Impact Investigation of Perceived Cost and Perceived Risk in Mobile Commerce: Analytical Study of Pakistan

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Summary
This paper is intended to examine the impact of perceived risk and perceived cost to accept mobile commerce in Pakistan. This research uses extended Technology Acceptance Model (TAM).The proposed model was tested through Structural Equation Modeling (SEM) with the help of Analysis of Moment Structures (AMOS) software using sample data of 414 responses collected through clustered sampling approach, on seven point Likert scale. Findings indicate that risk, cost, perceived ease of use and perceived usefulness are the considerable factors that influence the behavioural intention to accept M-commerce. Results further indicate that 71.4% variance in behavioural intention is explained by its predictor variables. Moreover, Pakistani consumers have some reservations about the cost and risk factors involved in M-commerce. Results indicate negative correlation between cost, risk and behavioural intention. Therefore, both cost and risk can be considered barriers in large scale diffusion of M-commerce in Pakistan. Besides many contributions, this research seizes many significant practical and theoretical implications for researchers, practitioners, policy makers, retailers, managers, technology consultants, software vendors, information systems developers, investors.

Key words:
TAM, Perceived Risk, Perceived Cost, Mobile Commerce, Pakistan

1. Introduction

Almost a decade ago mobile phones were just the wireless devices used for one-to-one voice communication. Nowadays, the purpose and capabilities of mobile phone has changed its usability. Modern mobile device with its features such as the convenience of its web browsing, the screen resolution, memory capacity, and capability to run internet, has enriched it to perform the activities which usually were only performed through Personal Computers (PCs) [1]. Mobile commerce (M-commerce) is mode of commerce usually conducted using hand held devices such as smart phones; tablet PCs [2]. According to [3] M-commerce users are exceeding the internet users in most of the countries around the world and M-commerce is now reshaping the traditional business approaches. However, it is observed that many factors have hindered consumer's usage of M-commerce in many developing nations [4] Factors such as cost of access, lack of trust, security and privacy risk, are imperative obstacles in large scale adoption of M-commerce in under developed financial systems [5] [6]. Moreover, as compared to traditional mode of commerce, M-commerce is a virtual mode of transactions and consumers are very much careful regarding their financial loses and risks involved in this kind of commerce in which seller is unknown [7]. Moreover, consumers believe that retailers are not able to adequately protect their personal information [8]. Therefore, risk concerns, privacy protection, and security, are the breakpoints for M-commerce popularity. Moreover, in addition to risk, cost concerns are also among the most significant issues in the acceptance of M-commerce underdeveloped countries [9].

Therefore, this research is aimed to measure the impact of perceived risk and perceived cost on the M-Commerce acceptance in Pakistan. As, M-commerce market in Pakistan has not evolved as expected results of this study can help M-commerce operators to understand user's beliefs. This research paper is further organized as follows: First the importance and impact of perceived cost and perceived risk in context of M-commerce perspective is highlighted. Next, a research model and hypothesized association between all variables is projected. Later on, research methodology including sampling, data collection, analysis tools used and techniques are presented. At last the discussion of research findings, implications along with limitations, conclusion and future research directions are provided.

2. Research Background

Considering the increasing role of consumer acceptance of Information Systems/Information Technology, researchers

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have used many research models to investigate users' acceptance of new technologies and systems. User acceptance is quite important key indicator of success for organizations [10]. In this regard, TAM [11] has been largely accepted to understand user's acceptance behaviour. According to TAM (as shown in Figure 1) two core beliefs i.e. Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU) are the main significant determinants of individuals' behavioural intention to accept or reject any IS/IT system [11]. Perceived usefulness is "one's belief that using a particular service or system would increase his productivity" whereas, perceived ease of use is "one's belief that the use of a particular service or system would be easy to operate or use" [11]. Although TAM has received huge researchers' attention due to its simplicity, robustness, some researchers [12] believe that PU and PEOU which are core assembles of TAM do not provide enough explanation of IS/IT users' acceptance, therefore addition of other variables can help and enhance the prediction power of TAM provided a way to access video remotely.

