

Financial Inclusion through Mobile Banking: A Case of Bangladesh

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Abstract

With an aim to expand financial inclusion through mobile banking, using innovation diffusion theory and decomposed theory of planned behavior together, this study added a variable, namely perceived financial cost to the combined model to identify and examine the impact of factors influencing behavioral intention to adopt (or continue to use) of mobile banking in Bangladesh. The results of Structural equation modeling (SEM) indicate that Perceived financial cost, Perceived risk and Subjective norm are the most influencing factor that affect people's behavioral intention to adopt (or continue to use) mobile banking and thereby left a message for the banks and policy makers to design mobile banking services in Bangladesh in such a way so that access and usage of this service can be increased which ultimately will have a positive impact on the country's financial inclusion campaign.

JEL Classification: G21, G28, O33

Key words: Mobile banking, Bank led financial inclusion, Diffusion of Innovation theory (DOI), Technology Acceptance model (TAM), Theory of planned behavior (TPB), Attitude, Behavioral Intention.

1 Introduction

1.1 Background

Financial inclusion has emerged as a hot issue to the researchers, academicians and governments of both developed and developing countries since 2005, a year that the UN has declared International Microcredit Year. From a broader perspective, financial inclusion denotes delivery of formal financial services at an affordable cost to each and every member of a country. In Bangladesh, during last few years, the banking industry has experienced tremendous growth. However, there are concerns that banks have not been able, due to high operating costs, to include vast section of entire population into the fold of basic banking services, especially peoples from remote and rural areas. Distance or time to bank branch can increase the effective cost of using financial services, as a result the supply curve of financial services shifts upwards, out of reach if individuals with modest demand. From a supply side perspective, higher levels of financial inclusion can be achieved if bank networks expand into small towns and villages.

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Though Branch expansion strategy has the potential of incremental improvements in financial inclusion, but it involves, *inter alia*, high costs, thereby can reduce the profitability of banks and thus making branch expansion decision unattractive to the service providing banks.

Thus, Bangladesh Bank, The central bank of Bangladesh, encouraging scheduled banks to deliver banking facilities to the people through updated technologies such as ATMs, mobile banking, smart cards, etc. Given that ATMs could never enable any rural individual to conduct a transaction from a remote location; mobile banking is considered now-a-days as one of the most effective alternatives to reduce the problem of proximity to bank branches (distance/time to bank branch). [1] stated that mobile banking has the great potential to make basic financial services more accessible to low-income people.

As a 2012 report by the US Federal Reserve stated: "Mobile banking and mobile payments have the potential to expand financial services to the unbanked and under-banked by reducing transaction costs and increasing the accessibility of financial products and services" [2].

However, studies have shown that there had been bottlenecks in the rate of adoption in MFS in various parts of the world. In Bangladesh, Mobile banking service or mobile financial service was offered effectively in March, 2011 and thus still in its infancy stage. According to data provided in table-1, only 14.3 % of the mobile users have been registered as mobile banking customers. It is evident that Bangladesh has much potential to accelerate financial inclusion through mobile banking and thus we assume that if this huge untapped market can be captured by examining the people's behavioral intention, financial inclusion will be geared.

1.2 Mobile Banking: A Tool of Financial Inclusion in Bangladesh

The broader vision of financial inclusion policy of Bangladesh is to bring all people under the umbrella of formal financial system. Mobile banking extends the opportunity to create another alternative method of banking beyond the bank branch and ATM network through which vast section of the population, including people who live in remote areas, will have easier and faster access to formal financial services.

Mobile Banking is simply defined as carrying out banking transactions via mobile devices such as cell phones or personal digital assistant(s) (PDAs). The offered services may include transaction facilities such as checking account balances, transferring funds and accessing other banking products and services from anywhere, at any time as well as other related services that cater primarily for financial information and communication needs revolving around bank activities [3]. According to [4], mobile banking refers to a system which enables people to conduct financial transactions using a mobile device against a bank account accessible from that device. Since, Compared to traditional banking, with the mobile banking system, an account holder can conduct banking transactions without visiting a bank branch, thus it increases the efficiency of the individual account holder by saving time as well as eliminating space shortcomings [5] and [6].

Bangladesh Bank, the central bank of Bangladesh, following a Bank led model, defines the Mobile financial Services as –“Mobile Financial Services (MFS) is an approach to offering financial and banking services via mobile wireless networks which enables for user to execute banking transactions. That is, any mobile account holder can make deposits, withdraw, and to send or receive funds from their mobile account. However, the central bank also specifies that these services are, often, enabled by the use of bank agents that allow mobile account holders to transact an independent agent location outside of bank branches [7].

In Bangladesh, mobile banking, which is termed as Mobile Financial Services (MFS), is effectively launched in March, 2011 and in September of the same year a guideline titled

“Guidelines on Mobile Financial Services (MFS) for the Banks” is issued by the Bangladesh bank, the central bank of Bangladesh. The central bank believes that MFS operations can reduce barriers to access and cost and over time enable to bring a much higher proportion of the population under the umbrella of formal financial inclusion.

Despite significant growth found in last three years, mobile banking has not accepted widely in Bangladesh. According to data provided by Bangladesh Telecommunication Regulatory Commission (BTRC), there are around 160 million people in the country of which the total number of mobile phone subscribers has reached 116.234 million at the end of May, 2014, and 116.553 million at the end of June, 2014³. And among these 116.553 million mobile users only 14.3% mobile users, around 16.7 million, are registered under mobile banking services which means 85.7%, around 99.853 million, people have not yet adopted mobile banking services. Table -1 provides a snapshot of MFS in Bangladesh as of May and June, 2014.

