The Impact of Using M-Commerce Platforms on M-Commerce Performance - Applying UTAUT2 and is Success Integration Model

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Abstract

Mobile commerce or M-Commerce is increasingly popular because of many outstanding advantages associated with a unique business model that allows businesses to transact products and services directly with customers via wireless devices connected to the Internet, like a phone or tablet. The purpose of this study is to determine the impact of mobile commerce platform (MCPs) adoption by retailers in Vietnam on mobile commerce performance through applying The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and The Information Systems Success (IS success) integration model. Data from 796 retail representative respondents were included in the empirical analysis. The findings show that MCPs providers, managers, retailers and stakeholders should pay attention and enhance Effort Expectancy, Facilitation Conditions, Social Influence, Hedonic Motivation, Habits, Human Resources to enhance behavioral intention of using MCPs. On the other hand, retailers increase Facilitation Conditions, Behavioral intention to promote behavioral of using MCPs. From there, promoting Use behavior, bringing satisfaction in using MCPs to increase M-Commerce Performance. These research results have some important implications in applying the UTAUT2 and IS Success integration model, deploying the application into practice to determine the factors affecting the M-Commerce performance of retailers in Vietnam.

Keywords: Behavioral intention, m-commerce, IS success, UTAUT2.

Introduction

M-commerce is transactions involving the transfer of rights to use goods and services through the use of mobile electronic devices to access the network (Tiwari and Buse, 2007). M-commerce is the ability to purchase goods anywhere via a wireless Internet-enabled device (Clarke, 2008). M-commerce is activities that include shopping and purchasing through mobile devices along with the development of mobile payment systems (Hillman and Neustaedter, 2016). Therefore, m-commerce refers to commercial or business activities through mobile phones or tablets. This is a modern form of commercial transaction that allows individuals or businesses to conduct any type of commercial transaction through the use of mobile devices to access an online trading platform.

M-Commerce is an important part of e-commerce. The development of MCPs has brought many benefits to both businesses and customers. MCPs bring outstanding convenience, time saving and flexibility in transactions, meeting the needs of individuals, businesses and creating many benefits for customers, etc. Customer satisfaction is one of the important factors contributing to increasing revenue, developing the market, expanding business and attracting more customers. In Vietnam, the e-commerce market could reach 13.90 billion USD in revenue by 2024, which is expected to have an annual revenue growth rate of 11.21%, leading to a value The market could reach 23.65 billion USD by 2029. The number of users could reach 24.61 million users by 2029. In 2024, the user penetration rate will be 21.4% and is expected to reach 24.6% by 2029. The average revenue per user is expected to reach 745.40 USD (Statista, 2024).

For retailers, MCPs contribute to effectively increasing revenue, opening up widespread marketing opportunities, positioning them on a larger scale, and helping retailers connect with customer loyalty. and increase M-Commerce efficiency. Besides, smartphone users in Vietnam are likely to increase (+15.04%) to 12.7 million users from 2024 to 2029 and will reach 97.19 million users in 2029 (Statista, 2024). The growth of the e-commerce market, the benefits of using MCPs, and the increasing number of smartphone users are favorable conditions that promote the growing development of M-commerce. The strong development of MPCs promises to open up many business opportunities, smart applications have been applied to retailers' business strategies to increase M-commerce efficiency. Therefore, studying the impact of MCPs on the performance of mobile commerce will contribute to increasing the use of MCPs and making the business operations of retailers in Vietnam more effective.

Literature and Hypotheses

The IS success Model

DeLone and McLean (1992) developed a successful IS

model to measure information system performance. The six factors in the successful IS model include Service Quality, System Quality, User Satisfaction, Information Quality, Individual Impact, Organizational Impact. The factors in this model are interrelated, Service Quality, Information Quality, System Quality affect user satisfaction; User satisfaction and information system usage are factors that influence personal impact; and this impact he has on individual performance, as well as organizational impact. A number of factors inherited from this model will be integrated with the UTAUT2 model, as can be seen in Figure 1.

The UTAUT2 Model

Based on the UTAUT model, Venkatesh et al. (2012) identified three factors such as Price Value, Hedonic Motivation and Habits into the UTAUT to create the UTAUT2 model to predict users' technology adoption and usage behavior. The UTAUT2 model has eliminated the imperfections of the theories The Technology Acceptance Model (TAM) of Davis (1989) and Theory of Reasoned Action (TRA) of Fishbein and Ajzen (1975) applied to the models. apply new technology. Factors inherited from the UTAUT2 model will be integrated into the IS success Model, as shown in Figure 1.

Hypothesis Development

From inheriting the elements of the UTAUT2 model, the IS success model, integrating these models and adding other elements to create a research model as can be seen in Figure1.

Factors affecting Behavioral intention and Behavior of using MCPs

Performance expectancy (PE) is stated as the degree to which a user believes that there are benefits to using a technology system for their activities (Venkatesh et al., 2012).Many previous researchers have asserted that performance expectancy plays an important role and has a positive impact on behavioral intention to use M-commerce (Jaradat and Al Rababaa, 2013). Chong (2013) demonstrated that performance expectations have a positive impact on behavioral intention of using Mcommerce. The study of Alsheikh and Bojei (2014) also suggested that performance expectations significantly impact behavioral intention of usingM-commerce and companies providing goods and services should increase the use of M-commerce. Fadzil (2017) showed that performance expectancy has a significant relationship with the behavioral intention of using mobile applications. Sair and Danish (2018) found that behavioral intention to use mobile commerce is significantly influenced by performance expectations. This result may provide many advantages for mobile commerce companies and in developing effective strategies. Sabri Alrawi et al. (2020) revealed that the behavioral intention of using Mcommerce is significantly affected by performance expectancy. The findings of Dagnoush and Khalifa (2021) show that the behavioral intention of using M-commerce is affected by performance expectations. Therefore, hypothesis H(PE) can be posed as:

H(PE): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by performance expectancy.

