Explaining the UTAUT Model to Understand Individuals' Attitude to Adopt M-Commerce Applications in Developing Countries like Pakistan

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Abstracts: M-commerce and E-commerce are gaining widespread acceptance among consumers and business communities alike in the shape of online buying and selling products and services interactions in developing countries like Pakistan. Purpose: This study intends to utilize the UTAUT model to investigate the factors influencing individuals' attitudes to adopt M-commerce application and understand the individuals' perceptions and expectations regarding M-commerce usage. Methodology: The research model and suggested hypotheses were addressed using a quantitative approach to achieve the research objective. Data was gathered total of 196 respondents from individuals especially those who spend time and money on M-commerce applications in developing countries like Pakistan was examined using the PLS-SEM approach. Findings: This research found that all significant predictors influence the individuals' attitude toward M-commerce adoption, and the study concluded using PLS-SEM techniques that all the constructs have a greater impact. This research study can help IT experts and online business stakeholders decide on implementing the M-commerce application successfully in Pakistan.

Keywords: Individual Attitude, UTAUT model, M-Commerce, Developing Countries, Pakistan.

1. INTRODUCTION

Mobile phones served primarily as wireless devices for one-to-one voice communication for decades. However, their purpose and capabilities have since evolved significantly. Recent modern mobile devices now boast features such as advanced web browsing capabilities, high-resolution screens, sufficient memory capacity, and the ability to access the internet for executing large modern applications. These enhancements have transformed mobile phones into versatile tools capable of performing tasks traditionally reserved for personal computers (PCs) (Nahari & Krutz, 2011). Moreover, mobile phones are portable and convenient which fix in hand an appealing choice for conducting various activities and services from any location and at any time. Consequently, mobile phone users not only rely on their devices to access communication information worldwide but also to facilitate online business transactions effortlessly through digital wallets and Debit/Credit cards (Lu et al., 2012). In today's fast-paced society, consumers seek convenient, cost-effective, time-saving, and ubiquitous access to product information and services that help users with online shopping. According to (Khan et al., 2021), suggested that M-commerce and E-commerce are gaining widespread acceptance among consumers and business communities alike in the shape of buying and selling products and services interactions. By increasing the number of mobile phone subscriptions surpassing Internet users in many countries, E-commerce and M-commerce are poised to significantly impact traditional brick-and-mortar businesses (Mishra, 2014). This presents a new era for online business practices and expands the

horizons of traditional brick-and-mortar establishments around the globe (Min et al., 2008; Hanif et al., 2022). Consequently, with the widespread adoption of mobile devices, M-commerce technology has made significant inroads into various industries, including retail, finance, telecommunications, and information technology services. According to researchers (Donner, 2007; Ibrahim & Siddiqui, 2020), stated that M-commerce applications enable businesses to interact with customers in real-time offering personalized recommendations, targeted promotions, and convenient shopping experiences tailored to individual preferences. Consequently, M-commerce applications capture valuable data insights on individuals' behaviour, preferences, and trends, enabling businesses to analyse consumer patterns, optimize marketing strategies, and tailor offerings to meet evolving market demands (Ashraf et al., 2021). On the other hand (Alvi et al., 2016; Ashraf et al., 2017), in a competitive marketplace, having well-designed and user-friendly m-commerce applications can differentiate businesses from competitors, positioning them as innovative, customer-centric, and forward-thinking brands. Therefore, m-commerce plays a transformative role in developing countries like Pakistan by driving inclusive growth, fostering innovation, expanding access to markets and financial services, and empowering individuals and businesses to participate in the digital economy.

In highlighting the past M-commerce literature (Khan et al., 2023; Ashraf et al., 2021; Mishra, 2014; Hanif et al., 2022), the research communities suggested that M-commerce can decline maintaining integrity and trust which is crucial for businesses to align with individuals' preferences and expectations for sustain long-term relationships. On the other hand (Ibrahim & Siddiqui, 2020; Khan et al., 2021), M-commerce should not conduct regular quality checks, product testing, and customer feedback surveys to identify and address any issues or concerns raised by individuals. By considering all these facts, this study intends to examine the M-commerce adoption for business purposes and understand individuals' perceptions and expectations towards online shopping strategies and mechanisms by using handheld mobile devices.

