2, INT3-INT4, PU2-PU3, PU2-PU5, PU4-PU5, PU5-PU6, and the item PU1 was deleted due to low loading. After modification of the model, the results show that the chi-square is 917.162, and the normed chi-square is 2.555. GFI, CFI, IFI, and TLI are 0.910, 0.913, 0.914, and 0.908, respectively, indicating that all values exceed the threshold value of 0.90. RMSEA is 0.067 lower than the threshold of 0.08. Therefore, the model matched the data well, as all goodness of fit indices fell within the permissible limits (Bentler & Bonett, 1980; Barry et al., 2024d, Barry, 2024a; Barry, 2024b).

Hypothesis Testing

Table 5 presents the findings of the hypotheses testing. Figure 2 shows the features of the causal routes, consisting of the standardized path coefficients.

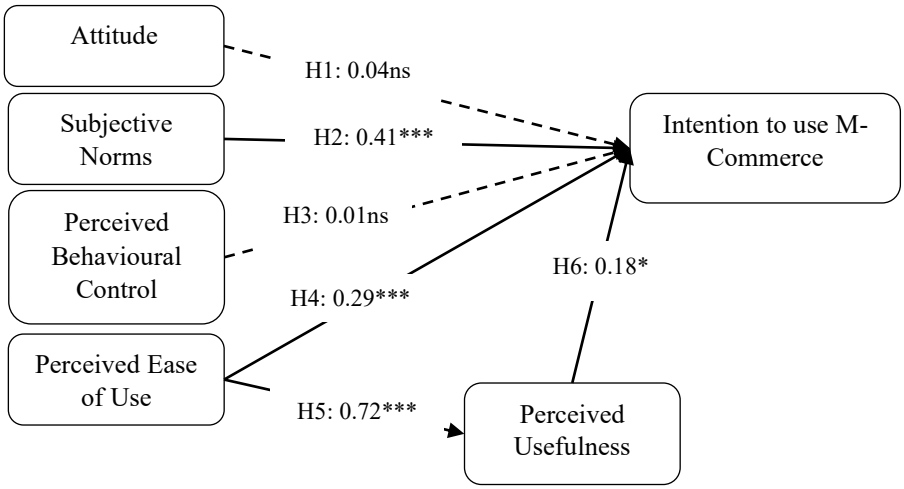

Figure 2.Hypothesised intention mobile commerce in Malaysia

Table 5.Hypotheses Testing and Results

H	Paths	Coefficient (β)	Standard Error	Critical Ratio	P-value	Result
H1	Intention <--- Attitude	0.037	0.157	0.475	0.635	Not Supp
H2	Intention <--- SubjectiveNorms	0.413	0.111	5.922	***	Supported
H3	Intention <--- Perceived B.C	0.008	0.053	0.123	0.902	Not Supp
H4	Intention <--- Perceived E.U	0.294	0.101	2.964	0.003	Supported
H5	Perceiveduseful <--- Perceived E.U	0.719	0.059	9.393	***	Supported
H6	Intention <--- PerceivedUseful	0.179	0.117	2.007	0.045	Supported

Note: *** indicates significance level < 0.001

Mediation

This study tested usefulness as a mediating variable between perceived ease of use and the intention to use mobile commerce among consumers in Malaysia. The results from 2000 samples of bootstrapping and 95% confidence interval analysis indicate no mediation effect (β = 0.131, p = 0.117). According to Table 6, perceived usefulness does not mediate the link between perceived ease of use and intention. However, this result is supported by Widiar et al. (2023). In contrast, the result contradicts Andavara et al. (2021).

Table 6.Mediation Effect of Perceived Usefulness

H	Paths	Total Effect (PEU → INT)		Direct Effect (PEU → INT)		Indirect Effect (PEU→PU→INT)		Results
		Coeff *(β)*	P-value	Coeff *(β)*	P-value	Coeff *(β)*	P-value	
H7	PEU--->PU--->INT	0.043	0.010	0.299	0.024	0.131	0.117	No Mediation

Source: Authors' computation

Result of the Hypothesis Testing

As shown in Table 5 above,fourregression coefficient pathsout of the six proposed in the conceptual model were statistically significant. Assessment of the path revealed that attitude has no significant effect on intention (β = 0.037, p =0.635) providing no support for hypothesis 1. This result contradictsAbdullah et al. (2024) and aligns with Marpaung et al. (2024).There was a statistically significant relationship between subjective norms and intention (β = 0.413, p <0.001) providing support for hypothesis 2.There was no statistical significance relationship between perceived behavioural control (β = 0.008, p <0.902) and intention contradicting hypothesis 3. However, perceived ease of use (β = 0.294, p =0.003) and perceived usefulness (β = 0.179, p = 0.045) significantly predict intention to use mobile commerce to support hypotheses 4 and 6 respectively. Moreover, perceived ease of use (β = 0.719, p <0.001) significantly predicts perceived usefulness proving support for hypothesis 5.In addition, the mediation regression coefficient path results (β = 0.131, p =0.117) as illustrated in Table 6 show no mediation effect providing no support for hypothesis 7.

