

Examining Factors Influencing Adoption of M-Payment: Extending UTAUT2 with Perceived Value

Tayyba Fatima¹, Dr. Sadaf Kashif², Dr. Muhammad Kamran³, Dr. Tahir Mumtaz Awan^{4*}, ¹Lecturer Business Administration, Iqra University, Islamabad Campus Park Road, Chak Shehzad, Islamabad, Pakistan, ²Assistant Professor, Department of Management Sciences, Iqra University, Islamabad Campus Islamabad, Pakistan, ³Assistant Professor, Warsaw University of Business, Warsaw, Poland, ⁴Assistant Professor of Marketing, Department of Management Sciences, COMSATS University Islamabad, Park Road, Chak Shehzad, Islamabad, Pakistan, 44000, Corresponding Author* Email: ¹tayyba@iqrauni.edu.pk, ²Sadaf.kashif2002@gmail.com, ³muhhammad.kamran@wvsb.edu.pl, ^{4*}tahir_mumtaz@comsats.edu.pk

The purpose of this paper is to empirically test the suggested modification of Unified Theory of Acceptance and Use of Technology² by introducing perceived value as mediating construct in it. To accomplish the specified objective, data was collected from 426 mobile-payment users in Pakistan. Data was then analyzed by using SmartPLS³. Study identified that mobile-payment users consider perceived value as a substantial part of the service along with other external variables. More specifically all constructs of Unified Theory of Acceptance and Use of Technology² affects perceived value except one construct i.e. price value. This study adds value in literature by modifying the model with perceived value and understanding that what attributes of m-payment deliver value to users leading to its adoption. The modified model of this paper empirically proved the replacement of price value with perceived value.

Key words: *UTAUT2, M-Payment, Perceived Value, Behavioral Intention, Price Value*

INTRODUCTION

The fast pace of information and communication technology (ICT) has amplified in past years triggering a great uplift to mobile technology and electronic commerce based practices (Shareef, Davies & Rana, 2019). The current post pandemic situation has heightened the usage of mobile phones. These devices serve as a medium through which financial transactions are

accomplished and referred as mobile payment (m-payment) -a process through which value is transferred via mobile devices without participation of banking progressions (Dahlberg, Guo & Ondrus, 2015; Abrahão, Moriguchi & Andrade, 2016). Consumer adoption of m-Payment has remained one of the most investigated themes (Hussain et al., 2018) in different contexts by applying different models (Slade et al., 2014; Abrahão, Moriguchi & Andrade, 2016; Brohi et al., 2018; Hussain et al., 2018). Former researchers have employed number of different information system theories e.g. “Diffusion of Innovation theory (Powell, Stern, Krohn, & Ardoin), Theory of Planned Behavior (TPB), Decomposed Theory of Planned Behaviour (D-TPB), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Valence Framework” etc. to understand the consumer behaviour towards different kind of technological innovations (Slade, Williams, & Dwivedi, 2013). The most recent work in m-Payments shows use of Unified Theory of Acceptance and Use of Technology (UTAUT) to understand consumer behavior (Hussain et al., 2018) as it has better explanatory power as compared to rest of the models (Rondan-cataluña et al., 2015). To understand behavior towards technological innovation generally and m-payment specifically Venkatesh (2003) and others applied UTAUT followed by application of UTAUT2 recently by Hussain et al., (2018) and others in developing realms’ perspective. Some other scholars have also focused on extension of theory by including other external variables e.g. Brohi et al., (2018) included compatibility, risk and innovativeness, Abrahão *et al.*, (2016) included perceived risk as external variable, Baabdullah, Abdallah, Rana and Kizgin (2019) extended theory by combining two models (UTAUT2 and Delone and Mclean information system Models).

Understanding consumers’ adoption of technology by applying single model/theory is not enough to understand specific characteristics due to dynamic nature of these models (Naranjo-Zolotov, Oliveira & Casteleyn, 2019). Keeping in view to understand the consumers’ adoption intention of m-payment, current study integrate UTAUT2, and value consumption theory as suggested by Venkatesh et al., (2016) “*it is necessary to draw on other theoretical perspectives to identify and examine specific characteristics*” of adoption. It is known fact that in consumer behavior literature, perceived value is important to develop consumers intentions towards product/service (Cheng, Wang, Lin & Vivek, 2009). For deeper understanding of consumers intention towards m-payment it is important to understand value perception of consumers. To expand the understanding towards the under-pining phenomenon current study was organized. Shaw and Sergueeva’s study (2019) adopted perceived value along with perceived privacy concern in context of m-commerce and found that perceived value was associated only with one construct of theory i.e. performance expectancy hence, there exists a research gap which was addressed in current study. Moreover Tamilmani et al., (2021) suggested to add new mediating and moderating mechanism in existing model. Thus, this study aimed at establishing a link between UTAUT2 constructs and behavioral intention through perceived value as mediating variable to understand the consumers’ intention toward m-payments in Pakistan.

LITERATURE REVIEW

The use of mobile phone for financial transactions specifically those who do not hold banks accounts is called m-payment. According to De Bel, and Gaza, (2011, p.12) m-payment is “*transfer of funds in return for a good or service, where the mobile phone is involved in both the initiation and confirmation of the payment*”. Now-a-days not only smart phones but basic phones can also be used for payments of different kind of digital contents e.g. ring tones, music, news, games, transport and other retail services (Kim, Mirusmonov & Lee, 2013). Venkatesh, Morris, Davis and Davis (2003) presented the UTAUT to measure behavioral intentions of customers towards technology. There are four prime constructs of theory: “*performance expectancy, effort expectancy, social influence, and facilitating conditions*”. In 2012 Venkatesh, Thong, and Xu, (2012) extended UTAUT and added three new constructs “*hedonic motivation, price value and habit*” in it and renamed the theory as UTAUT2 and their impact on behavioral intention was confirmed. Venkatesh et al., (2013) tested this theory on mobile internet technology in Hong Kong and later, various studies in various contexts were undertaken with little modifications. Hussain et al., (2018) applied this theory on m-payment in Bangladesh considering bottom of pyramid people and another construct lifestyle compatibility was added; total eight construct were used to measure consumer adoption intention of consumers towards mobile payment system. Similarly, Shaw and Sergueeva (2019) have applied UTAUT2 theory in mobile commerce sector including two external variables perceived privacy risks and perceived value. Baabdullaha et al., (2019) applied it in mobile banking with combination of D & M IS Success Model, and others e.g. Abdullah et al., (2018); Abrahão *et al.*, (2016); Bendar and Al-sahouly, (2017); Brohi et al., (2018); Min, So, and Jeong, (2018) applied both UTAUT and UTAUT2 to shed light on consumer adoption of new technological services.