2. LITERATURE REVIEW

2.1 M-Commerce for Business Purposes

Mobile internet connectivity is crucial for the widespread individual adoption of M-commerce. The finest and most reliable infrastructure ensures seamless access to M-commerce services, enhances individual experience, and supports the scalability of online transactions (Ashraf et al., 2021). Additionally, system failures, technical glitches, and compatibility issues with different devices and platforms can decline and disrupt M-commerce services which ultimately leads to dissatisfaction among individuals and a decline in M-commerce application usage. On the other hand (Ullah et al., 2022; Hossain et al., 2020), the operating skills of mobile devices are essential requirements for interactions between individuals and M-commerce business applications. This can only be possible by educating individuals on how to use mobile applications, navigate online platforms, and practice safe online behaviours can empower individuals to engage confidently in digital transactions and M-commerce services. Moreover, it is also important for individuals to understand how innovative technology is influential in their daily lives. According to (Saeed, 2023; Gull et al., 2023), The most important factor in M-commerce is Security breaches such as data breaches, hacking incidents, and unauthorized access to personal and financial information which can erode trust in M-commerce platforms and deter users from engaging in digital transactions. Consequently, negative experiences such as unreliable service providers, fraudulent transactions, or instances of misinformation can decline the trust in M-commerce platforms and also discourage individuals from accessing m-commerce in the future. In past research (Ullah et al., 2022), for M-commerce growth, increasing financial inclusion by expanding access to formal banking services, promoting mobile banking solutions, and providing affordable digital payment is essential for conducting transactions smoothly. In addition, financial inclusion by expanding access to formal banking services, promoting mobile banking solutions, and providing affordable digital payment options is vital for M-commerce growth.

2.2 M-commerce Adoption

M-commerce adoption frameworks are models used to understand individuals' behaviour by considering influential factors towards the adoption of innovative applications of mobile commerce (M-commerce) services.

These frameworks typically combine various social, psychological, and technological factors to explain opinion why individuals choose and engage in M-commerce services and how they behave in using mobile shopping platforms (Rashid et al., 2022). Light of past literature (Ali et al., 2022), stated that the primary goal of M-commerce adoption models is to provide insights into the drivers and barriers of M-commerce adoption, as well as to guide businesses in designing strategic policies to enhance individuals' experiences towards the usage of M-commerce services. M-commerce adoption models play an important role in guiding online businesses' understanding of individuals' behaviour, enhancing user experience, informing strategic decision-making, and mitigating risks associated with the adoption of mobile commerce services (Anjum & Chai, 2020). Incorporating adoption models likewise TAM and UTAUT models into M-commerce application adoption processes can help online businesses in a better way by examining users' needs and expectations, improving user experience, and increasing the likelihood of successful adoption and usage of M-commerce applications. There is only a choice of implementation of these models to serve the study purpose.

2.3 The Unified Theory of Acceptance and Use of Technology Model

The well-structured UTAUT model is a widely used theoretical framework developed to understand and predict individuals' acceptance and use of new technologies, including mobile commerce (M-commerce) applications emphasized by (Venkatesh et al., 2003; Shahzad et al., 2020), The UTAUT model highlights the importance of these factors in shaping users' behavioural intentions and actual usage behaviour towards technology adoption. By understanding users' perceptions and expectations of performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) factors because businesses can design and implement M-commerce applications successfully, that meet users' needs and preferences also thereby increasing the likelihood of adoption and usage (Nur & Panggabean, 2021). The adoption of M-commerce models is essential for the successful implementation and operationalized M-commerce services effectively for achieving customer satisfaction (Pipitwanichakarn & Wongtada, 2021).

2.4 Development of Hypotheses and Research Model

The proposed model is derived from the UTAUT model which identifies four primary factors: PE, EE, SI, FC. These significant factors collectively influence users' intentions and attitudes regarding newly introduced technologies adoption. Performance expectancy refers to users' beliefs about how effectively a system will help them accomplish tasks, while effort expectancy relates to the degree of ease of using the system. Social influence pertains to the perceived importance of the new system among peers. Facilitating conditions assess the availability of technical and organizational support for system usage (Venkatesh et al., 2003; Shahzad et al., 2020; Nur & Panggabean, 2021). The research model is shown in Figure 1. The below relationships are considered the hypotheses.