Effort Expectancy(EE) is elucidated as the convenience and ease of using a technology system (Venkatesh et al., 2012).Fadzil (2017) showed that effort expectancy has a positive impact on the behavioral intention of using mobile applications. Sair and Danish (2018) revealed that the behavioral intentionsof usingM-commerce are positively affected by effort expectancyand the results of this study contribute to enriching and adding value to strategies Attract potential consumers effectively. Sabri Alrawi et al. (2020) indicated that the behavioral intention of adopting M-commerce is affected by effort expectancy. Utomo et al. (2021) measured mobile app effectiveness using the UTAUT model showing that effort expectancy can increase the behavior intention of using mobile apps. Research on M-commerce usage has provided practical guidance to managers on solutions to improve M-commerce usage. Because, the research results confirm that the expected effort of adopting M-commerce increases the behavioral intention of using M-commerce, or in other words, expected effort has a positive influence on behavioral intention of using M-commerce (Dagnoush and Khalifa, 2021). Thus, hypothesis H(EE) is proposed as follows:

H(EE): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by effort expectancy.

Social Influence (SI) refers to the adoption of new technology platforms by adopters being affected by the beliefs of important people in their lives, such as family, friends, etc (Venkatesh et al., 2012). According to Chong (2013), social influence has a positive impact on the behavioral intention of using M-commerce and users of these platforms have the freedom to choose to use them to transact goods and services.Fadzil (2017) showed that the social influence has a positive impact on the behavioral intention of using mobile applications. Sabri Alrawi et al. (2020) showed that the behavioral intention of using Mcommerce is affected by social influence. The results of the study by Hwang and Mulyana (2022) found that social influence can lead to the behavioral intention of using commercial trading platforms. This makes it possible for product providers to adopt this factor as a stronger social influence factor will drive behavioral intention to use the app for commercial transactions. Hence, hypothesis H(SI) is stated as follows:

H(SI): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by social influence.

Facilitation Conditions (FC) refer to the perception and behavioral performance of technology users. When these people have the support of resources and have the necessary abilities, they will intend to use technology (Venkatesh et al., 2012). Research on M-commerce adoption by users of this platform has shown that facilitating conditions have impact on the behavioral intention of using M-commerce (Chong, 2013). Fadzil (2017) revealed that facilitation conditions significantly impact behavioral intention when using mobile applications. Sabri Alrawi et al. (2020) found that the behavioral intention of using M-commerce is affected by facilitating conditions.Utomo et al. (2021) measured mobile app effectiveness using the UTAUT model showing that facilitation conditions can increase behavior and behavior intention to use mobile apps. Therefore, two hypotheses are presented as follows:

H(FCa): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by facilitating conditions

H(FCb): The Vietnamese retailers' behavioral of using MCPs are positively affected by facilitating conditions

Hedonic Motivation (HM)is described as the enjoyment or pleasure derived from the adoption of technology platforms by users (Venkatesh et al., 2012). According to Dwivedi et al. (2014), enjoyment is one of the important factors to determine behavioral intention towards adopting Mcommerce applications among platform users. Hew et al. (2015) suggested that the hedonic motivation impacts on the behavioral intention of using mobile commodity trading applications. Fadzil (2017) indicated that the hedonic motivation impacts on the behavioral intention when using mobile applications. Hedonic motivation has a positive impact on behavioral intention to use commodity trading platforms (Ezennia and Marimuthu, 2022), as well as the creation of hedonic motivation has a positive impact on behavioral intention to use MCP (Ha, 2023). Hypothesis H5 is formulated as follows:

Hypothesis 5 (H5): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by hedonic motivation.

Price Value (PV) represents the technology adopter's perception of the costs and benefits received. At the same time, this is one of the factors that affects the behavioral intention of technology adopters (Venkatesh et al., 2012). Wei et al. (2009) argued that price value affects the success of M-commerce development of goods suppliers through their behavioral intention to adopt mobile commerce. Fadzil (2017) demonstrated that the price value has a positive impact on the behavioral intention of using mobile applications.Kwofie and Adjei (2019) found that the price value positively effect on the adopters' behavioral intention of using M-commerce. Research by Rufino (2021) indicates that price value is positively correlated with the behavioral intentions of commodity trading platforms adopters on mobile devices. Therefore, hypothesis H(PV) is stated as follows:

H (PV): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by price value.

Habits (HA)are the factors affecting technology use, this is the frequency of user activities through learning to perform technology use behavior automatically (Venkatesh et al., 2012). Fadzil (2017) showed that habits have a positive impact on the behavioral intention of using mobile applications.Kwofie and Adjei (2019) showed that habits positively impact the adopters' behavioral intention of using M-commerce.Research by Utomo et al. (2021) measured mobile app effectiveness using the UTAUT model showing that habits can increase intention to use mobile apps. According to Hwang and Mulyana (2022), if using commercial transaction platforms has become a habit, then the behavioral intention of using these platforms will certainly be formed. Because habits can lead to behavioral intentions to use trading platforms. Hence, two hypotheses are indicated:

H(HAa): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by habits.

H(HAb): The Vietnamese retailers' behavioral of using MCPs are positively affected by habits.

Behavioral intention (BI) is a determinant of a technology adopter's intention to continue using the technology (Venkatesh et al., 2012). In M-commerce, behavioral intentions of M-commerce adopters represent their willingness to use M-commerce (Bhattacherjee, 2001).According to Hung et al. (2004), the impact of behavioral intention using of MCPs is statistically significant. Because these platforms are expected to bring about a thriving market for goods and service providers, they recognize the potential behavior of using MCPs. The behavior of people adopting technology or using new technology is influenced by their behavioral intentions (Zhang et al., 2012). Behavioral intention of using MCPs and factors that influence intention of using MCPs have an impact on developing appropriate marketing strategies for m-commerce use. M-commerce use behavior is affected by behavioral intention of people adopting this commerce platform (Sabri Alrawi et al., 2020). Thus, hypothesis H(BI) is proposed as follows:

H(BI): The Vietnamese retailers' behavioral intentions of using MCPs are positively affected by behavioral intention.