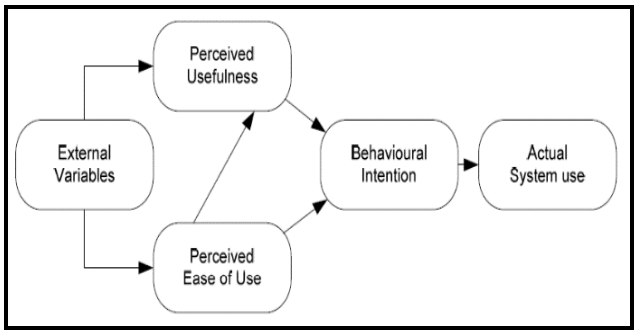

Fig.1. TAM block diagram

3. Development of the Model and Hypothesis

3.1 Proposed research Model

Although, TAM has been extensively applied in different contextual settings to explain user acceptance of new IS, but TAM has also been considered to have some limitations i.e. being over studied and too simple [13][14][15]. In [11] it is believed that researchers can improve the predictive power of TAM by exploring other variables that could affect its primary variables (PU, PEOU) to make it fit for explaining specific technology adoption contexts. Therefore, many researchers [15] [16] asserted that, in addition to core PU and PEOU some other factors related to user characteristics and the nature of technologies/service or system may be added to enhance its explanatory power. (Figure 2) presents the research model and relationships between dependent and independent variable to be used in this research. As shown in (Figure 2). TAM is used as a baseline model while perceived cost and perceived risk are added as additional independent variables. The research model posits that behavioural objective to accept M-commerce is jointly determined by PU, PEOU, Perceived Cost (PC), and Perceived Risk (PR).

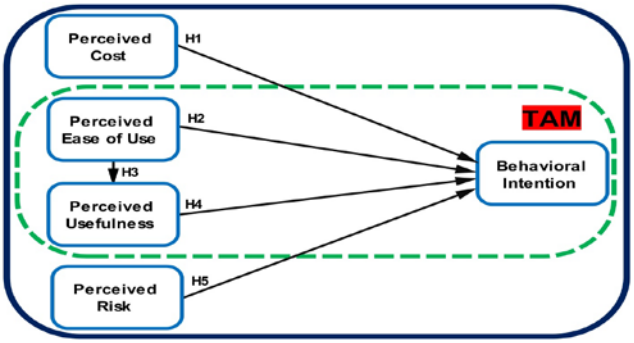

Fig. 2. Research model

3.2 Behavioral Intention

Behavioral Intention (BI) can be defined as an individual's will to perform or conduct a specific behavior [11]. From M-commerce perspective behavioural intention is consumers will to conduct, perform or use M-commerce mode of commerce to purchase services or products using handheld mobile devices.

3.3 Perceived Cost

From M-commerce perceptive, Perceived Cost (PC) is the cost involved in using M-commerce facility including transaction cost, equipment cost; applications download cost and access cost [9] [17]. Some researchers argued that access cost, equipment costs, and transaction fees are important factors that create perception in users' mind that M-commerce is expensive to use [18]. Many researchers [19] [20] [21]. The [9] found negative corelational between perceived cost and consumers' intention to use M-commerce. It is therefore hypothesized that: H1. Cost has negative effect on behavioral intention.

3.4 Perceived Ease of Use

Perceived ease of use is described as individual's level of confidence to perceive that a particular system or service is simple in usage [11]. From M-commerce perspective perceive ease of use is consumers' perception to feel that for him or her purchasing through M-commerce or using M-commerce as a mode of commerce does not require additional effort. Many researchers found PEOU as a direct considerable feature to affect behavior intent to adopt a particular IS/IT system or services. Therefore, it

can be hypothesized that: H2.On behavioral intention and H3 on perceived usefulness PEOU have positive effect.

