



## Integration of Technology Acceptance Model with Perceived Risk, Perceived Trust and Perceived Cost: Customer's Adoption of M-Banking

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**ABSTRACT:** Even with the rapid expansion of information technology and m-banking services in India, M-banking adoption has not seen that tremendous growth. Still there has been a lot more potential market to connect with online banking services. It has been observed that India has great potential for m-banking but very less customer base is registered as users of mobile banking. This study extends the applicability of TAM (Technology Acceptance Model) constructs modified with customers' perceived risk, perceived trust and perceived financial cost to investigate the factors influencing actual usage of m-banking adoption. Data collected from 265 m-banking users were analyzed by means of multiple regression. In support with previous studies, findings revealed that perceived usefulness, perceived ease of use, perceived risk and perceived trust found to be significant in adoption of m-banking adoption. Perceived cost was not significant for explaining m-banking adoption.

**Keywords:** TAM, M- Banking, Perceived Risk, Perceived Trust, Perceived Cost.

**Abbreviations:** Technology Acceptance Model (TAM), Perceived Usefulness (PU), Perceived ease of use (PEOU), Perceived Risk (PR), Perceived Trust (PT), Perceived Financial Cost (PFC) & Behavioral Intention (BI).

### I. INTRODUCTION

M- Commerce is connected wirelessly in a mobile environment using mobile devices unlike online commerce [38]. Mobile commerce is relatively as it does not require heavy investments like that of online commerce requirements like computers and fixed line network for online commerce. Hence mobile commerce offers larger potential for business industries than any other mode.

Mobile phones are now a day's regarded as suitable medium to carry out financial transactions due to its ease, interactivity and every time and everywhere use. Nowadays, bank customers are able to conduct banking services from anywhere within fractions of seconds. M-banking can be regarded as a provision and accessibility to banking and financial transactions and services with the assistance of mobile communication devices [34]. M-banking not only helps the individual customers for their day to day banking services but also provides the easy and quick accessibility of the banking information as and when required. M-banking is based on wireless networking using protocols such as GPRS and CDMA. In mobile banking, mobile phones are used as terminals for banking customers to check their account balances, make fund transfers, payment of utility bills and various other banking transactions [4]. M-banking was started in India in the year 2002 by using smart phones or other cellular phones with the help of sending and receiving messages. One of the biggest advantage of using m-banking is just within fractions of a second, the required information is available to the account holder. The verification of accounts, requests for other services is also accepted at a finger touch. Also, when customers are facing problems like plastic money theft or frauds, features like hot listing of debit

and credit card is provided by the mobile banking. One of the most noteworthy advantage of m-banking is equipping the banking customers with omnipresent and real-time services [40] and provide immediate and interactive banking facilities [6].

M-banking has entirely revived the nature and concept of traditional banking and has set the mindset of customers from "nice to have" to "need to have" approach. M-banking has a lot more to do as far as banking industry in India is concerned-banking has lot of potential in India, which is obvious from the studies showing comparative statistics of ratio of m-banking customers to bank branches across different countries of the worlds [20]. Maintaining a banking customer is more important than acquiring new customer [3]; Attracting the new customers may not be easy than retaining the existing m-banking customers [9, 12]. Perceived financial cost plays a significant role. If customer feels that cost of using any service is high than it may have the reduction in adoption of that facility [18, 32]. Perceived usefulness and trust found to be the significant factor predicting customer's intention to use m-banking in Saudi [46, 47]. Therefore, the current research focuses on the factors that influence the m-banking adoption.

### II. REVIEW OF LITERATURE & CONCEPTUAL FRAMEWORK

TAM (Technology Acceptance Model) is one of the most widely accepted and prominent extension of Ajzen and Fishbein's research work known as theory of Reasoned Action [35] was developed by Davis in 1986. It was specially tailored to predict the individual's information technology acceptance behavior [8] and its explanatory power was ranging between 40– 60% of the total