Factors affecting User Satisfaction

Use Behavior (UB) is defined as actions measured by the actual frequency of using a particular technology platform (Venkatesh et al., 2012). Empirical research on the combined model of different IS success models (DeLone and McLean, 1992) has highlighted the extremely important association between use behavior and user satisfaction.McKeen et al. (1994) found that information systems development that involves users in system development activities leads to greater usage and ultimately higher user satisfaction. The study of Ghobakhloo et al. (2013) also confirmed user satisfaction through technology acceptance of using M-commerce in business. User behavior has a strong impact on user satisfaction because users themselves contribute to their own satisfaction (Harnjo et al., 2021). Hence, hypothesis H(UB) is stated as follows:

H(UB): The Vietnamese retailers' behavioral of using MCPs are positively affected by use behavior.

Service Quality (SQ)is the meeting or exceeding of users' needs or expectations of a service (Parasuraman et al., 1985). Service quality also represents the quality that the information system provides and this is the service that the system user receives with the ability to accurately meet technical capacity, ensure reliability and empathy with the user (Petter et al., 2013). Magi and Julander (1996) research demonstrated that the outcome of service quality as perceived by users will lead to user satisfaction. Service quality and user satisfaction are interrelated and in fact, service quality leads to user satisfaction. The study of Magi and Julander (2009) demonstrated that user satisfaction is a result of service quality perceived by users. Liu et al. (2010) asserted that the usage quality of M-commerce online service meets users' needs and this leads to enhanced user satisfaction. According to Salameh and Hassan (2015) service quality impacts user satisfaction, thereby providing insights for researchers and practitioners in the field of Mcommerce transactions. M-commerce service quality is the main factor affecting user satisfaction and improving this platform to enhance user satisfaction (Ye and Liu, 2017). When using the IS success model for research, Jaafreh (2017) found that user satisfaction is positively influenced by service quality. Siahaan and Legowo (2019) demonstrated that service quality is a significant factor influencing user satisfaction. The study of Ismail et al. (2020) also showed that M-commerce online service quality is important in determining user satisfaction. Hence, hypothesis H(SQ) is described as follows:

H(SQ): The Vietnamese retailers' satisfaction is positively affected by M-Commerce service quality

System Quality (SY) is the advantages of an information system such as its intuitiveness, flexibility, ease of use, sophistication, reliability and response time system suitability (Petter et al., 2013).Mobile platform user satisfaction is stimulated by system quality, and in the Mcommerce context, system quality of MCPs positively impacts the satisfaction of MCPs adopters (Yeh and Li, 2009). Liu et al. (2010) found that the online system quality of M-commerce meets the user needs and this has impact on enhancing user satisfaction. In M-commerce context, system quality represents the perception of the application's performance in collecting and delivering user information. In particular, system quality is measured by accessibility, interactivity, ease of use and perception of innovation of MCPs (Salameh and Hassan, 2015). Jaafreh (2017) indicated that system quality has a positive impact on user satisfaction when using the IS success model for research. Siahaan and Legowo (2019) also found that user satisfaction is significantly influenced by system quality. Therefore, hypothesis H11 is expressed follows:

Hypothesis 11 (H11): The Vietnamese retailers' satisfaction is positively affected by M-Commerce system quality.

Information Quality (IQ)is the consistency, completeness, and timeliness of information generated from the system.(Ghalandari, 2012). DeLone and McLean (1992) showed that information system user satisfaction is significantly positively influenced by information quality. Information quality including content completeness, connection quality, context quality and interaction quality affects the satisfaction and needs fulfillment of mobile service users(Chae et al., 2002).Mobile platform users' satisfaction and need fulfillment are also stimulated by the quality of information and in the context of M-commerce, the quality of information positively affects the satisfaction and need fulfillment of MCPs adopters(Yeh and Li, 2009). Petter et al. (2013) also found that the quality of information positively affects user satisfaction and need fulfillment. Jaafreh (2017) applied the IS success framework and found that the quality of information positively affects adopter satisfaction and need fulfillment. Siahaan and Legowo (2019) found thatthe quality of information is a variable that significantly affects user satisfaction and need fulfillment. Kim et al. (2021) confirmed that the quality of information positively affects M-commerce adopter satisfaction and need fulfillment. Zariman et al. (2023) argued that the quality of information is a major factor contributing to adopter satisfaction and need fulfillment for MCPs. Thus, hypothesis H(IQ) is indicated as follows:

H(IQ): The Vietnamese retailers' satisfaction is positively affected by M-Commerce information quality.





Factors affecting M- Commerce Performance

Use Behavior (UB). Through the use of M-commerce by business communities, M-commerce performance is increased, such as reduced time-to-market for new products and services, more efficient payment systems, product and service customization, improved market reach (Barnes, 2002). This study by Lee et al. (2005) supported the positive effect of M-commerce use behavior on M-commerce performance. The M-commerce applications handle many user requests through their appropriate use behavior, which will contribute to increasing M-commerce performance (Nafea and Younas, 2014). Jaafreh (2017) revealed that use behavior has a positive effect on benefits and effectiveness when using the IS success model for research. Leinbach (2022) indicated that retail businesses developing business strategies through M-commerce can facilitate them maintain competitiveness and improve M-commerce performance. Therefore, hypothesis H(UB) is determined as follows:

H(UB): M- commerce performance is positively affected by Vietnamese retailers' use behavior