HYPOTHESIS DEVELOPMENT

This section focusses on developing relations among all constructs of UTAUT2 and perceived value to understand the customers’ intention to adopt m-payment. Performance expectancy is defined as benefits or gains (e.g., cost and time avoiding efficiency, ease of access, customization, convenience) that a user can obtain from use of innovative service (Venkatesh et al., 2003). Performance expectancy is proved as crucial predictor of adoption intention in different study of mobile technologies e.g. internet banking, (Abdallah, Dwivedi, Rana & Algharabat, 2018; Oliveira, Thomas, Baptista & Campos, 2017; Baabdullaha et al., 2019), m-commerce (Chopdar et al., 2018; Shaw and Sergueeva, 2019) and in mobile payment system scholars have also confirm that performance expectancy considerably influences the user intention to adopt m-payment (Slade & Williams, 2013; Abrahão, Moriguchi & Andrade, 2016; Ariyanti, 2016; Baptista & Oliveira, 2016). Performance expectancy is also considered as one of driver of perceived value (Jeyaraj et al., 2006). According to Davis (1989) perceived utility of product increase its performance. Performance expectancy of innovation is associated with

functional value and overall perceived value of innovation (Gill, Byslma & Ouschan, 2007). Past studies proved considerable connection between performance expectancy and perceived value. Convenience of using m-payment at any time and at any place increase consumers' perceived value of m-payment (Yoon & Kim, 2007). Similar results were also depicted in a research by Commerce, Silva, and Souza (2018) and most recently was also reinforced in a study by Shaw and Sergueeva (2019) survey.

H_{1a}: Performance expectancy significantly affect consumer intention to adopt m-payment.

H_{1b}: Performance expectancy significantly effect on Perceived value of m-payment.

“Effort expectancy is degree to which new product or service is easy to use, originally conceptualized as extent of ease connected with use of system” (Venkatesh et al., 2003, p.450). It was proved an important factor in different studies of internet banking, and said as key determinant of adoption intention (Martins & Oliveira, 2014; Abdallah et al., 2018). Perceived ease of use from Davis (1989) model is considered as its source factor, proved by various studies that perceived ease of use contributes to behavioral intention to adopt internet banking e.g. (Al-somali & Clegg, 2009; Cheng et al., 2009). Various researchers have also verified that effort expectancy considerably influences user intention to adopt m-payment (Slade et al., 2013; Ariyanti, 2016; Abrahão et al., 2016; Baptista & Oliveira, 2016; Shaw & Sergueeva, 2019). Effort expectancy of innovation is associated with overall value of product. In different mobile payment studies effort expectancy is considered as an important element (Abrahão, Moriguch & Andrade, 2016; Teo, Tan, Ooi & Lin, 2015; Tan, Ooi, Hew & Yew, 2015). M-payment system is considered as easy to use without any complexity and users have to exert little effort to transfer money; this convenience lead to perceive higher value of service (Pura, 2005; Colwell et al., 2008). In extension of UTAUT by (Pitchayadejanant, 2014), effort expectancy was proved as predictor of perceived value. Liu, Zhao, and Chau, (2014) demonstrated that effort expectancy significantly affects perceived value; which was later also intensified by Commerce, Silva and Souza (2018).

H_{2a}: Effort expectancy significantly affect consumer intention to adopt m-payment.

H_{2b}: Effort expectancy significantly affect Perceived value of m-payment.

Social influence was conceptualized by Venkatesh et al. (2003, p.450) as “the extent to which an individual perceives that important others believe he/she should apply the new system”. When consumer considers certain innovation is important for other people in society, they feel social pressure to use it (Venkatesh et al., 2012). In collectivist societies like Pakistan most of the decisions are made in group and influenced by other members of group. On the way to lessen ambiguity friends and family play an important role in determining intentions (Tan, Chong, Ooi, & Chong, 2010; Abdallah et al., 2018). In previous studies of consumer behavior

social influence was underlined as predictor of behavioral intention (Al-somali, Clegg, 2009; Abushanab, Pearson & Setterstrom, 2010; Martins & Oliveira, 2014). Abrahão et al., (2016) proved it as a valuable predictor of consumer intention to adopt M-Payment along with confirmatory evidence from several other studies (e.g., Hussain et al., 2018, Shaw & Sergueeva, 2019). An innovation which increases consumer's social acceptance also increases social value of new offerings (Abrahão, Moriguchi & Andrade, 2016). According to Sheth et al. (1991) social value is acquired when users finds association with one or more social groups (Soomro & Abdelwahed, 2021). Mobile payment studies proved that social influence is predictor of social value if consumer use such product and increase overall value of product. It was reported by Pitchayadejanant (2011) that consumers are not intended to use innovation based on social influence only; until they do not perceive it valuable.

H_{3a}: Social Influence significantly effect consumer intention to adopt m-payment.

H_{3b}: Social Influence significantly effect Perceived value of m-payment.