variation in an individual's intention to use technology [6]. Technology acceptance model need to be integrated with appropriate situation related variables for improved understanding of IT (Information Technology) acceptance [19]. Researchers integrated and used TAM in m-banking context in various countries [4, 15, 18, 25, 26, 30, 39]. As per TAM, BI is influenced by a user's attitudes towards any service or a product which in line is affected by PU and PEOU of the product [8]. PU can be understood as "the degree to which a person agrees that using a particular system would augment his or her job performance." PEOU is defined "as the degree to which a person believes that would be free of effort" [8]. TAM's basic constructs do not completely replicate the multiplicity of user task environments and should be improved and extended [39]. Hence, current research incorporated user's Perceived Trust, Perceived risk and Perceived Financial Cost as additional constructs along with TAM's fundamental constructs. Researchers considered risk as one of the factor that influences the mobile user's acceptance [4, 26, 39]. PFC is very important factor for m-banking adoption by the users. If the customer feels that cost of using any service is high than it may have the reduction in adoption of that facility [18, 32]. Since m-banking is an emerging channel in India, the customers may perceive this channel is risky to perform financial transactions. The customer may also perceive m-banking channel is incompatible to their lifestyle, profession style and their current banking needs. The perception of risk may be higher than offline depending on their experience, skill of the customers. The current research specifically considers the risk related to user's perceived security and privacy. Therefore the m-banking user's Perceived Trust (PT), Perceived Risk (PR) and Perceived Financial Cost (PFC) are incorporated along with Perceived Usefulness (PU) and perceived ease of use (PEOU) to explore the m-banking adoption.

**Perceived Usefulness, Perceived Ease of Use, Perceived Risk, Perceived Trust and Perceived Financial Cost:** M-banking user's perceived usefulness and ease of use were strong determinant of m-banking acceptance in Korea and Taiwan which is also confirmed in the context of usage of online games [11, 13, 19]. Perceived ease of use is defined as accessing a system with less effort [8]. Studies have found positive influence of perceived ease of use on intention to use online banking technology [2, 22]. Therefore, extending this to m-banking context, we test the influence of ease of use on behavioral intention to use m-banking services. Perceived usefulness of m-banking technology influences perceived ease of use which in turn influences their adoption [1]. In contrary to that, the mobile commerce usage is not directly influenced by the user's perceived ease of use but indirectly through perceived usefulness [14]. M-banking user's perception of ease of use leads to perception of usefulness of the technology to conduct banking services which indirectly influences the intention and usage of m-banking services in Singapore [26]. If the customers feel comfortable with particular technology, they would fully utilize the technology and realize its benefits which may make them to feel it as useful. Hence, to identify the influence of user's perceived ease of using m-banking

technology on their perception towards usefulness the above mentioned factor has been adopted.

Though the m-banking channel is useful, compatible and easy to use, the degree of usage is determined by the level of risk associated with performing financing transactions on this channel. Empirical studies found that, customers perceived risk of m-banking channel negatively influence their attitude, intention, adoption and usage of online and m-banking services [4, 29, 31, 39, 41]. Since m-banking is a emerging channel in India the users intention to use in spite of risk associated with m-banking channel needs to be investigated. Customer's perception of risk in m-banking involves security system of banks, authentication procedures and privacy guarantee provided by the bank. Hence the current research proposes the following proposition to verify the influence of risk on actual usage of m-banking services.

Trust is very important for any kind of business relationship and plays a vital role in m-commerce, as it decreases the risk of uncertainty [13, 23, 37]. Similarly, building customers trust is also necessary for the m-banking service providers [41]. The adequate construction of trust-assurance arguments, which are disclosed on websites, is another factor that affects customers' trust [16]. The same assumptions are applied in case of mobile banking. Banks need to have strong and robust technological advancements so that the customers can establish trust over online services and facilities provided by the banks. Trust has been proved as one of the most important antecedent of engagement in online banking services [33, 36].

Perceived financial cost (PFC) can be understood as the measure which an individual believes that using banking services from m-banking facility is costlier as compared to other modes [18]. Perceived financial cost and acceptance of mobile banking services are inversely proportion to each other in general sense. Debatably, consumers will willingly adopt m-banking if they accepts the perceived financial cost is not too high and will not adopt it if the perceived financial cost is unsuitable for them i.e., cost is too high.

TAM explains that perceived usefulness and ease of use of any technology influences the actual usage through behavioral intention which in turn influences actual use of any technology. Various previous studies have included other factors and analyzed but risk, trust and cost found to be important factors. Therefore, considering this as this research gap extending this context to m-banking usage, the following hypotheses are framed:

H1: Perceived usefulness will have a significant positive influence on people's intention to adopt mobile banking.