User Satisfaction (US) refers to the level of comfort or fulfillment of expectations that a user experiences about a product (Theofanos and Stanton, 2012). The more user satisfaction increases, the more operational performance develops, and adopter satisfaction has an impact on business operational performance (Wiele et al., 2002). The positive effects on the performance of business transactions through M-commerce are associated with increased user satisfaction (Lee et al., 2005). User satisfaction is an important factor in business strategy and contributes to increasing key performance indicators of businesses (McDaniel, 2006). When using the IS success model for research, Jaafreh (2017) showed that user satisfaction has an effect on benefits and efficiency. Kalankesh et al. (2020) showed that the measure of information system effectiveness success is considered adopter satisfaction. Thus, user satisfaction is considered as the acceptability and level of expectations of a product or service that meets user needs. In the context of applying MCPs, the satisfaction of MCPs adopters is the acceptability and level of their expectations of MCPs, as well as a measure of the effective success of MCPs. Thus, hypothesis H(US) is presented as follows:

H(US): M- commerce performance is positively affected by Vietnamese retailers' satisfaction.

Research Methodology

Research design

This study applies many different types of research designs, such as descriptive design, exploratory design, and crosssectional design. In particular, descriptive design is used to collect statistics, average numbers and frequencies; this is helpful in determining the variables used for this research. Exploratory design used in this research because no previous research such as this has been conducted and this design was undertaken to clarify concepts and develop hypotheses for this study. Cross-sectional design was conducted over a short period of time, with each retailer collecting information only once and investigating the impact of MCPs usage on mobile commerce performance. This study also applies qualitative research methods as well as quantitative research methods. In particular, the qualitative research method allows finding findings, the quality of the topic and helps the interviewee clearly understand the content that needs to be learned about behavior in order to find factors that affect behavioral intention of using MCPs and factors affecting M-commerce performance. Quantitative methods are applied to measure the quantity, quantity, and assess the level of factors affecting behavioral intention to use MCPs and factors affecting M-commerce performance in Vietnam. This method refers to the systematic empirical analysis of quantitative data and their relationships through analysis of Cronbach's Alpha reliability coefficient, EFA, CFA and SEM.

Sample and data

The survey questionnaire was used in this study to collect data to determine the m-commerce performance influenced by the use of MCPs. A five-point Likert scale ranging from 5 (completely satisfied) to 1 (completely dissatisfied) was used to represent the responses of the surveyed retailers. The subjects of this study were retailers in Vietnam. Using the "10-fold rule" method, which is a widely used method in PLS-SEM to estimate the minimum number of samples (Hair et al., 2011), the number of samples in this study was 570 (10x57 = 570). Therefore, the questionnaire was used to collect data from 792 retail representatives who responded through a convenient sampling technique which was considered to ensure a sufficient number of samples for this study.

Research Results

Cronbach's alpha reliability analysis

The Cronbach alpha results were greater than 0.60 and showed that the total correlation coefficients were greater than 0.3 and the variables had alpha coefficients greater than 0.6 (Hulin et al., 2001), the scales were eligible to perform EFA as shown in Table 1.

No.	Code	Observed variables	Corrected Item-Total Correlation
	PE	Cronbach's alpha = 0.879	
1	PE1	MCPs are used by retailers anytime and anywhere to sell online.	0.737
2	PE2	MCPs are well understood and easily used by retailers to sell online.	0.682
3	PE3	MCPs have high expectations from retailers regarding online sales efficiency.	0.585
4	PE4	MCPs are used by retailers to sell more online.	0.609
5	PE5	MCPs used by retailers are more in line with market trends.	0.624
6	PE6	MCPs are used by retailers to make online sales more convenient.	0.801
7	PE7	MCPs are used by retailers to sell online more effectively.	0.616
	EE	Cronbach's alpha = 0.776	
8	EE1	MCPs are used by retailers to help increase online sales revenue.	0.512
9	EE2	MCPs are used by retailers to retail more goods.	0.585
10	EE3	MCPs are used by retailers for safer online retailing.	0.559
11	EE4	MCPs are used by retailers and understand online retail information.	0.572
12	EE5	MCPs used by retailers have enough information to sell online.	0.519
	SI	Cronbach's alpha = 0.853	
13	SI1	MCPs used by retailers for online retailing are influenced by many influencers.	0.688
14	SI2	Retailers are advised by MCPs vendors to use MCPs for online retailing.	0.607
15	SI3	Retailers are advised by other retailers to use MCPs for online retailing.	0.606
16	SI4	Retailers are advised by the retailer association to use MCPs for online retailing.	0.634
17	SI5	Retailers' use of MCPs in online retailing is influenced by strategic partners.	0.618
18	SI6	Familiar vendors support retailers using MCPs for online retailing.	0.691
	FC	Cronbach's $alpha = 0.841$	
19	FC1	Retailers gain control over online retail when using MCPs.	0.687
20	FC2	Retailers have enough knowledge to use MCPs for online retailing.	0.601
21	FC3	Retailers guarantee trading conditions on MCPs for online retailing.	0.624
22	FC4	Retailers secure the necessary resources when using MCPs for online retail.	0.621
23	FC5	Retailers ensure safety in transactions on MCPs for online retail.	0.602
24	FC6	Retailers are supported by MCPs vendors in using MCPs for online retailing.	0.575
	HM	Cronbach's alpha = 0.819	
25	HM1	Retailers feel comfortable using MCPs for online retail.	0.540
26	HM2	Retailers have found luck in using MCPs for online retail.	0.528
27	HM3	Retailers show happiness in using MCPs for online retailing.	0.680
28	HM4	Retailers feel satisfied in using MCPs for online retailing.	0.577
29	HM5	Retailers are very interested in using MCPs for online retail.	0.734
	PV	Cronbach's $alpha = 0.777$	
30	PV1	Retailers save time by using MCPs for online retailing.	0.558
31	PV2	Retailers save a lot of costs by using MCPs for online retail.	0.633
32	PV3	Retailers pay reasonable costs by using MCPs for online retailing.	0.663