Facilitating conditions are described as “degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh et al., 2003, p.453). In studies of m-payment location of merchant and availability to make transaction and working condition of EDC machine (*electronic data capture machine used for data processing at point of sale*) is considered as facilitating condition to drive consumer intention to adopt (Ariyanti, 2016). In other studies scholars proved that facilitating conditions significantly influenced consumer intention to adopt m-payment (Slade et al., 2014; Baptista & Oliveira, 2015; Teo et al., 2015). Hossain, Hasan, Chan, and Ahmed, (2017) proved that facilitating conditions as an important predictor of consumer intention to adopt m-payment, while relation is also intensified by Hussain et al. (2018). When customers have information and knowledge necessary for service along with skill to perform certain behavior they develop convenience value (Wang, Lo & Hui, 2003). When users consider that circumstances are in favor of product use and helps to facilitate its usage the perceived value of such kind of service is high (Magsamen-conrad et al., 2015). In this context Commerce et al., (2018) have also proved a significant relationship between facilitating condition and perceived value, hence hypothesized as below.

H_{4a}: Facilitating conditions significantly effect consumer intention to adopt m-payment.

H_{4b}: Facilitating conditions significantly affect Perceived value of m-payment.

“Hedonic motivation is fun, or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use” (Venkatesh et al., 2012). Through means of technology, the feelings of delight and cheerfulness are substantial factors of intention to adopt (Childers et al., 2001; Brown, & Venkatesh, 2005; van der Heijden, 2016). Earlier work on UTAUT2 found hedonic motivation as a significant

predictor of consumers' behavioral intention to adopt mobile banking (Baptista & Oliveira, 2016). It was reported by Seth, Newman and Gross (1991) that emotional value is associated with affective state of mind. In similar context other studies stated that online banking is considered as modern technology related to present life style of people delivering value to consumers (Gan et al., 2006; Çelik, 2008; Lin & Hsieh, 2011; Riffai, Grant & Edgar, 2012). In addition to it, users who feel fun, pleasure and joy while using technology are more inclined to perceive it as more productive and ultimately contributing to perceived value (Venkatesh, 2000; Moon & Kim, 2001; Cheng, Sheen & Lou, 2006). Consumers often expect enjoyment and fun whilst using technology; their emotional value or in other words perceived value increases (Turel, Serenko & Bontis, 2007; Liu, Zhao & Chau, 2014).

H_{5a}: Hedonic Motivation significantly effect consumers' intention to adopt m- payment.

H_{5b}: Hedonic Motivation significantly effect Perceived value of m-payment.

Price value is measured to play crucial role in consumers' willingness to adopt new technology (Mallat, Rossi, & Kristiina, 2008; Venkatesh, Thong & Xu, 2012). Price value is measured relative to benefits received (Venkatesh et al., 2012). Literature on price value reported that consumers' behavioral intention is considerably influenced by price value (Al-hawari & Ward, 2006; Lee, 2006; Ho & Ko, 2008; Gerrard et al., 2010). Shaw and Sergueeva (2019) intensified this connection in the perspective of m-commerce whereas, Abdallah et al., (2018) tested the internet banking environment. Studies on m-payment have also strengthened this relationship (Slade et al., 2014; Abrahao et al., 2016, Husain et al, 2018). Zeithaml (1988) suggested that if consumers' sacrifices are lesser, then they perceive higher value of product/service. To transfer the money through mobile phone consumers, must pay initial transaction cost in terms of money and efforts to use m-payment (Abrahão, Moriguchi and Andrade, 2016). Researchers have proved price value as an important antecedent of utilitarian value (Dwivedi et al., 2011). When consumers pay less amount as compared to perceived benefits, they perceive higher value of innovation (Islam, 2013). So, consumers adopt m-payment if they consider it valuable in term of its cost through high perceived value. Price value is significantly associated with perceived value (Turel, Serenko & Bontis, 2007).

H_{6a}: Price Value significantly effect consumer intention to adopt m-payment.

H_{6b}: Price Value significantly effect perceived value of m-payment.

In information system habit is found to have significant impact on affect and actual usage. With use of certain product consumers develop information and knowledge associated with that product. This knowledge predicts their behavior which become their habit (Johora & May, 2015). In context of mobile phone, habit was proved as determinant of usage (Zhang et al., 2018). Literature of mobile payments have discussed positive relationship between habit and behavioral intention (Keramati, Taeb, Larijani & Mojir, 2012; Morosan & DeFranco, 2016,

Slade, Williams, Dwivedi, & Piercy, 2015). Most recently it is demonstrated in m-payment framework by Hussain et al., (2018). Information and knowledge of performing certain behavior is considered important for functional capabilities and increases perceived value (Cheng et al., 2009). Rogers (2005) explained that experience and information might decrease uncertainty related to technological product and helps to automate behavior (Limayem et al., 2007). Repeated behavior is said to have positive influence on perceived value of service (Chiu et al., 2012).

H_{7a}: Habit significantly effect consumer intention to adopt m-payment.

H_{7b}: Habit significantly effect perceived value of m-payment.

Based on above-mentioned explanation of perceived value, m-payment is overall assessment of benefits and gains received against expenses incurred while using m-payment system (Liu, Zhao & Chau, 2014). Perceived value of product/service will be greater when consumers' experience is improved with more benefits and less cost (Hsiao, Chang & Tang, 2015). Value perception has been recognized as important predictor of buying intention (Wu et al., 2018). Mostly value assessment is done on the basis of quality and price but other types of values are also important in m-payment perspective (Liu, Zhao and Chau, 2014). Extensive research shows that perceived value has significant influence on behavioral intention of consumer (Kleijnen, Ruyter & Wetzels, 2007; Pitchayadejanant, 2014).

H₈: Perceived value significantly effect consumer intention to adopt m-payment.