H2: Perceived ease of use will have a significant positive influence on people's intention to adopt mobile banking.

H3: Perceived Risk will have a significant negative influence on people's intention to adopt mobile banking.

H4: Perceived Trust will have a significant positive influence on people's intention to adopt mobile banking.

H5: Perceived financial cost will have a significant negative influence on people's intention to adopt mobile banking.

The study proposes a research model to examine the influence of Technology Acceptance Model constructs such as perceived usefulness and perceived ease of use along with construct of Perceived Risk, Perceived Trust and Perceived Financial Cost on intention to adopt m-banking services in India. In specific, the objective of the study is to examine the influence of Perceived usefulness and Perceived ease of use, Perceived Risk, Perceived Trust, and Perceived Financial Cost on behavioral intention of using m-banking and on actual usage of m-banking services.

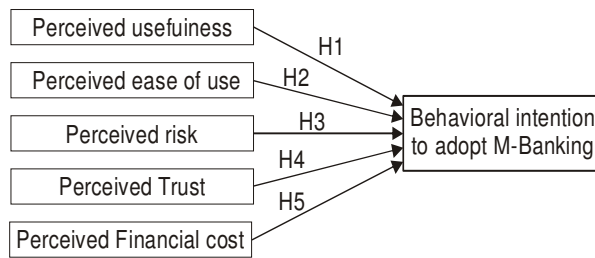


Fig. 1. Research Framework.

### III. RESEARCH METHODOLOGY

### Data Collection Procedure & Measurement Development:

Data was collected by floating a survey questionnaire. A total of 270 questionnaires were circulated out of which 265 responses were considered for analysis as 5 were found invalid due to imperfect data. The questionnaires were given to the customers of the banks who were using mobile banking facility. The measurement items of the selected variables were adopted from the previous validated studies. The details of constructs along with items shown in the table below. A five-point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree” were adopted to measure responses. Furthermore, a pilot study was conducted on a selected 30 customers to verify the reliability of the instrument.

### IV. DATA ANALYSIS

#### A. Reliability Test

To verify the reliability of the items, Cronbach alpha coefficient was calculated. The values of which ranged between 0.703 to 0.921, satisfying and exceeding the value recommended of 0.70, are worthy of adoption as true measures of the variables they represent [48, 49].

Table 1: Constructs and Corresponding Items.

Construct	Corresponding Items	Items Sources
Perceived Usefulness	(PU1)“I find Mobile banking useful in my daily life.” (PU2)“Using Mobile banking increases my chances of achieving tasks that are important to me.” (PU3)“Using Mobile banking helps me accomplish tasks more quickly.” (PU4)“Using Mobile banking increases my productivity.”	[8]
Perceived Ease of Use	(PEOU1)“Learning how to use Mobile banking is easy for me.” (PEOU2)“My interaction with Mobile banking is clear and understandable.” (PEOU3)“I find Mobile banking easy to use.” (PEOU4)“It is easy for me to become skilful at using Mobile banking.”	[8]
Perceived Risk	(PR1)“Using Mobile banking services subjects my banking account to potential fraud.” (PR2)“Using Mobile banking services subjects my banking account to financial risk.” (PR3)“I think using Mobile banking services puts my privacy at risk.” (PR4)“Hackers might take control of my bank account if I use Mobile banking services.”	[42]
Perceived Trust	(PT1)“I believe that it is always safe to transfer money using Mobile banking.” (PT2)“I believe it is reliable to transfer money using Mobile banking.” (PT3)“My bank promptly informs me whenever anything goes wrong with any of my transactions.” (PT4)“Based on my past experience, I can say that using Mobile banking is trustworthy.”	[35, 43]
Perceived Financial Cost	(PFC1) “The cost of using mobile banking is higher than using other banking channels.” (PFC2) “The wireless link fee is expensive when using mobile banking.” (PFC3) “The mobile device setup to using mobile banking charges me lot of money.” (PFC4) “Using mobile banking services is cost burden to me.”	[18, 44]
Behavioral Intention	When dealing with banking affairs (BI1) “I prefer to using mobile banking.” (BI2) “I intend to use mobile banking.” (BI3) “I would use mobile banking.”	[18, 44, 45]