Table 1. In	dependent.	moderating a	nd dependent	variables in	the research
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No.	Code	Observed variables	Corrected Item- Total Correlation
33	PV4	Retailers do not have to pay transaction checking fees thanks to the use of MCPs for online retailing.	0.418
34	PV5	Retailers do not have to pay any additional costs thanks to using MCPs for online retail.	0.510
	HA	Cronbach's alpha = 0.685	
35	HA1	Retailers have staff that are in the habit of using MCPs for online retail.	0.532
36	HA2	Retailers have enough manpower to operate MCPs for online retail.	0.596
37	HA3	Using MCPs for online retail is a trend among retailers.	0.502
38	HA4	Retailer staff receive guidance and support from the MCPs supplier.	0.494
39	HA5	Retailer staff can use MCPs for online retailing.	0.493
	BI	Cronbach's alpha = 0.768	
40	BI1	The use of MCPs for online retail continues to be implemented by retailers.	0.607
41	BI2	The use of MCPs for online retail will be implemented by retailers.	0.591
42	BI3	The use of other retailers' MCPs is recommended by retailers.	0.614
	UB	Cronbach's alpha = 0.684	
43	UB1	If using MCPs is difficult, MCPs suppliers support retailers.	0.466
44	UB2	Retailers' use of MCPs may not require the assistance of the MCPs supplier.	0.513
45	UB3	Using MCPs for online retail even though retailers may never have used MCPs.	0.516
	SQ	Cronbach's alpha = 0.659	
46	SQ1	Retailers trust the use of MCPs to ensure the interests and needs of the market in online retail.	0.481
47	SQ2	Retailers can afford to respond to the market when using MCPs for online retail.	0.441
48	SQ3	Retailers' human resources have enough knowledge to manage and operate MCPs.	0.491
	SY	Cronbach's alpha = 0.662	
49	SY1	Retailers find MCPs easy to use and fully functional for online retail.	0.468
50	SY2	Retailers show that MCPs are flexible, ensuring data quality for online retail.	0.434
51	SY3	Retailers describe MCPs as important, ensuring integration of systems for online retail.	0.522
	IQ	Cronbach's alpha = 0.718	
52	IQ1	Retailers find MCPs ensure consistent, timely information for online retail.	0.593
53	IQ2	Retailers indicate that MCPs ensure adequate information for online retail.	0.461
54	IQ3	Retailers describe MCPs as ensuring high coherence and compatibility for online retail.	0.568
	US	Cronbach's alpha = 0.764	
55	US1	Retailers find MCPs easy to use and fully functional for online retail.	0.609
56	US2	Retailers show that MCPs are flexible, ensuring data quality for online retail.	0.587
57	US3	Retailers describe MCPs as important, ensuring integration of systems for online retail.	0.600
	MP	Cronbach's alpha = 0.685	
58	MP1	The use and satisfaction of using MPCs contributes to promoting marketing, brand promotion and improving retail efficiency of retailers.	0.451
59	MP2	The use and satisfaction of using MPCs helps digitize and increase efficiency in the management and operations of retailers' distribution supply chains.	0.507
60	MP3	The use and satisfaction of using MPCs helps retailers apply modern retail models easily as well as reduce costs and improve retail business efficiency.	0.541

Source: Inherited from previous studies and additions by the authors

Exploratory factor analysis

The EFA for the independent variables to determine the underlying relationship between the measured variables

showed a Kaiser-Meyer-Olkin (KMO) of 0.793. This result satisfies the condition greater than 0.5 and less than 1 and .Sig coefficient. = 0.000 in the Bartlett test as can be seen in Table2.

Compo nent		Initial Eigenv	alues	Extrac	tion Sums of Sq	Rotation Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	Cumulative %	
1	7.625	13.377	13.377	7.625	13.377	13.377	4.223	7.408	
2	4.111	7.212	20.590	4.111	7.212	20.590	3.823	14.116	
3	3.603	6.321	26.911	3.603	6.321	26.911	3.591	20.416	
4	2.833	4.971	31.882	2.833	4.971	31.882	3.440	26.451	
5	2.736	4.800	36.682	2.736	4.800	36.682	3.052	31.805	
6	2.369	4.156	40.838	2.369	4.156	40.838	2.746	36.622	
7	2.199	3.858	44.696	2.199	3.858	44.696	2.170	40.429	
8	1.980	3.474	48.170	1.980	3.474	48.170	2.136	44.177	
9	1.916	3.362	51.532	1.916	3.362	51.532	2.122	47.900	
10	1.710	3.001	54.532	1.710	3.001	54.532	1.925	51.277	
11	1.459	2.560	57.093	1.459	2.560	57.093	1.883	54.580	
12	1.412	2.477	59.570	1.412	2.477	59.570	1.860	57.844	
13	1.227	2.153	61.722	1.227	2.153	61.722	1.800	61.001	
14	1.131	1.985	63.707	1.131	1.985	63.707	1.542	63.707	
15	15 .952 1.669 65.376								
			Extraction Meth	nod: Princi	pal Component A	Analysis.			

	Table 2. Explora	tory factor a	analysis for	independent	variables
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Source: Calculated from SPSS 25.0

The results of generating new factors (with the pair of observed variables HA1 and HA2) are shown in Table 3. The observed variables HA1 and HA2 are related to human resource characteristics in using MCPs. Hence, this new

factor is named Human Resources (HR). The hypothesis of this new factor has a positive impact on behavioral intention and behavior of using MCPs in Vietnam as can be seen in Table3.