Customers perceived value which ultimately has impact on behavioral intention of consumers is important when trying to understand consumer behavior. Zeithaml (1988 p. 14) stated it as "consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given." Perceived value was conceptualized differently in different time periods e.g. transaction and requisition value (Thaler, 1985), consumer (Holbrook, 1994; Sheth, Newman, & Gross, 1991) conceptualized perceived value as a multidimensional variable including "functional value, conditional value, social value, emotional value, and epistemic value." The current study proposes perceived value as a potential mediator between the predicting variables of UTAUT2 and the behavioral intention.

H₉: Perceived value significantly mediates the relationship between predicting variables and the consumer intention to adopt m-payment.

CONCEPTUAL FRAMEWORK

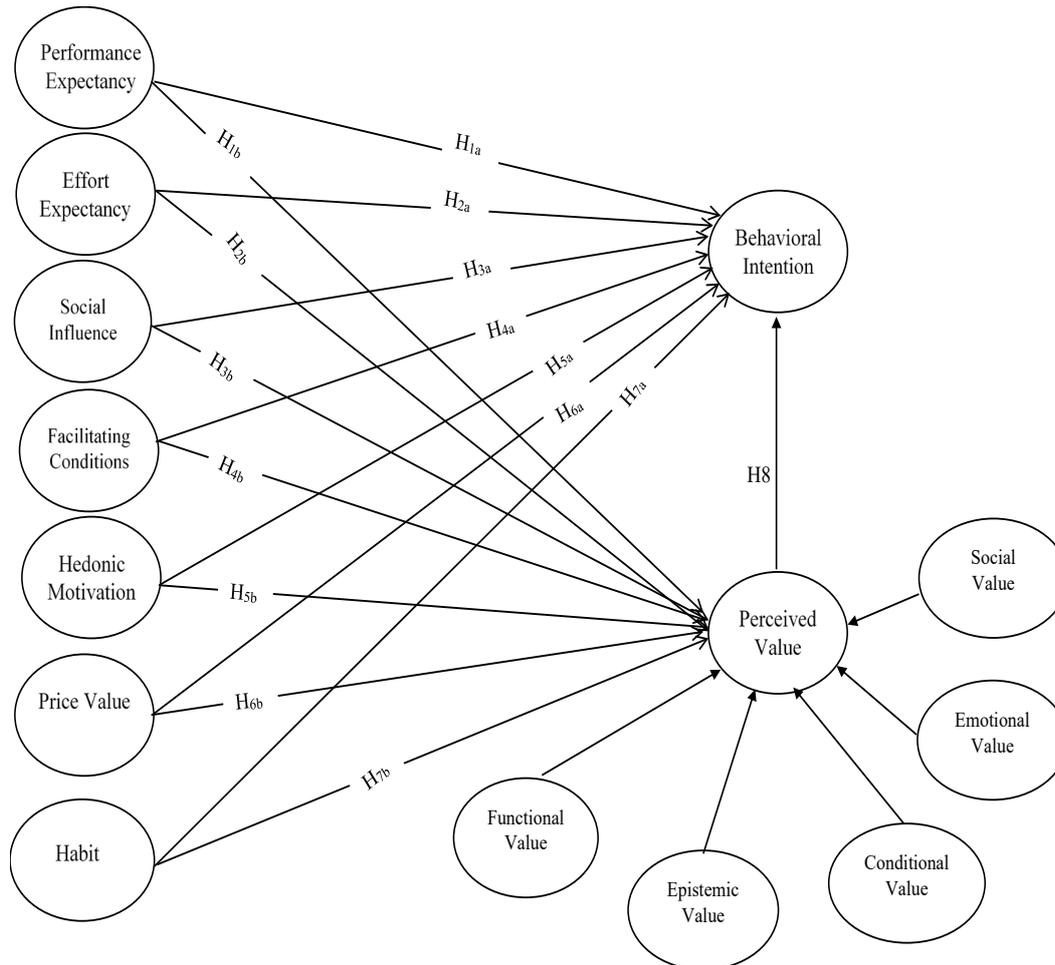


Figure 1: Conceptual Framework

Based on UTAUT2 and Consumption value foundations, conceptual framework of this study is given below (see fig. 1.) to test for m-payment users in Pakistan. Demographics (age and gender) were control variables in the study.

METHODOLOGY

Based on well-established instrument this study develops questionnaire measuring different constructs of UTAUT2 from the scale adopted from (Hussain et al., 2018; Venkatesh, Thong & Xu, 2012). Another important construct of study (perceived value) scale was developed by Sweeney, and Soutar (2001), functional value was measured with five items, price and social value was measured with four items adopted from (Sweeney & Soutar, 2001) study. While epistemic and conditional value scale was adopted from a study of Pura (2005). Behavioral intention scale was adopted from (Maniam, Dhillon & Baghaei, 2015). Initially, questionnaire was circulated among a total of 67 respondents for pre-test. Based on results and discussion with respondent's questionnaire was aligned for better results of final study. The questionnaire

was designed using five-point Likert scale ranging from 5 (Strongly agree) to 1 (Strongly Disagree).

Data was collected from respondents through convenience sampling method. Initially the questionnaire URL was posted at various social networking websites and sent personally through WhatsApp. A total of 486 responses were received and considered for the study. Final response rate was 54%. Among those 486 responses, 426 were used for data analysis.

DATA ANALYSIS

Data collection method in this research was survey. To check the possibility of method bias, (as data was gathered from single source) Herman single factor test (Podsakoff and Organ, 1986) was adopted. The factor solution results in 9 factors with eigen values greater than 1-0 showing 34 percent of variance. The cumulative percentage of 34 shows that the bias was not a serious threat for current study since value is within acceptable range as per threshold level (i.e., <0.50).