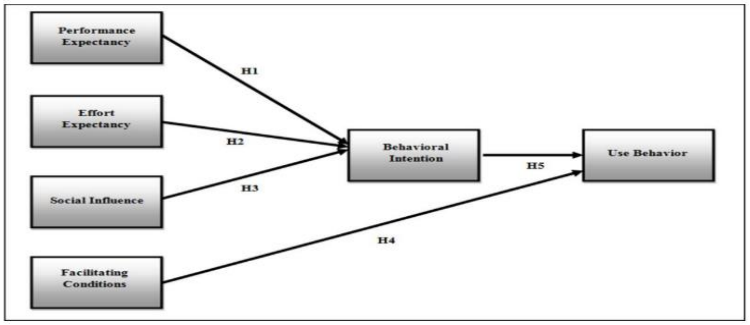

Figure 1. Research Model

H_1: Performance expectancy has a positive impact on individuals' behavioural intention.

H_2: Effort Expectancy has a positive impact on individuals' behavioural intention.

H_3: Social Influence has a positive impact on individuals' behavioural intention.

H_4: Facilitating conditions have a positive impact on individuals to the actual use of M-commerce applications.

H_5: The behaviour intention (BI) has a positive impact on individuals' actual use of M-commerce applications.

3. METHODOLOGY

3.1 Development of Measurement Instrument

This study will employ a quantitative data collection method, utilizing a survey questionnaire approach, to ascertain the behavioural intention of potential consumers of M-Commerce and validate the research model to achieve the purpose of the study. The measurement instrument is comprised of two sections. The initial segment gathered demographic data from respondents such as gender, age, spending money, etc. The subsequent segment focused on measurement items aligned with the conceptual research model and suggested hypotheses to achieve research objectives. This proposed model included four constructs as independent predictors such as (PE, three items), (EE, three items), (SI, three items), and (FC, three items). The dependent variables included two constructs; behavioural intention (BI, four items) and use behaviour (UB, four items). There was a total of 20 measurement items and all measurement items were adapted in this study from prior research (Martín & Herrero, 2012). The respondents rated them on a Likert five-point scale, starting with strongly disagree (1) and ending with strongly agree (5). Data collection was conducted through a self-administered online questionnaire presented in Google Form format and shared via email and WhatsApp.

3.2 Participants

To follow the data collection procedure and screening processes, a total respondents 196 authenticated surveys were taken for analysis from individuals who were the actual buyers using M-commerce located in different highly populated cities in Pakistan. While researchers (Anderson & Gerbing, 1988), recommended a minimum of 150 sample size of the participants, the other researchers (Bentler & Chou, 1987; Kline, 2011), suggested a minimum of 200 participants for acceptable SEM analysis, or preferably at least 5 cases per parameter for simple SEM models. Given the study's 25 observable variables, at least the sample size required was calculated as 25 × 5 = 125.

4. RESULTS AND DISCUSSIONS

4.1 Descriptive Statistics Outcomes

The bulk of collected responses were male (58.7%), employed to spend money (41.3%), and spent time (74.0%) in a day on m-commerce applications. The maximum of respondents (46.0%) were aged 31 to 40 years old and had at least an undergraduate degree (57.1%), Table 2 provides full demographic profile information in tabular form.