Discussion and Implication

The purpose of this study was to integrate the technology acceptance model and theory of planned behaviour in the context of mobile commerce adoption intention in Malaysia. The results challenge some of the basic assumptions of the theory of planned behaviour. As attitude and perceived behavioural control showed no significant effect on the intention.

This research ascertained that subjective norms have a significant effect on the intention to use mobile commerce. Hypothesis 2 result indicates that subjective norms positively impact the intention to utilise m-commerce. Nevertheless, the positive impact of subjective norms on the intention to utilise mobile commerce is statistically and practically significant. Hence, supporting Hypothesis 2. This result is confirmed by Yasin et al. (2024) who revealed that subjective norms strongly predict intention. Ahmed and Barry (2023)and Barry et al (2024) also found subjective norms were a significant determinant of intention. Additionally,Restianto et al. (2024)witnessed that subjective norms and intention have a positive and significant relationship. Marpaung et al. (2024) revealed that subjective norms were a strong predictor of intention through satisfaction. Thus, all these scholars found a substantial positive relationship between subjective norms and intention. In contrast, Abdullah et al (2024) revealed a minor relationship between subjective norms and mobile payment adoption among adults of working age in Malaysia.

As shown in Table 5, perceived behavioural control has no statistical significance on the intention to use mobile commerce. However, this relationship is statistically and practically insignificant providing no support to Hypothesis 3. However, this finding contradicts Restianto et al. (2024) who revealed a significant relationship between perceived behavioural control and intention. Allahham and Ahmed (2024) also found that perceived behavioural control is a strong predictor of intention. Ahmed and Barry (2023) and Barry et al (2024) found that perceived behavioural control and intention have a significant positive relationship. Thus, all these studies revealed a substantial positive link between perceived behavioural control and intention. In contrast, the finding aligns with Zhang (2024), who observed no substantial correlation between perceived behavioural control and intention.

This study also investigated the effect of perceived usefulness and perceived ease of use on intention to use mobile commerce. The results indicate that perceived ease of use and perceived usefulness are pertinent in predicting the intention to use mobile commerce supporting hypotheses 4 and 6. This finding aligns with the findings of Barry et al. (2024b) who revealed a significant relationship between perceived ease of use and intention to use mobile commerce.Users may simply have a positive and favourable intention to use mobile commerce if they find it easy to use (Widiar et al.,

2023).Consumers will only use mobile commerce if they find it useful and easy to use (Susanti, 2022).Perceived ease of use and perceived usefulness are the strongest predictors of intention to use mobile commerce (Ferdianto, 2022). However, Chan et al. (2022) found that perceived usefulness and intention are significantly related. Barry and Jan (2018) also found that perceived ease of and perceived usefulness significantly predictthe intention to use mobile commerce. This finding is also supported by Barry and Jan (2016) and Barry et al. (2024c). Therefore, it is evident that the more mobile commerce is useful and easy to use the more consumers will have a positive and favourable intention to use it. In contrast, the finding contradicts Barry et al. (2024a) who revealed that perceived ease of use and perceived usefulness have no significant effect on the intention to use mobile commerce. Restianto et al. (2024) also discovered that perceived ease of use and perceived usefulness do not predict the intention to use mobile commerce.

The study also investigated the effect of perceived ease of use on the perceived usefulness. The results imply that perceived ease of use has a significant effect on perceived usefulness in mobile commerce supporting hypothesis 5. This result aligns with Andavara et al. (2021) who discovered that perceived ease of use and perceived usefulness have a significant positive relationship. Consumers may find mobile commerce useful so long as it is easy to use (Barry et al., 2024a). Users are motivated to use mobile commerce systems when it is easy to use (Barry et al., 2024b). When consumers can easily use mobile commerce systems to get accurate information, they can surely use it (Barry et al., 2024c; Barry &Jan, 2018). This result is also supported by Barry and Jan (2016) found a significant relationship between perceived ease of use and perceived usefulness. Therefore, this indicates that perceived ease of use is a prerequisite for perceived usefulness in mobile commerce. In contrast, this result contradicts Mahaputra and Mahaputra (2023), who found while perceived ease of use positively impacts perceived usefulness, this impact is not statistically meaningful.

The study also investigated the mediation effect of perceived usefulness in the relationship between perceived ease of use and intention to use mobile commerce. The results indicate that perceived usefulness has no mediation effect between perceived ease of use and the intention to use mobile commerce providing no support to hypothesis 7. This result contradicts Andavara et al. (2021) who found that perceived usefulness mediates the relationship between perceived ease of use and intention. In contrast, Widiar et al. (2023) revealed no mediating effect of perceived usefulness in the relationship between perceived ease of use and intention. It could be argued that so long as mobile commerce system is useful consumers will always find a way to learn how to use it, which may lead to creating a more favourable and positive intention to use it.