A total of 228 (54%) were male and 198 (46%) were female. Regarding age 47% belongs to age range (25 and below) and 32% belongs to age group (26-35). While remaining percentage belongs to older age group. As to the education the respondents who were using m-payment were educated, as 43% were having master's degree and 35% were bachelor's degree holder. 14% holds high school education and 9% of the respondents have not specified their education level. In Pakistan major telecom service providers are Telenor, Ufone, Mobilink and Zong. Among different m-payment service easy-paisa is widely used. As respondents profile showed that 246 (58%) have used easy-paisa service, on second number mostly used service is Jazz-cash as 24% (102) respondents were using it. While remaining 12% and 6% were users of u-pay and pay-max respectively.

Assessment of Measurement Model

To access the overall model Smart PLS version3 was used. Wold (1985) developed the PLS for analyzing multidimensional models with fewer paths. It was further developed and used for different statistical measurements. Perceived value was specified as second order construct with five dimensions. "Repeated indicator approach" was used for the measurement of second order construct (Bradley & Henseler, 2007). Analysis was done in two steps; first measurement model was tested through validity and reliability analysis (Awan, Latif, Aslam, & Fatima, 2021), In second step, hypotheses were analyzed through Bootstrapping technique as done by earlier scholars (Khan, Awan, Fatima, & Javed, 2020).

To access the measurement model reliability and validity analysis was done through Cronbach's alpha, Factor loadings and average variance extracted (AVE) values (Hair, Hult, Ringle, & Sarstedt, 2016). All values lie in acceptable range as depicted in Table I.

Table II.: *Reliability and Convergent Validity of Instruments*

Name		AVE	Weights	T-values
PE		0.743		
EE		0.713		
SI		0.710		
FC		0.599		
HM		0.757		
PR		0.788		
HT		0.792		
BI		0.660		
	FV	0.714	0.312	37.038
	SV	0.791	0.220	34.299
PV	EV	0.784	0.287	37.722
	EPV	0.771	0.203	37.072
	CV	0.784	0.128	23.312

BI=Behavioral Intention, EE=Effort Expectancy, FC=Facilitating Conditions, HM=Hedonic Motivation, HT=Habit, PE=Performance Expectancy, PR=Price, PV=Perceived Value, SI=Social Influence, FV=Functional Value, EM=Emotional Value, EPV=Epistemic Value, CV=Conditional Value, SV=Social Value.

Perceived value was measured as second order construct in this study. Higher level of this construct which was formative in nature was validated by weight significance and multicollinearity assessment as suggested by (Hair,Hult,Ringle & Sarstedt, 2016). Bootstrapping result shows that all weights for dimensions of perceived value were significantly greater than 0.1 which shows that dimension is having some impact on variable. While t-value should be greater than 1.96. as shown in above table. Outer loadings and weights of dimensions of perceived value are exhibited in figure 2.