Table 5. Rotated component matrix for independent variables	Table 3. Rotated com	ponent matrix	for independent	t variables
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	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PE6	.817													
PE1	.769													
PE7	.730													
PE3	.713													
PE5	.705													
PE2	.694													
PE4	.650													

	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EE5		.898												
EE2		.889												
EE1		.731												
EE3		.678												
EE4		.615												
IQ3		.584												
SI6			.784											
SI1			.739											
SI2			.707											
SI4			.702											
SI3			.671											
SI5			.655											
FC1				.803										
FC3				.742										
FC2				.735										
FC5				.723										
FC4				.715										
FC6				.691										
HM5					.864									
HM3					.830									
HM4					.725									
HM1					.686									
HM2					.665									
PV3						.814								
PV2						.781								
PV1						.734								
PV5						.679								
PV4						.594								
US2							.808							
US3							.808							
US1							.804							

	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BI1								.797						
BI3								.783						
BI2								.776						
HA5									.819					
HA4									.812					
HA3									.727					
UB2										.791				
UB3										.777				
UB1										.719				
SY3											.799			
SY1											.792			
SY2											.684			
SQ3												.781		
SQ1												.753		
SQ2												.744		
IQ2													.844	
IQ1													.833	
HA1														.788
HA2														.696

Source: Calculated from SPSS 25.0

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The EFA for the dependent variables to determine the underlying relationship between the measured variables showed a KMO of 0.657. This result satisfies the condition

greater than 0.5 and less than 1 and. Sig coefficient. = 0.000 in the Bartlett test, this result meets the condition of being less than 0.05 as can be seen in Table 4.

Table 4. Exploratory	factor analysis f	or dependent variables	

Factor		Initial Eigenvalu	es	Extraction Sums of Squared Loadings						
Total % of Variance Cumulative % Total % of Variance Cumulative										
1	1.842	61.396	61.396	1.842	61.396	61.396				
2	.645	21.502	82.899							
3	.513	17.101	100.000							
Extraction Method: Principal Axis Factoring.										

Source: Calculated from SPSS 25.0

Confirmatory factor analysis

KMO coefficient is 0.788, Chi-square/df = 2.421, p value = 0.000 and CMIN/df value is less than 5, GFI is 0.863, CFI is 0.887 which is acceptable (Hair et al., 2010). TLI is 0.874 which is acceptable (Shadfar and Malekmohammadi, 2013), RMSEA is 0.042, PCLOSE is 1.000 which is acceptable (Hu and Bentler, 1999) as can be seen in Figure 2.

Figure 2. Confirmatory factor analysis



Source: Calculated from SPSS 25.0

Structural equation modeling

The results of SEM integrated factor analysis and multiple regression analysis indicate that p = 0.000; TLI = 0.871; CFI = 0.882; GFI = 0.858; RMSEA = 0.043; PCLOSE =1,000, Chi-square/df = 2,457. This research model achieves compatibility with the market data as can be shown in Figure 3.



Figure 3. Structural equation modeling

Source: Calculated from SPSS 25.0

The results indicate that EE, SI, HM, HA and HR have a positive impact on BI with P values of 0.000; 0.000; 0.001, 0009 and 0.000. While PE and FC have a negative effect on BI with P values of 0.000 and 0.038. FC and BI have a positive effect on UB with P values of 0.000; and 0.000, MB is positively influenced by US and UB with P values of 0.004 and 0.003, as can be seen in Table 5.

			τ	J nstandardiz		Standardized Coefficients	
			Estimate	S.E.	C.R.	Р	Estimate
BI	<	PE	-,123	,032	-3,825	***	-,205
BI	<	EE	,122	,027	4,465	***	,182
BI	<	SI	,166	,039	4,263	***	,256
BI	<	FC	-,095	,046	-2,079	,038	-,090
BI	<	HM	,132	,040	3,282	,001	,132
BI	<	PV	-,045	,054	-,820	,412	-,035
BI	<	HA	,126	,048	2,631	,009	,126
BI	<	HR	,264	,063	4,191	***	,245
UB	<	BI	,175	,046	3,791	***	,210
UB	<	FC	,166	,042	3,943	***	,189
UB	<	HA	-,056	,044	-1,270	,204	-,068
UB	<	HR	-,041	,052	-,795	,426	-,046
US	<	SY	-,009	,054	-,163	,871	-,008
US	<	SQ	,068	,064	1,059	,290	,054
US	<	IQ	-,023	,022	-1,027	,304	-,042
US	<	UB	,005	,048	,098	,922	,005
MP	<	US	,144	,049	2,919	,004	,143
MP	<	UB	,154	,052	2,986	,003	,154

Table 5. Regression Weights and Standardized Reg	gression Weight	ts
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Source: Calculated from SPSS 25.0

The results with C.R < 1.96 imply a p-value > 5% and repeated sampling of N=1500 gave the results as shown in Table 6.

Parameter			SE	SE-SE	Mean	Bias	SE-Bias	C.R = Bias / SE-Bias
BI	<	PE	,032	,002	-,052	,001	,003	0,3
BI	<	EE	,028	,001	,123	-,002	,002	-1,0
BI	<	SI	,022	,002	,148	-,002	,003	-0,7
BI	<	FC	,053	,002	,298	,005	,004	1,3
BI	<	HM	,039	,002	,193	-,004	,003	-1,3
BI	<	PV	,023	,002	,176	-,002	,003	-0,7
BI	<	HA	,042	,002	,151	-,002	,003	-0,7
BI	<	HR	,035	,001	-,081	-,002	,002	-1,0
UB	<	BI	,035	,001	,049	-,002	,002	-1,0
UB	<	FC	,039	,002	,02	-,002	,003	-0,7
UB	<	HA	,045	,002	-,133	-,005	,003	-1,7
UB	<	HR	,063	,003	-,003	-,002	,004	-0,5
US	<	SY	,071	,003	,072	,001	,005	0,2
US	<	SQ	,083	,004	-,051	,001	,006	0,2
US	<	IQ	,049	,002	,032	-,003	,003	-1,0
US	<	UB	,081	,001	,057	,001	,001	1,0
MP	<	US	,041	,001	-,048	-,001	,001	-1,0
MP	<	UB	,099	,001	-,187	-,003	,002	-1,5