3.5 Perceived Usefulness

Perceived usefulness (PU) is described as an individual's level of confidence to assume that the use of a particular system or service would be useful for him or her [11]. From M-commerce perspective, PU is consumers' belief to consider M-commerce useful as compared to other mode of commerce [8]. believed that PU has significant positive effect on individuals' acceptance of M-commerce. Similarly, many other researchers found PU as a significant contributor in the acceptance of ICT systems and services [9] [11][22][23]. It is therefore hypothesized that: H4. PU has positive effect on behavioral intention.

3.6 Perceived Risk

Perceived Risk (PR) is referred as the consumers' perception of adverse result of products and services [24]. Since, wireless media is used as a transmission medium for making financial transaction in M-commerce, risk perception in consumer's mind is comparatively high [5]. In [24] it is believed that consumer's hesitation towards online shopping can be biased by the risk factors such that, whether the products or service they receive will be as per their perception or not. Some researchers [25][26]. The [9] found negative effect of risk on consumers' intention to adopt M-Commerce. In a study [27] argued that most people in Pakistan are risk averted and show reluctance to conduct transactions via mobile devices. Thus it is hypothesized that: H5. On behavioral intention perceived risk has significant negative effect.

4. Materials and method

4.1 Development of Survey instrument

In order to measure the role of perceived risk and perceived cost in the adoption of M-commerce in Pakistan, researchers developed a survey questionnaire for data collection. Although all items in the survey instrument were adopted from previous research studies, but were modified and pretested before final survey conduction [28]. Respondents feedback for all variables was sought on seven-point Likert scale starting from (1) strongly disagree to (7) strongly agree, however demographic data was sought on nominal scale.

4.2 Collection of Data

In this survey based study the data was collected from mobile device internet users located in five major cities Islamabad, Karachi, Lahore, Peshawar and Quetta. All these five major cities of Pakistan were considered as clusters and respondents were contacted on random basis. Survey instrument was distributed through face to face meetings, postal mail and online web based. Subjects were contacted at main shopping malls, educational institutes, railway stations, banks and organizational headquarters.

4.3 Response rate

Data for the survey questionnaires were uniformly distributed in all five main cities (clusters) of Pakistan. In total 750 distributed survey questionnaires, 459 responses were provided, which shows 61.2% response rate. In this 18 respondents sent partial response, 7 checked same response for all things and 5 provided entirely blank feedback form. 15 mentioned that they have never used Internet on the mobile. Therefore, finally 414 valid responses were coded in SPSS for further data analyses. Table.1 summarizes the sample profiles of the respondents.

Table 1: Demographic detail of the respondents

Variable	Category	Frequency	Percent (%)	Cumulative
Gender	Male	285	68.8	68.8
	Female	129	31.2	100
Age	<20	3	0.7	0.7
	21–30	211	50.9	51.7
	31–40	126	30.4	82.2
	41–50	60	14.5	96.7
	51–60	10	2.4	99.1
	>60	4	0.9	100
Education	Less than high school	0	0	0
	High school	22	5.3	5.3
	Intermediate	24	5.8	11.1
	Diploma	36	8.7	19.9
	Graduate	192	46.3	66.2
	Postgraduae	140	33.8	100
Occupation	Student	87	21.0	21.0
	Government employee	130	31.4	52.4
	Private sector	141	34.1	86.5
	Businessperson	39	9.4	95.9
	Other	17	4.1	100
Income (rupees)	<20,000 Rs	67	16.2	16.2
	21,000-40,000 Rs	135	32.6	48.8
	41,000–60,000 Rs	107	25.8	74.6
	61,000-80,000 Rs	59	14.3	88.9
	81,000-100,000 Rs	24	5.8	94.7
	>100,000 Rs	22	5.3	100
n =414				

4.4 Measurement Model

Researchers employed SEM technique for Confirmatory Factor Analysis and Structural Model testing. Researchers used AMOS software version 23 for SEM. Initially, CFA was run on the measurement model to test the model fit. Standardized loading results indicated that only one item i.e. PR6 related to Perceived Risk construct found to have less than recommended value of 0.5 and was dropped from further analysis. Measurement model was run again after dropping the low loaded items [29]. As shown in Table 2 all factor loading results found above than recommended value of 0.5. Moreover results of internal consistency measured through Cronbach's alpha also found above than 0.7. Similarly, Average Variance Extracted (AVE), Composite Reliability (CR) also found significant (CR ≥ 0.70 and AVE ≥ 0.50) [30].