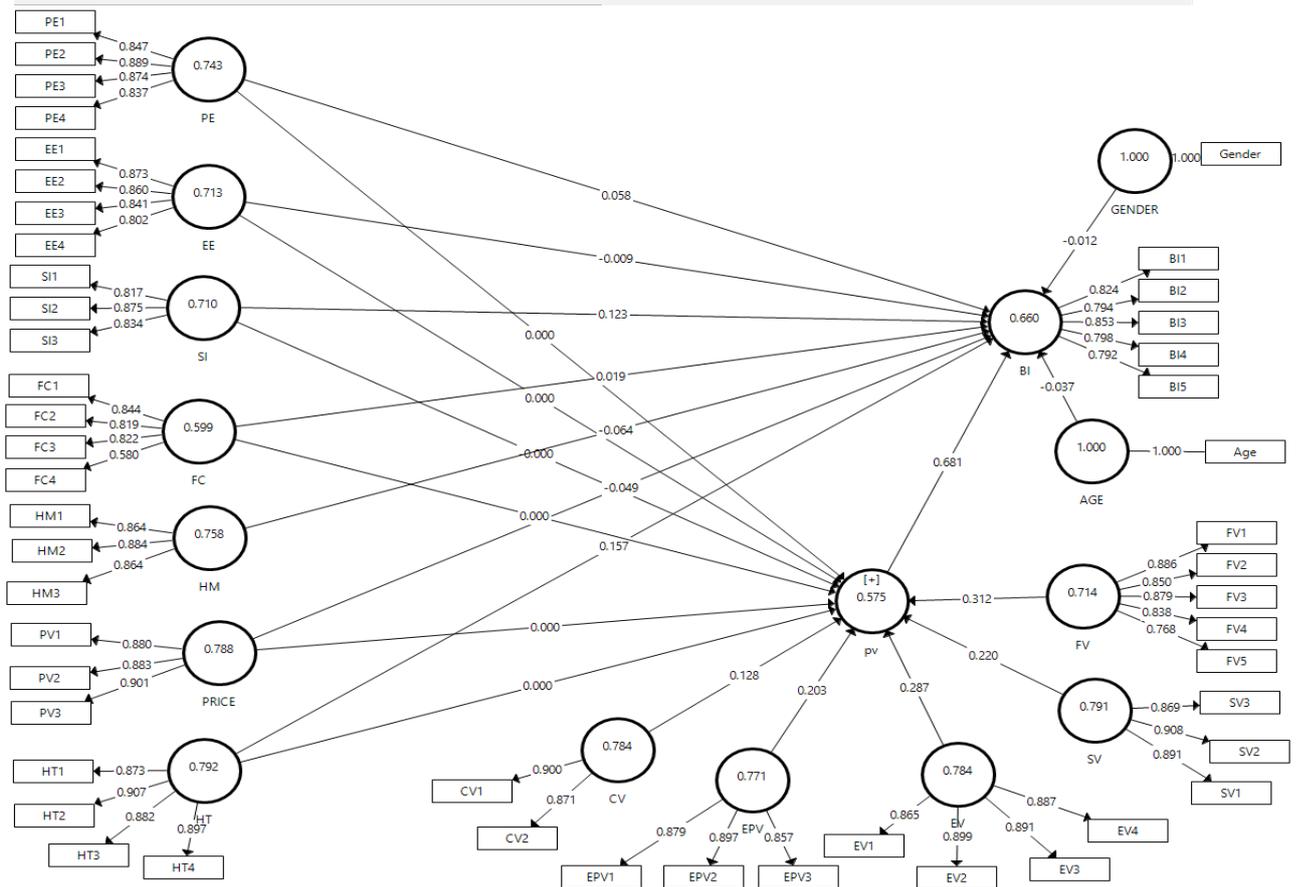


Figure 2: Outer Loadings

To measure the “Discriminant Validity” of instrument mostly researchers used “Fornell-Larcker” criterion to assess the validity of construct, but some suggested that “Fornell-Larcker” criterion is not good measure of discriminant validity in SmartPLS (Henseler, Ringle & Sarstedt, 2015). Following techniques were also used by previous studies as well (Tahir, Hadi, & Awan, 2021). Keeping this in consideration HTMT ratios were calculated and it was found that all values were in acceptable range (i.e., HTMT<0.9) as depicted in Table II.

Table II. Heterotrait-Monotrait Ratio

	BI	EE	FC	HM	HT	PE	PRICE	PV	SI
BI	1								
EE	0.52	1							
FC	0.551	0.677	1						
HM	0.599	0.500	0.514	1					
HT	0.668	0.422	0.463	0.591	1				
PE	0.615	0.715	0.622	0.591	0.511	1			
PRICE	0.572	0.548	0.552	0.627	0.604	0.662	1		
PV	0.813	0.629	0.631	0.75	0.733	0.69	0.7	1	

SI	0.594	0.541	0.596	0.528	0.563	0.628	0.629	0.707	1
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Assessment of Structural Model

The research model was assessed using SmartPLS3. R-square value shows that all UTAUT2 constructs namely, “performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, price value & habit” predict 59% behavioral intention of consumers to adopt m-payment. Path coefficients were assessed based on magnitude and signs. PLS algorithm shows that “performance expectancy, social influence, facilitating condition, hedonic motivation and habit significantly predicts the behavioral intention of consumers”. Therefore, hypothesis 1a, 3a, 4a, 5a, and 7a were accepted while effort expectancy and price value show negative and insignificant impact on behavioral intention i.e. not supporting the hypothesis 2a and 6a as depicted in table 4. Further path analysis was completed incorporating the second order construct perceived value in model to test remaining hypotheses.

R-square value shows that all constructs of UTAUT2 “performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, price value & habit” predict 78% of perceived value while perceived value expects 66% of behavioral intention of consumers. PLS bootstrapping was performed to check significance of path coefficients. As used in previous studies (Fatima, Awan, & Kamran, 2021). Perceived value significantly predicts the behavioral intention leading to acceptance of H₈. Path coefficients for, performance expectancy, effort expectancy, social influence, hedonic motivation, and habit (Table 4) are significant at 99% level of confidence interval. While path coefficients for facilitating condition and price value are not significant; Hence not accepting H_{4b}, and H_{6b}.

Effect sizes (f^2) in this study were examined, based on Gefen, Ringdon and Straub (2011) effect size determines impact of exogenous latent constructs on endogenous variables. Assessment is normally suggested for changes in R^2 values (Hair et al., 2017). The resulted f^2 values were larger than 0.35 denoting larger effect size, 0.15 medium effect size and 0.02 denotes small effect size (Ch, T., Awan, Malik, & Fatima, 2021; Khan, Awan, Fatima, & Javed, 2020). Summary of all results is depicted in Table III given below.

Table III. Summary of Results

	Hypotheses	β value	P-value	f ²	LC	UP	Result
H ₁	H _{1a} : PE--> BI	0.183	0.003	0.002	0.000	0.000	Supported
	H _{1b} : PE--> PV	0.074	0.040	0.061	0.042	0.042	Supported
H ₂	H _{2a} : EE--> BI	-0.002	0.968	0.000	-0.069	0.063	Not Supported
	H _{2b} : EE-->PV	0.121	0.000	0.017	0.054	0.034	Supported
H ₃	H _{3a} : SI--> BI	0.116	0.031	0.096	0.124	0.124	Supported
	H _{3b} : SI--> PV	0.197	0.000	0.550	0.513	0.660	Supported
H ₄	H _{4a} : FC--> BI	0.164	0.000	0.020	-0.053	-0.005	Supported
	H _{4b} : FC--> PV	0.063	0.037	0.223	0.128	0.275	Supported
H ₅	H _{5a} : HM--> BI	0.154	0.004	0.017	0.047	0.030	Supported
	H _{5b} : HM--> PV	0.299	0.000	0.025	0.020	0.017	Supported
H ₆	H _{6a} : PR--> BI	-0.018	0.759	0.002	-0.022	0.066	Not Supported
	H _{6b} : PR--> PV	0.064	0.119	0.001	-0.023	0.016	Not Supported
H ₇	H _{7a} : HT--> BI	0.365	0.000	0.042	0.006	0.006	Supported
	H _{7b} : HT--> PV	0.288	0.000	0.116	0.060	0.135	Supported
H ₈	PV--> BI	0.813	0.000	0.022	0.003	0.003	Supported

BI=Behavioral Intention, EE=Effort Expectancy, FC=Facilitating Conditions, HM=Hedonic Motivation, HT=Habit, PE=Performance Expectancy, PR=Price, PV=Perceived Value

Mediating Role of Perceived Value

Mediating role of perceived value was measured by applying the bootstring techniques. The result of study revealed that perceived value significantly mediates the relation between all the constructs of UTAT2 and behavioral intention to adopt m-payment except price value. The direct relation between the effort expectancy and behavioral intention was not accepted but in presence of PV it's become significant. Which means perceived value is playing significant intervening role. Whereas m-payment is very cheap or free of cost service that's why price value become insignificant. All the results are shown in Table IV.