**Table 2: Variables with Factor Loading and Cronbach's  $\alpha$ .**

Construct	Corresponding Items	Loadings	Cronbach's $\alpha$
Perceived Usefulness	PU1	0.815	0.921
	PU2	0.833	
	PU3	0.801	
	PU4	0.812	
Perceived Ease of Use	PEOU1	0.773	0.853
	PEOU2	0.805	
	PEOU3	0.751	
	PEOU4	0.752	
Perceived Risk	PR1	0.715	0.812
	PR2	0.695	
	PR3	0.798	
	PR4	0.769	
Perceived Trust	PT1	0.701	0.759
	PT2	0.753	
	PT3	0.717	
	PT4	0.733	
Perceived Financial Cost	PFC1	0.732	0.703
	PFC2	0.725	
	PFC3	0.758	
	PFC4	0.705	
Behavioral Intention	BI1	0.793	0.841
	BI2	0.793	
	BI3	0.789	

**B. Multiple Regression Analysis**

Results of linear regression analysis indicated that 13%, 45.6%, 50.6%, 64.2% and 60% variance in BI is explained by PU, PEOU, PR,PT and PFC which is evident by the value of  $R=0.365$   $F=39.247$  at  $p<0.01$ (PU),  $R=0.677$   $F=215.942$  at  $p<0.01$ (PEOU),  $R=0.713$   $F=263.064$  at  $p<0.01$ (PR),  $R=0.802$   $F=460.094$  at  $p<0.01$ (PT) illustrates the model's goodness of fit, the regression result also confirms that PU,PEOU,PR and PT is a significant predictor of BI (Beta = 0.365,

$t = 6.265$ ,  $p<0.01$ ), BI(Beta= 0.677,  $t= 14.695$ ,  $p<0.01$ ), BI (Beta= 0.713,  $t= 16.219$ ,  $p<0.01$ ) and BI (Beta= 0.802,  $t= 21.450$ ,  $p<0.01$ ) whereas  $R=0.671$   $F=213.452$  at  $p<0.01$ (PFC) illustrates the model's goodness of fit, the regression result also confirms that PFC is insignificant predictor of BI (Beta= 0.017,  $t= 20.215$ ,  $p<0.01$ ).

PU, PEOU and PT were strong determinant of m-banking adoption [11, 13, 19, 33, 36]. PR negatively influences users' attitude, intention, adoption and usage of online and m-banking services [4, 29, 31, 39, 41].

**Table 3: Result of Hypothesis.**

Hypothesis	Result
"H1: Perceived usefulness will have a significant positive influence on people's intention to adopt mobile banking"	Accepted
"H2: Perceived ease of use will have a significant positive influence on people's intention to adopt mobile banking."	Accepted
"H3: Perceived Risk will have a significant negative influence on people's intention to adopt mobile banking."	Accepted
"H4: Perceived Trust will have a significant positive influence on people's intention to adopt mobile banking."	Accepted
"H5: Perceived financial cost will have a significant negative influence on people's intention to adopt mobile banking"	Rejected

**V. CONCLUSION**

This empirical study is based on the Technology Acceptance Model (TAM) as a medium that is modified with the important factors like risk, trust and cost which are the key elements for the m-banking usage by the customers. The main aim of this research is to analyze the factors influencing the m-banking usage in India. In support with previous studies, findings revealed that perceived usefulness, perceived ease of use, perceived risk and perceived trust found to be significant in adoption of m-banking adoption. Perceived cost was not significant for explaining m-banking adoption. This study concluded that m-banking users does not consider the cost as a barrier for the usage whereas other factors like

trust and risk are found to be strong determinants for m-banking adoption.

**VI. FURTHER SCOPE AND LIMITATIONS OF THE STUDY**

The study is limited to only 265 m-banking users. Future researches can be extended to larger sample of respondents to bring greater insights to the success of m-banking adoption. This integrated TAM model can be further extended to other technological services such as m-education, m-health, social media usage, self servicing technologies (SST). Future studies can also incorporate variables like service quality, and social influence and other facilitating condition in future research to get a broader perspective.



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**Conflict of Interest.** The authors of this study declare that they have no conflict of interest.

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