Table 2: Assessment of measurement model for constructs

Construct	Cronbach's α	CR	AVE	Std. loadings
BI	0.931	0.931	0.731	BI1(.830), BI2(.86), BI3(.875), BI4(.839), BI5(.863)
PC	0.902	0.905	0.706	CS1(.751), CS2(.863), CS3(.887), CS4(.853)
PEOU	0.950	0.950	0.730	PEOU1(.875), PEOU2(.889), PEOU3(.888), PEOU4(.837), PEOU5(.853), PEOU6(.856), PEOU7(.778)
PU	0.942	0.943	0.703	PU1(.842), PU2(.829), PU3(.854), PU4(.834), PU5(.868), PU6(.881), PU7(.751)
PR	0.876	0.876	0.586	PR1(.774), PR2(.813), PR3(.762), PR4(.711), PR5(.765)

Table 3: Model-fit indices for the measurement model and the structural model.

Fit indices	Criteria	Measurement Model	Structural Models	Reference
X2/Df	1< χ2/df <3	1.735	1.909	Hair *et. al.*, (2006) [30]
RMSEA	<0.05	0.042	0.47	Bagozzi and Yi (1988)
NFI	≥ 0.90	0.942	0.936	Bentler and Bonett, (1980)
TLI	≥ 0.90	0.971	0.965	Hair *et. al.*, (2006)[30]
CFI	≥ 0.90	0.974	0.968	Bagozzi and Yi, (1988)
AGFI	≥ 0.80	0.890	0.881	Hair *et. al.*, (2006)[30]

As shown in Table 3, the results of model fit indices indicate that data fits the model (i.e. absolute fit measures as x^2/df found 1.735, root-mean-square-of-approximation (RMSEA) found 0.042, comparative-fit-index (CFI) and normated-fit-index (NFI) found 0.974 and 0.942, respectively, and adjusted- goodness-of-fit index (AGFI) found 0.890).

Table 4: Discriminant validity

	PEOU	BI	PC	PR	PU
PEOU	0.854				
BI	0.691	0.855			
PC	-0.563	-0.582	0.840		
PR	-0.475	-0.662	0.289	0.766	
PU	0.646	0.754	-0.442	-0.589	0.838

Moreover, as shown in Table 4, the square root of the AVE is greater than the inter-construct correlations, which satisfies the discriminant validity condition [31].

4.5 Structural Model

According to [29] Structural Model (SM) helps to evaluate affects the other construct in the proposed model directly or indirectly. As shown in Table 5 indicate that all five hypothesis (H1, H2, H3, H4, and H5) are highly significant (i.e p values is < 0.001). Moreover, large negative relationship exist between BI and PC (β value -0.240, t-value -5.746) as well as between BI and PR (β value -0.306, t-value -6.916). However relationships between BI and PU (β value 0.385, t-value 7.650), BI and PEOU (β value 0.181, t-value 3.592), and PEOU to PU (β value 0.656, t-value 11.673) are positive. (Fig. 3) further demonstrate the statistical results of final model.

Table 5: hypotheses test results, Notes: ***p<0.001

Hypothesis	Relationship	Structural Coefficients	(t-Value)	Remarks
H1	PC→BI	-0.240***	-5.746	Supported
H2	PEOU→BI	0.181***	3.592	Supported
H3	PEOU→PU	0.656***	11.673	Supported
H4	PU→BI	0.385***	7.650	Supported
H5	PR→BI	-0.306***	-6.916	Supported