Table IV. Summary of Hypotheses

	Beta	S.D.	T.Value	P Values	5.00%	95.00%	Result
EE -> VALUE -> BI	0.138	0.039	3.569	0.000	0.079	0.204	Supported
FC -> VALUE -> BI	0.021	0.031	1.668	0.022	0.069	0.032	Supported
HM -> VALUE -> BI	0.204	0.031	6.546	0.000	0.156	0.258	Supported
HT -> VALUE -> BI	0.238	0.035	6.825	0.000	0.180	0.299	Supported
PE -> VALUE -> BI	0.084	0.042	1.993	0.023	0.017	0.163	Supported
PR -> VALUE -> BI	0.051	0.032	1.575	0.058	0.001	0.107	Not Supported
SI -> VALUE -> BI	0.071	0.038	1.889	0.030	0.008	0.133	Supported

PLS Predict

Predictive relevance was employed to test the predictive performance of model. Predictive validity was evaluated with cross validation with holdout samples following Shmueli et al. (2016), where cross validated prediction errors and summaries statistics were obtained; including root mean squared error (RMSE), mean absolute error MAE. The corresponding Q^2 from PLS Predict analysis was 0.676 for behavioral intention and 0.856 for perceived value which are greater than 0 suggesting sufficient relative performance. RMSE, MAE and MAPE were lower than corresponding value in LM as shown in table given below. Which shows that model have good out of sample predictive power.

Table V: Indicator Prediction Summary

	PLS				LM				PLS-LM			
	RMSE	MAE	MAPE	Q ² - Predict	RMSE	MAE	MAPE	Q ² _predict	RMSE	MAE	MAPE	Q ² _predict
BI4	0.604	0.468	13.051	0.494	0.678	0.547	15.654	0.362	-0.074	-0.079	-2.603	0.132
BI5	0.722	0.537	16.451	0.375	0.712	0.558	17.44	0.393	0.01	-0.021	-0.989	-0.018
BI2	0.595	0.463	14.006	0.636	0.678	0.524	17.596	0.527	-0.083	-0.061	-3.59	0.109
BI1	0.587	0.444	12.717	0.581	0.626	0.494	14.495	0.525	-0.039	-0.05	-1.778	0.056
BI3	0.686	0.515	15.676	0.511	0.704	0.536	17.489	0.485	-0.018	-0.021	-1.813	0.026

DISCUSSION

The current study established a link between UTAUT2 constructs and behavioral intention with mediation of perceived value to determine the impression of consumers toward m-payments in Pakistan. The research results show that the proposed model has been verified. It was noted that influence of perceived value on behavioral intention was found significant and its path coefficient showed it as strongest predictor of intention as compared to the other variables that influenced outcome variable, concluding that consumers engage in m-payments system considering the value it holds for them as also reported by various researchers (Pura, 2005; Liu, Zhao & Chau, 2014; Shaw & Sergueeva, 2019).

The verdicts of study revealed that habit and performance expectancy are stronger predictor of behavioral intention of consumers towards m-payment adoption, consistent with previous studies (Keramati, Taeb, Larijani & Mojir, 2012; Morosan & DeFranco, 2011; Slade, Williams, Dwivedi, & Piercy, 2015). Confirming that consumers' intention to adopt m-payment depend on their habit and performance of the service (Mehri, Hons & Tarhini, 2019). Effort expectancy was found insignificant in this study while predicting the behavioral intention of customers. In past studies of m-payment effort expectancy is found to have very low impact on behavioral intention (Hussain et al., 2018) and also no relationship was reported as well (Baptista & Oliveira, 2015). It can be inferred that consumers do not feel any difficulty in using m-payment system as retailers or salesmen are available to facilitate them. Alongside, Social Influence,



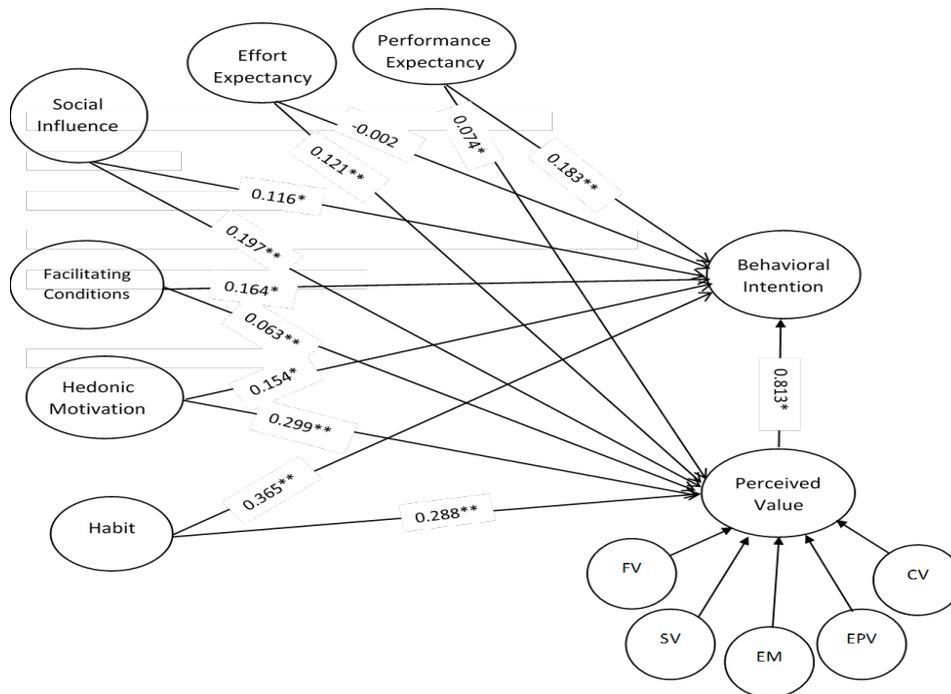
Facilitating Condition and Hedonic Motivation found to have significant impact on consumers' intention to adopt m-payment as stated in original model of UTAUT2 by Venkatesh et al., (2012).