Table 5. Bootstrap method on SEM

Source: Calculated from SPSS 25.0

Discussions Results

Factors affecting Behavioral intention and Behavior of using MCPs

Performance expectancy has a negative impact on Vietnamese retailers' behavioral intention of adopting MCPs. This result does not coincide with the research results of Venkatesh and colleagues (2012), Jaradat and Al Rababaa (2013), Chong (2013), Alsheikh and Bojei (2014), Fadzil (2017), Sair and Danish (2017). 2018), Sabri Alrawi et al. (2020), Dagnoush and Khalifa (2021). This shows that the use of MCPs by retailers in Vietnam faces challenges in terms of competition, security and technical infrastructure. Security as well as privacy issues play important issues in mobile commerce. Personal information leaks and cyberattacks can cause serious damage to both consumers and retailers. On the other hand, technical factors are also a problem when developing mobile commerce. The diversity of operating systems (iOS, Android, Windows), the diversity of mobile device lines and the differences in structure and user interface require flexibility and in-depth technical knowledge. In addition, there are some cost difficulties that affect the operation of websites and mobile applications, such as logistics investment costs, customer attraction costs (marketing, promotion); website and mobile application operating costs; technology investment costs, etc.

Effort expectancy has a positive impact on Vietnamese retailers' behavioral intention to use MCPs. This is similar and consistent with the results of studies by Venkatesh et al. (2012), Fadzil (2017), Sair and Danish (2018), Sabri Alrawi et al. (2020), Utomo et al. (2021), Dagnoush and Khalifa (2021). This clearly shows that the use of information technology systems and products that retailers find easy to use MPCs. In addition, in Vietnam, there are many experienced retailers for providing MPCs to meet the needs of using electronic devices, especially mobile devices.

Social influence has a positive impact on Vietnamese retailers' behavioral intention to use MCPs. This agreed with the studies by Venkatesh et al. (2012), Chong (2013), Fadzil (2017), Sabri Alrawi et al. (2020), Hwang and Mulyana (2022). This means that retailers in collaboration with MCPs providers have measures to fully utilize

infrastructure and resources to join other retailers in using MCPs to promote the development of mobile commerce in Vietnam.

Facilitating conditions have a negative impact on Vietnamese retailers' behavioral intention to use MCPs. This is inconsistent with the studies by Venkatesh et al. (2012), Chong (2013), Fadzil (2017), Sabri Alrawi et al. (2020), Utomo et al. (2021). Vietnam has witnessed growth in mobile users and has a growth rate of smartphone users. The popularity of the mobile internet, with high-speed telecommunication packages, has promoted the use of mobile online shopping applications. In addition, more and more retailers are deploying e-commerce applications to serve users' shopping activities. Many retailers find that favorable conditions are an important factor, encouraging them to use MCPs. However, transaction costs negatively influence the behavioral intention to adopt MPCs and, only when the scale of MPCs operations is expanded and the coverage time is long enough, will transaction costs no longer be a factor hindering the development of the service. In addition, technical conditions also need to be considered when developing mobile commerce. The diversity of operating systems (iOS, Android, Windows), the diversity of mobile device lines and the differences in structure and user interface require flexibility and in-depth technical knowledge.

Hedonic motivation has a positive impact on Vietnamese retailers' behavioral intention to use MCPs. This result is consistent with the results of studies by Venkatesh et al. (2012), Dwivedi et al. (2014), Hew et al. (2015), Fadzil (2017), Ezennia and Marimuthu (2022), (Ha, 2023). This shows that retailers with high levels of hedonic motivation are more likely to develop an intention to use MPCs. Retailers not only focus on the characteristics and quality of using MPCs, but also pay more attention to online retailing. When retailers enjoy their benefits and feel the fun and enjoyment from the retailing process through MPCs, they will increase to develop an intention to adopt MPCs for online retailing.

Habits have a positive effect on Vietnamese retailers' behavioral intention to use MCPs. This is consistent with the studies by Venkatesh et al. (2012), Fadzil (2017),

Kwofie and Adjei (2019), Utomo et al. (2021), Hwang and Mulyana (2022). This shows that when using MPCs has become a habit, the behavioral intention to adopt these platforms of retailers for online retail transactions will certainly be formed. The development of e-commerce and digital technology has created online retail business habits of many retailers. Retailing methods have changed with the growing trend of online retailing through MPCs suitable for the increasing number of smartphone users, helping to promote the behavior of using MPCs by retailers in Vietnam.

Human resources are a new factor that has a positive impact on Vietnamese retailers' the behavioral intention to use MCPs. This shows that in recent times, in Vietnam, there have been many policies and strategies to promote the application science and technology, promote digital transformation. Many retailers have proactively and actively participated in the application of MPCs and achieved many important results. From there, the use of resources to meet investment requirements and the application of MPCs has promoted the on Vietnamese retailers' behavioral intention of using MCPs.

Behavioral intention has a positive impacton Vietnamese retailers' behavior of using MCPs. This is consistent with the studies by Venkatesh et al. (2012), Bhattacherjee (2001), Hung et al. (2004), Zhang et al. (2012), Sabri Alrawi et al. (2020). The results show that retailers are proactive in using MPCs and using resources to develop MPCs applications. Retailers can develop online sales through MPCs, which demonstrates the professionalism of retailers and provides retailers with opportunities to expand their online retail business.

Facilitating conditions have a positive impact on Vietnamese retailers' behavior of using MCPs. This agrees with the studies by Venkatesh et al. (2012), Utomo et al. (2021). This shows that MPCs open up development opportunities for retailers in the context of high smartphone and mobile internet usage rates in Vietnam, helping retailers obtain customer data effectively and costeffectively. New technologies and features of mobile devices are increasingly upgraded to enhance the mobile shopping experience, increasingly creating new opportunities for retailers, which is the important factor that help promote the behavior of using MPCs.