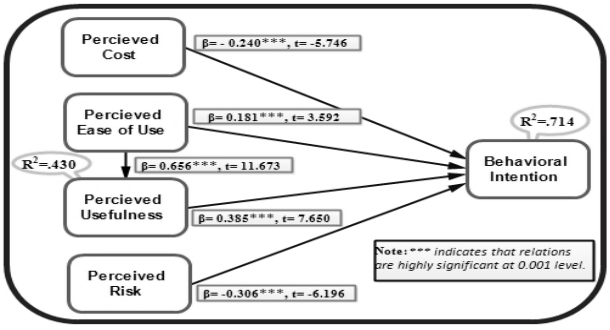

Fig. 3 Final research model with empirical findings

5. Discussion

According to results shown in Figure 3, a total of 71.4% variance in BI (dependent variable) is explained by its predictor variables i.e. PU, PEOU, PR and PC. Among these predictor variables, PU is found to be the most significant determinant followed by risk, cost, and PEOU. These findings demonstrate that an increase in PU, and PEOU and decrease in cost and risk (both risk and cost are negative predictors) would increase M-commerce acceptance among Pakistani consumers. The significant relationship between BI and PU supported the argument that usefulness beliefs of the potential users have positive influence on the behavioural intention to accept the M-commerce. These results are consistent with the findings of original TAM in which PU was found to have direct significant effect on the behaviour intention [11]. These empirical findings suggest that users are driven to accept M-commerce based on their beliefs established through the perception of its relative advantages after considering its usefulness. Therefore, it can be predicted that M-commerce is more likely to be accepted on large scale in Pakistan if its usefulness is realized by the potential users. These results indicating the significant relationship between BI and perceived are in agreement with the empirical findings of many previous research studies [9] [21] [27] [32] [33] which also found that if users' concerns about risk increases the acceptance of new IS decreases, i.e. there is inverse proportion between risk and acceptance. Moreover, because of the unique nature of M-commerce (i.e., users cannot taste, touch, or feel the product), it is perceived as risky and users confidence about their privacy and security significantly influence their adoption.

Findings further demonstrate that there is an inverse relationship between cost and intention to accept the M-commerce, i.e. an increase in its usage cost would reduce its acceptance. This indicates that potential users have some reservations about the usage cost of M-commerce and they feel it higher than the alternate methods of commerce. However, these results may not be surprising because, M-commerce usage cost including cost of handheld devices (smart phones and tablet PCs) internet subscriptions and transaction fees are some of the major issues in the underdeveloped economies where the overall income is low. These results are in accord with the result of numerous earlier analyses [5] [9] [19] [21] [22] [27] [33]. Additionally, results of this study revealed that PEOU is a strong predictor of BI and an increase in users' perception of the easiness of M-commerce would further enhance its acceptability. These results are consistent with many other earlier empirical studies conducted in similar contexts [7] [11] [34] [35]. These results are evident that potential users feel M-commerce as an easy to use alternate compared to conventional commerce methods.

Results of this research fill in an important gap in literature by contributing the results of the determinants of individual's acceptance of M-commerce in developing economies context, with a theoretical based empirical investigation. Consequently, the empirical validation of model posits that model is valid and can generally be applied to explore and achieve better results in similar contextual setting. In summary, results of this research provide important guidelines for M-commerce service providers, retailers, managers, technology consultants, software vendors, IS developers, investors and designers.

6. Conclusion

This research was aimed to measure the impact of perceived cost and perceived risk in the acceptance of M-commerce in Pakistan. The proposed research model was tested using 414 valid responses collected from Pakistan. Research findings indicate that perceived risk (i.e. functional, financial, time, social, security, online privacy and personal data) that create doubts about the credibility of M-commerce, and negatively affect its acceptance among Pakistani consumers. Therefore, Pakistani consumers have prime concerns about their privacy and security and feared that their personal as well as private confidential information may be at risk while using this new mode of commerce. Moreover, potential adopters of M-commerce are highly sensitive to cost factors. Which implies that, being an under developed economy, M-commerce users in Pakistan have high concerns about its usage cost. Therefore, both cost and risk may be considered as barriers in large scale usage of M-commerce in Pakistan.

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