The significant impact of social influence on behavioral intention shows that consumers are more willing to adopt m-payment if friends and family are using this payment method. Pakistan is held as a collectivist society as reported by various researchers e.g. (Abrahão, Moriguchi & Andrade, 2016; Baptista & Oliveira, 2016; Hussain et al., 2018) where social groups play important role in adoption of any new service. Facilitating condition was proved as significant predictor of m-payment adoption and results were supported by previous studies (Abdallah, Dwivedi & Rana, 2017; Martín & Salmones, 2017; Hussain et al., 2018). Similarly, hedonic motivation was also established as strong predictor of behavioral intention and these results are in-line with the outcomes of prior studies (e.g., Venkatesh et al., 2012; Abdallah *et al.*, 2018; Shaw & Sergueeva, 2019).

The current study reported insignificant impact of price value on both behavioral intention and perceived value in line with (Hussain et al., 2018; Morosan & DeFrance, 2016; Oliveira et al., 2016; Slade et al., 2015; Tang et al., 2014). Likewise, previous studies have also suggested incorporating perceived value by replacing price value (Wong et al. 2015). Outcomes indicate that relation between price value and perceived value is insignificant; whereas previous researchers omitted price value while including perceived value in the model (e.g., Ain *et al.* 2016; Shaw & Sergueeva, 2019).

The results provide confirmatory evidence that performance expectancy have significant impact on value which means that functionality of technology significantly predicts perceived value. Further findings are found aligned with previous work on hedonic motivation and social influence (Cheng, Sheen, & Lou, 2006; Moon & Kim, 2001; Venkatesh, 2000; Liu et al., 2014; Pitchayadejanant, 2011). Habit also has significant impact on perceived value, and was supported by Chiu et al., (2012). The impact of facilitating condition on perceived value is overlooked in past (Pitchayadejanant, 2011) but it is proved that facilitating condition is important degerminator of perceived value and this effect is in line with previous work (Magsamen-conrad, Upadhyaya, Youngnyo & Dowd, 2015; Commerce et al., 2018) as perceived value relation was found significant. In meta-analysis of UTAUT2 role of price value was discussed in detail and some scholars (Tamilmani *et al.*, 2019) have omitted it in different settings while some (e.g. Shaw and Sergueeva, 2019; Ain et al. 2016) suggested to replace it in future with perceived value but was never tested with all antecedents of UTAUT2. Current study proved this replacement by testing it empirically and developed the relationship of perceived value with all variables. On the bases of results of current study, revised model is given below with the beta values of construct see fig3. Moreover, mediating role of perceived value is also proved based on Tamilmani et al., (2021) study; it suggested to incorporate new

mediating variable. This model not only empirically prove the replacement of price with perceived value; also proves the intervening role of perceived value.



FV=Functional Value, EM=Emotional Value, EPV=Epistemic Value, CV=Conditional Value, SV=Social Value

Figure 3: Revised Model

THEORETICAL & PRACTICAL CONTRIBUTIONS

This study proposed modification in UTAUT2 in m-payment field. This study examined the interaction of perceived value with UTAUT2 constructs and reported modification in theory from two different aspects. First, by introducing new mediating construct and second by proving replacement of price value by perceived value which was reported by assuming that free of technology is the reason (Shaw & Sergueeva, 2019; Ain et al. 2016) without any data support. Thus, modified model of adoption by concentrating more on new mechanism pertaining to automaticity behavior is applicable to consumers use of technology that has actual minimal or no direct costs. The research results give practical implications for m-payment service providers and technologist working in the similar fields about how to improve quality of the service. First, it is it is important for companies to provide rational benefits with the service by establishing and communicating service effectively which helps to create value for creators. Aimed at effective m-payment adoption firm should focus on its usage easiness and hedonic benefits of it. Consumers habitual behavior and social group also help in developing the value of product. Some customers prefer visiting banks for transactions so they can be facilitated by convenience and efficacies whereas for distant users the service should provide pleasure of easy access by emphasizing on it via promotion. Second, this will help to minimize design-reality gap of service, design can be mor modernized and more personalized services

can be offered which reduces negativity related to technology. To exploit information technology in collective society firms should use opinion leaders and buzz marketing to create increased value of m-payment. Therefore, policy makers, firms and other organizations can get benefit from this study for the better use of m-payment by masses.

CONCLUSION

The UTAUT and UTAUT2 has been used various times to study different e-commerce, banking and other types of technology acceptance issues (Abrahão et al., 2016; Hussain et al., 2018; Brohi et al., 2018; Shaw et al., 2019; Baabdullah et al., 2019). In this study, we focused to suggest modified information system model by adding perceived value in m-payment in Pakistan. Perceived value was suggested to be included in place of price value by Ain et al. (2016) which was further tested by Shaw et al. (2019) and newer version was presented, however, it was empirically not proven and also relationship of perceived value was not studied with other constructs. As perceived value was proven a strong predictor of m-payment adoption. It should not be overlooked in information for better understanding. Furthermore, analysis revealed that perceived value should replace price value for low-cost products and services. Moreover, the impact of effort expectancy effect was found significant with both perceived value and behavioral intention, which was reported very weak and insignificant in previous studies (Hussain et al., 2018; Baptista & Oliveira, 2015).

LIMITATIONS and FUTURE RESEARCH

Nevertheless, this study has limitations as well. Firstly, quantitative was used a mixed method approach could be used especially for insignificant relationships for closer look. Secondly, respondents of study were small and responded at one point of time only. Longitudinal studies and higher number of respondents may reveal more interesting results. Thirdly, respondents were approached founded on ease of researchers by using convenience sampling which gave narrow results. Fourth, in future researchers can empirically test this modified model in other context with perceived value and other variable (e.g., voluntariness of use, experience) as moderator. Also, this model could be further extended with addition of other external constructs that helps to develop consumer value while adopting innovative technology.

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