Factors affecting M- Commerce Performance

Retailer' satisfaction positively affected on M-commerce performance in Vietnam. This agrees with the results of studies by Theofanos and Stanton (2012), Wiele et al. (2002), Lee et al. (2005), McDaniel (2006), Jaafreh (2017), Kalankesh et al. (2020). Retailers focus on using the internet to build websites to introduce products and retail, put e-catalogues online, and accept online orders. In particular, they pay attention to the user interface and management interface, diverse e-commerce feature systems, high integration capabilities, and high scalability of MPCs to develop online retail business. Therefore, many retailers invest in aspects such as management interface, diverse e-commerce feature systems, high integration capability, high scalability of MPCs will have high satisfaction and positively affected on M-commerce performance in Vietnam.

Vietnamese retailer' use behavior positively affected on Mcommerce performance. This is similar with the studies by Barnes (2002), Lee et al. (2005), Nafea and Younas (2014), Jaafreh (2017), Leinbach (2022). This result reflects the behavioral intention of retailers using MCPs to increase performance due to more effective procurement and inventory management, improved internal and external distribution channel systems, saving transaction costs, increasing the effectiveness of advertising, marketing, sales and payment, increasing the ability to popularize and absorb new technology, etc.

Conclusions and Recommendations

This study applies UTAUT2 and the integrated IS success framework to determine the impact of MCP adoption by retailers in Vietnam on mobile commerce performance. The research results propose and recommend to the retailers, suppliers, managers, retailers and stakeholders in Vietnam as follows.

Firstly, to overcome the challenges of competition, security and technical infrastructure, retailers need to constantly innovate, improve products and services, as well as build effective marketing strategies. Security and privacy issues are important issues in MCPs. Personal information leaks and cyberattacks can cause serious damage to both consumers and retailers. Therefore, retailers and MCPs platforms will need to pay attention to security and data protection compliance when deploying MCPs applications.

Secondly, increase effort expectancy by designing interfaces that are easy to adopt and clear in function, convenient to adopt, even for users who are not yet proficient in technology. Retailers need to understand the needs of MCPs, enhance corresponding services and develop user interfaces. At the same time, retailers should provide full user guidance information such as instructions for building registration procedures, purchasing processes, transactions, etc.

Thirdly, Retailers need to promote MCPs adoption to enhance social influence on MCPs usage intention. MCPs providers should take advantage of their reputation and information technology resources to promote the benefits and incentives of their services to retailers through direct communication and online communication on websites, social networks, etc.

Fourthly, mobile commerce is becoming a mainstream trend in Vietnam, bringing many benefits and opportunities for retailers. The development of mobile technology and infrastructure has facilitated the explosion of MPCs and related services. However, to make the most of these opportunities, retailers need to increase the application of technologies and improve the shopping experience, use a variety of MPCs compatible with mobile devices, structures, user interfaces, as well as have flexibility and indepth technical knowledge.

Fifthly, retailers are conveniently providing goods for smartphone users to shop on the go. Retailers need is to ensure seamless connectivity with mobile network providers and internet networks to ensure internet access through mobile devices and be able to sell to customers who operate on the screen. At the same time, ensure to attract omnichannel shoppers for omnichannel retailing through social media, mobile apps, email, etc. To keep up with the rapid pace of the market, retailers need to increase the development of MPCs for retail business. Because omnichannel retailing is the best practice for retailers to combine physical commerce with mobile touchpoints before customers make a purchase.

Sixthly, the development of technology and digital transformation is an important factor in the development of MPC and this is the best opportunity for retailers to apply MPCs. Therefore, retailers need to strengthen research, application of science, technology, innovation with breakthroughs, master strategic technology, core technology; apply policies to meet requirements; develop high-quality human resources; ensure synchronous infrastructure, especially digital infrastructure; information security, safety, data protection.

Seventhly, behavioral intention has a positive impact on Vietnamese retailers' behavior of using MCPs. Therefore, MPCs providers along with innovative technological advances have contributed to changing retail behavior, as well as consumption through smartphones and tablets. The shopping applications, mobile-optimized websites, retailers can control products, manage prices and sales through MPCs.

Eighthly, fast and convenient delivery service arethe factors that promote the adopting of MPCs. Retailers operating in Vietnam should improve the quality of service, meeting the needs of consumers for fast delivery. In addition, the integration of order tracking features in shopping applications also makes it easier for users to check the delivery status. The development of MPCs not only benefits retailers but also contributes to the economy development.

Ninthly, many retailers in Vietnam often choose to deploy e-commerce websites as the main channel in mobile commerce. Thanks to building an effective website system, many mobile commerce retailers have not only seized the opportunity to boost revenue but also developed online retail businesses sustainably. The common feature that makes this success lies in MPCs. Each of these platforms has its own unique features that can support retailers to develop online business. Therefore, retailers need to consider applying platforms, in addition to using a servicebased platform (SaaS) in which the supplier designs the entire system, from providing hosting, interface, features to maintaining technology infrastructure, for open source platforms, retailers completely own the source code and control the data, freely design the interface, the system is highly scalable and flexible, using an open source platform often requires retailers to have a specialized development team, invest more money and time.

Tenthly, the M-commerce applications, the performance of mobile smart and the service quality of M-commerce, the improved internal and external distribution channel system, the savings in transaction costs, the increased efficiency of advertising, marketing, sales, etc. are the main factors affecting theVietnamese retailers' behavioral intentions of using MCPs to increase M-commerce performance. Therefore, retailers develop retail management systems that both serve the purpose of regular retailing and provide network connectivity, integrate many smart management programs, sales forecasting, customer relationship management, employee management, and support analytical capabilities to help retailers develop appropriate online retail business strategies, contributing to increasingly improving M-commerce performance.

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