Table 1. Descriptive Statistics Outcomes

Demographic Information	Frequency	Percentage of frequency (%)
Gender		
Male	115	58.7
Female	81	41.3
Age		
18-30	80	40.8
31-40	90	46.0
41-50	12	6.1
More than 50	14	7.1
Qualification		
Below Undergraduate	112	57.1
Undergraduate	79	40.3
postgraduate	05	2.6
Money spent on M-commerce in a month		
5000-15000	81	41.3
15000-25000	54	27.6

25000-35000	38	19.4
35000-45000	--	--
45000+	--	--
Daily Time spent on M-commerce		
1-3 Hours	41	20.9
4-6 Hours	145	74.0
7-10 Hours	9	4.6
10+ Hours	1	0.5

4.2 Reliability Test (Pilot Study)

Before including the measurement items in the final survey, an initial study was undertaken to verify and evaluate their reliability. In this preliminary phase, 43 participants were randomly chosen from the target population. The internal reliability of the construct items was assessed employing Cronbach's alpha with an acceptable significance coefficient set at **0.70** or higher, as referred by (Hair et al., 2013). All constructs exhibited Cronbach's alpha coefficient surpassing **0.7,** between the range **0822 to 0.869** as represented in Table 2. Based on these results, the researchers concluded that the constructs demonstrated sufficient reliability, prompting the decision to proceed with the final study.

Table 2. Cronbach's Alpha (Reliability of each Construct)

Constructs	*No. of Items*	*Alpha (α ≥ 0.7)*
Use Behavior (UB)	**04**	**0.823**
Behavior Intention (BI)	**04**	**0.869**
Performance Expectancy PE)	**03**	**0.833**
Effort Expectancy (EE)	**03**	**0.837**
Social Influences (SI)	**03**	**0.876**
Facilitating Conditions (FC)	**03**	**0.822**

Regarding the table provided above, the six scales for the measurement of the data instrument are deemed suitable for use in the current study due to their established reliability.

4.3 Measurement Model Analysis

SmartPLS4 is specifically designed for Partial Least Squares-Structural Equation Modelling (PLS-SEM), which is particularly well-suited for analysing complex models involving latent variables (Chin, 1998). In this study, PLS-SEM was utilized to explore both the structural and measurement models. The measurement model, also known as the outer model, elucidates the relationships among indicators, while the structural model delves into the connections among latent constructs. Employing the SEM-PLS approach, as advocated by (Anderson & Gerbing, 1988), the research model was rigorously evaluated using a variety of metrics to ascertain reliability and convergent validity, including factor loadings, composite reliability, and average variance extracted. A higher factor loading indicates the dimensional significance of the factors. Composite Reliability (CR) is a reliable metric for assessing reliability, as it accurately captures the essence of factor loadings within its formula. Average Variance Extracted (AVE) computes the proportion of variation attributed to a latent construct. AVE serves as a valuable tool for evaluating convergence when discriminant validity is established across multiple factors. Our experiment's results, as represented in Table 2, exceed the required significance for data instrument reliability and convergent validity. Table 3 provides a comprehensive overview of the data instrument's validity and reliability, showcasing the evaluation outcomes for each factor derived from the instrument's variables.

4.3.1 Measurement Outer Model Assessment

The degree of convergent validity is assessed through various indicators, including loadings factors, extracted variance, and reliability measures such as Composite Reliability and Cronbach's Alpha. As outlined by (Hair et al., 1998), when the reliability significance and (CR) Composite Reliability of all constructs exceed **0.7,** it specifies a high level of inner consistency across multiple extents of a construct. Table 3, represents the evidence of the calculated results, where Cronbach's alpha values surpass **0.7** (Nunnally & Bernstein, 1978; Hair et al., 2013), and composite reliability values for constructs range from **0.748 to 0.881** respectively**.** Additionally, all (AVE) values range between **0.613 to 0.721**, meeting the criterion of explaining the minimum partial of the variance extracted from a collection of items (Falk & Miler, 1992) that represent the core elements of the latent construct. Thus, the range used to evaluate the constructs is deemed sufficient to establish convergent validity.