Theoretical Contribution

This study uses TAM and TPB as a theoretical framework to explore the drivers of mobile commerce activities in Malaysia. The findings demonstrate that customers agreed with and acknowledged mobile commerce's potential. Our study investigated how customers' ability to manage their behaviour, perceived usefulness, and the ease of mobile commerce affect their desire to use it. This research focuses on a new and unexplored area. The findings are consistent with those of prior experts, who suggest that customers' intention to accept mobile commerce impacts their adoption. By understanding this concept, individuals can modify their experiences and activities to meet consumers' needs, enhancing their ability to engage in mobile commerce activities effectively.

Another significant finding confirms the impact of perceived behavioural control (H3), perceived ease of use (H4), and perceived usefulness (H6) on consumers' intentions. These findings offer valuable insights into the correlation between consumers' impression of m-commerce and their intention to use it, enabling us to enhance our comprehension of this subject. Furthermore, an intriguing discovery was made regarding the substantial influence of perceived ease of use on the perceived usefulness of m-commerce (H5). Interestingly, perceived usefulness did not mediate the link between perceived ease of use and intention to use m-commerce. Nevertheless, this may be due to cultural or religious issues, as Malaysia is a Muslim-majority country.

Managerial Implications

Consumers' intentions will increase if m-commerce providers improve their technology, including their platforms, to be reliable, advantageous, and user-friendly. The strong correlation between the perceived usefulness and ease of use directly impacts the intention to employ mobile commerce. To enhance the adoption rate of m-commerce among consumers in Malaysia, m-commerce providers should utilise a series of strategic marketing decisions and integration strategies to cultivate a favourable and optimistic awareness in the minds of consumers. Malaysian Communication and Multimedia Commission (MCMC) and other policymakers in Malaysia should implement robust policies to guarantee superior internet connectivity in the communications sector. This would enable mobile commerce providers to offer exceptional services, motivating consumers to participate in mobile commerce activities. To promote the acceptance of m-commerce in Malaysia, mobile commerce providers need to establish robust partnerships with website and app designers, smartphone manufacturers, and telecommunication companies.

To increase the rate at which mobile commerce is embraced, designers of mobile commerce applications or websites could arrange seminars or training sessions to acquaint users with the features and procedures of mobile commerce. However, this will allow users to be familiarised with mobile commerce systems, and it will also allow providers to answer all queries the user may have about their system and reduce stress by providing support to users. They must interact with users, ensuring that confidentiality and data protection issues are addressed and emphasising the security and privacy standards in place while using mobile commerce. Businesses must also assure consumers that their financial data is protected throughout any mobile commerce transaction. This will encourage customers to engage in mobile commerce and stimulate the expansion of the mobile commerce industry in Malaysia, ultimately significantly impacting the Malaysian economy.

Mobile commerce providers must allocate resources and make strategic investments to enhance the application's performance, ensuring it meets or surpasses user expectations. Consistently evaluate and enhance the technological components, speed, and overall functionality to positively influence customer behavioural intention. Enhanced performance may have a direct correlation with heightened user intention. They must emphasize user experience design to develop intuitive platforms that require minimal cognitive effort to navigate. Enhancing perceived ease of use and optimizing perceived behavioural control can substantially impact consumers' intention to use mobile commerce. It is essential to have ongoing monitoring and user feedback systems to achieve continual improvement. They must address technical and logistical concerns swiftly to establish a seamless workflow. Create an optimal atmosphere for application utilisation by enhancing customers' attitudes and behavioural control. Possible enhancements could include enhancing server efficiency, addressing software problems, and guaranteeing a seamless user experience. Enhancements in attitudes and behavioural control directly influence consumers' behavioural intentions. They should maintain and improve consumers' subjective norms to positively influence behavioural intention. They should provide strong customer support to improve behavioural intention, leading to a higher mobile commerce adoption rate in Malaysia.

Conclusion

This study explores the drivers of mobile commerce in Malaysia, specifically concentrating on attitude, perceived usefulness, subjective norms, perceived ease of use, and perceived behavioural control. The paper proposes a framework for future investigation and practical experimentation, highlighting the aim of utilising mobile commerce to enhance the effectiveness of service providers. After data analysis, the

results show that perceived behavioural control, perceived ease of use, and perceived usefulness are the most critical factors driving Malaysian smartphone owners' intention to use mobile commerce. Nevertheless, this study is limited by its belief in quantitative data and lack of qualitative evidence to uphold its claims. In Malaysia, consumer intention can also be influenced by privacy, security, cost, perceived trust, and cultural or religious factors. Future studies could employ a qualitative method, such as interviews, to enhance mobile commerce activities and foster positive intention. Furthermore, the data gathered in the Klang Valley of Malaysia does not encompass the entirety of Malaysia. Potential future studies could encompass additional states and undertake comparative studies between Malaysia and other developing nations. Lastly, the research framework of this study can be used in various contexts of technological behavioural intention.

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