Table 3. Reliability and Validity Constructs

Constructs	Items	Factor Loading	Cronbach's Alpha	CR	AVG
Performance expectancy	PE1	0.874	0.851	0.881	0.652
	PE2	0.873			
	PE3	0.890			
Effort Expectancy	EE1	0.845	0.871	0.872	0.701
	EE2	0.854			
	EE3	0.888			
Social Influence	SI1	0.867	0.743	0.844	0.715
	SI2	0.783			
	SI3	0.718			
Facilitating Condition	FC1	0.847	0.817	0.770	0.621
	FC2	0.849			
	FC3	0.842			
Behaviour Intention	BI1	0.761	0.738	0.778	0.721
	BI2	0.774			
	BI3	0.774			
	BI4	0.875			
Use Behaviour	UB1	0.822	0.891	0.748	0.613
	UB2	0.839			
	UB3	0.734			
	UB4	0.749			

Table 4. Discriminant Validity

	BI	PE	EE	SI	FC	UB
BI	**0.849**					
PE	0.822	**0.807**				
EE	0.746	0.743	**0.837**			
SI	0.791	0.639	0.631	**0.845**		
FC	0.596	0.452	0.417	0.406	**0.788**	
UB	0.571	0.551	0.426	0.523	0.504	**0.782**

Table 3 illustrates that all Average Variance Extracted (AVE) values surpass the squared correlation between constructs in the measurement structural model which demonstrates the satisfying conditions for discriminant

validity. As per the guidelines of (Fornell and Larcker, 1981; Hair et al., 1998), an AVE value exceeding 0.5 indicates that the construct captures at least 50% of the measurement variance. Discriminant validity was assessed using (SmartPLS). Cross-loadings and loadings are detailed in Table 3, where a comprehensive investigation reveals that all measurement items primarily load on their respective latent constructs rather than other constructs. AVE interpretation is presented in Table 4, with the bold diagonal elements representing the square root of the AVE scores. Conversely, off-diagonal elements indicate the correlation between constructs. The table unequivocally demonstrates that the square root of the AVE values falls within the range of **0.782 to 0.849,** surpassing the standard threshold of 0.5. Notably, the AVE values consistently exceed all other correlations for each construct, indicating a higher variance of all constructs with their respective measures compared to those of other constructs in the model, thus confirming discriminant validity.

4.4 Structural Inner Model Assessment

4.4.1 R^2 - The Determination Coefficient

The coefficient of determination (R^2 value) serves as a measure to evaluate the structural model (McKelvey & Zavoina, 1975), and also assists in assessing the predictive correctness of the model (Al-Saedi et al., 2020). As the coefficient reflects the extent to which the variance of endogenous constructs is explained by each associated exogenous construct, higher values signify greater explanatory power. In shed of past research by Chin (1998), values exceeding 0.67 indicate a high level of explanatory power, while values ranging from 0.33 to 0.67 indicate moderate influence and values between 0.19 and 0.33 suggest weak. Values lower than 0.19 are deemed insufficient. In Figure 2, the model demonstrates moderate predictive power, explaining approximately 62.6% of the variance. As shown in Table 5, the model exhibits more predictive power, accounting for approximately 68% and 58% of the variance in Behavioural Intention and Use Behaviour.

Table 5. The endogenous latent variable R^2

	R^2	Results
BI	0.682	High
UB	0.577	High

4.4.2 Estimates of Structural Parameters

To assess the relationship between the hypothetical constructs within the structural model, SEM was employed using SmartPLS4, employing the highest probable estimation method to analyse the proposed hypotheses (Wong, 2013; Ramayah et al., 2018). The findings summaries is shown in Table 5 and Figure 2, revealing that all hypotheses demonstrate significance. By considering the data analysis results, H1, H2, H3, H4, and H5 hypotheses received empirical support. Performance Expectancy (PE), (b = 0.371, P < 0.01), Effort Expectancy (EE), (b = 0.228, P < 0.022), Social Influence (SI), (b = 0.121, P < 0.01), and Facilitating Conditions (FC), (b = 0.131, P < 0) were found to have a significant impact on Behavioural Intention (BI), thereby supporting hypotheses (H1), (H2), (H3), and (H4) have a great impact. Additionally, Behavioural Intention (BI) exhibited significant effects on Use Behaviour (UB) (b = 0.269, P < 0), consequently supporting H5 on use behaviour. A brief overview of the hypotheses' findings is represented in Table 6.

Table 6. Estimates of Structural Model

	Path	t - value	P values	Direction	Decision
BI → UB	0.269	11.416	0	Positive	Supported
PE →BI	0.371	1.211	0.01	Positive	Supported
EE →BI	0.228	9.432	0.022	Positive	Supported
SI → BI	0.121	10.422	0.01	Positive	Supported
FC → BI	0.131	1.619	0	Positive	Supported

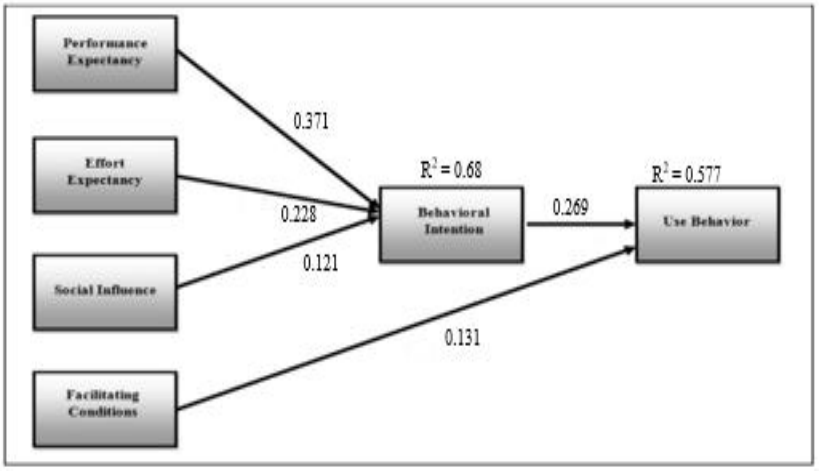

Figure 2. Path coefficient results

CONCLUSION

By employing the UTAUT model, this research investigates online shopping strategies and mechanisms by using Mobile devices to understand individuals' attitudes towards adopting M-commerce applications using mobile devices. The (UTAUT) model serves as the framework for exploring these determinants. Utilizing a survey methodology, quantitative data was collected to analyse the research outcomes. Participants included individuals especially those who are engaged with m-commerce applications in the different metropolitan cities in Pakistan. The predictive behaviour of the expected drivers outlined in the research model was assessed through structural analysis. Structural Equation Modelling was utilized to examine the influence of various factors such as (PE), (EE), (SI), and (FC) on individuals' behavioural intentions. The flexibility provided by the UTAUT model allows for a nuanced understanding of M-commerce in this context.

This study aims to examine the significant factors influencing the individual's intention to understand their perception and expectations regarding M-commerce adoption and usage. Structural Equation Modelling (PLS-SEM) was employed to scrutinize the research hypotheses with a focus on the variance explained (R^2 - values), estimates of structural paths, and t-statistics. Figure 2 illustrates the path coefficient structural model, while Table 6 summarizes the data analysis outcomes. In this research model, each hypothesis was assessed for path coefficients and variance explained (R^2) to support the proposed hypotheses.

The research revealed that individuals' inclinations toward adopting and utilizing the M-commerce applications were positively influenced by H1, H2, H3, H4, and h5 where all hypotheses have a higher impact. It also indicates a favourable environment for adoption and usage. Individuals are likely to perceive M-commerce apps as valuable, easy to use, socially endorsed, and supported by conducive conditions leading to increased acceptance and utilization of these applications in mobile commerce transactions in developing countries like Pakistan. Past studies revealed and found the beneficial influencing on individuals intention Khan & Ahmad, (2015); Sair & Danish, (2018). This research study can help IT experts and online business stakeholders decide on implementing the M-commerce application efficaciously and steadily growing economy in Pakistan.

A substantial variance ($R^2 = 0.682$) was observed for behavioural intention confirming the predictive power of (PE), (EE), and (SI). However, a lower R-squared value ($R^2 = 0.577$) was noted for individuals' behaviour which was predicted by (FC) and use behaviour.

Future Work

The future research by adding constructs such as secure transaction and payment methods to the UTAUT model enriches the framework and enables researchers to conduct more comprehensive analyses of individuals' adoption

of m-commerce technologies. Secure transaction and payment methods are critical components of M-commerce platforms. By incorporating these constructs into the UTAUT model, researchers can better capture the specific factors that influence individuals' adoption of m-commerce technologies in future research conduct.

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DOI: https://doi.org/10.15379/ijmst.v11i1.3661