Table-1: Mobile Financial Services (MFS) Comparative summary statement of May, 2014 and June, 2014:

Serial no	Description	Amount (in May, 2014)	Amount (in June, 2014)	Percentage Change (May, to June,2014)
1	No. of approved Banks	28	28	-
2	No. of Banks started to convey the service	20	20	-
3	No. of agents	3,78,018	4,14,170	9.56%
4	No. of registered clients	161.48 lac*	167.10 lac*	3.48%
5	No. of active accounts	65.05 lac*	67.48 lac*	3.74%
6	No. of total transaction	3,76,78,005	4,40,15,721	16.82%
7	Total transaction in taka (Crore)	8,205.99 Crore** BDT***	8,523.01 Crore** BDT***	3.86%
8	No. of daily average transaction	12,55,934	14,67,191	16.82%
9	Average daily transaction in taka	273.53 Crore** BDT***	284.10 Crore** BDT***	3.86%

*Numerically 1 lac=1,00,000 ** 1 Crore=10,000,000, and ***BDT=Bangladeshi Currency, named as Bangladeshi Taka.

Source:http://www.bangladesh-bank.org/fnansys/paymentsys/20140720_mfs.pdf
(Accessed on 20 July, 2014).

Following a Bank led Model, Bangladesh bank has approved 28 banks to operate Mobile Banking services and out of these 20 banks are started mobile banking services. At present, ‘bkash’, the Brac Bank-initiated Mobile Banking service, and ‘DBBL mobile’ mobile banking service of Dutch-Bangla Bank Ltd., are country's leading service-provider in Mobile Banking.

³ Source: www.btrc.gov.bd

With the help of around 4.15 lac agents throughout the country almost 16.7 million customers are conducting financial transactions. The total transaction in amount stood at 8523 crore more BDT at the end of June, 2014. Thus, it could be argued that mobile banking improves access to and use of financial services in the country.

1.3 Problem Identification

Although, the mobile banking system in Bangladesh has been experiencing strong growth over the last three years, it is still in its infancy. According to data provided by Bangladesh Bank at the end of June, 2014, there are 16.7 million registered mobile banking customers of which 6.74 million using mobile banking services actively. Meanwhile, the number of mobile subscribers nationwide at the end of June, 2014 is 116.553 million⁴. This represents a huge untapped market for commercial banks.

During the last ten years, many studies have been conducted on the issue of the intention to use mobile banking and most of these studies focused on the West and the United States. In the Asian region, most studies concentrated in developed Asian countries (Singapore, Hong Kong, Taiwan, Malaysia, etc....) than developing countries like Bangladesh.

In Bangladesh, mobile banking services are still in the initial stages of development. It's the time to implement a mobile banking system for better financial inclusion. The commercial banks have a huge untapped market and needs to be captured through which financial inclusion are assumed to be accelerated. However, people are more conservative when they are exposed to a proposal of adopting a new banking technology. Thus, there is a need to study and understand peoples' intention to adopt and use of mobile banking services, specifically which factors affecting their intention to adopt and use of mobile banking.

On the other hand, previous research on this issue, in Bangladesh, is so limited and thus this paper is an endeavor to mitigate the research gap in this regard. The findings of this study can help the academicians, researchers, concerned service providers and policy makers in making their own research works, strategies and policies respectively in their field in order to make higher attractiveness with mobile banking services.

2 Literature Review

Mobile banking is a new technology based banking concept in Bangladesh. People of this country get accustomed with traditional branch based banking system and are afraid of using mobile banking because they cannot feel it trust worthy [6]. There have been a number of studies conducted by researchers worldwide on factors that prevent and/or influence customers to adopt the technology interfaced banking [8]. It has been observed by the researchers that people are less inclined to adopt a new technology based banking system. Even though a significant number of mobile banking has been implemented across the world, their adoption rate has been found as fairly low [9]. Followings we discuss a broad literature on factors that influence adoption of mobile banking and then propose a research framework in the context of Bangladesh.

2.1 Theoretical Framework for Adoption

2.1.1 Diffusion of Innovations Theory

Diffusion research has examined the adoption and uses of information technology from a diffusion of innovation perspective [10] and [11]. By focusing on the attributes of a technology, [12] argued that a diffusion process entails four facets, namely an innovation or new technology, a social system, the communication channels of the social system, and time. In order to explain

⁴ Source: www.btrc.gov.bd

the observed adoption behavior, he focused on first three facets mentioned above. Specifically, [12] identified and explained an adoption behavior by following five attributes discussed and presented in figure-1:

Relative Advantage: it refers whether an innovation is perceived as better, which offer more value, than the idea it supersedes. The more the perceived relative advantage, the faster its adoption will be.

Compatibility: Compatibility has a great influence on adoption of innovation. It refers to the extent to which an innovation is recognized as being consistent with the existing values, past experiences and needs of the potential adopters.

Complexity: It refers to the difficulty of understanding an innovation. Innovations that are simpler to understand and use are likely to be adopted quickly.

Trailability: An innovation may be experimented with on a limited basis. An innovation that is trialable signifies less doubt to the adopter and therefore more likely that it will be adopted. However, [13] found that trailability has no influence on adoption of innovation. Therefore concept of trialability was not included in the research framework for this study.

Observability: It relates to the idea that whether the results of an innovation are visible to others. The innovations that are relatively less observable diffuse more slowly. Observability is considered irrelevant in this study because an important characteristic of doing banking is privacy. Therefore, observing others using mobile banking services may prove difficult unless one makes a conscious effort to do so.

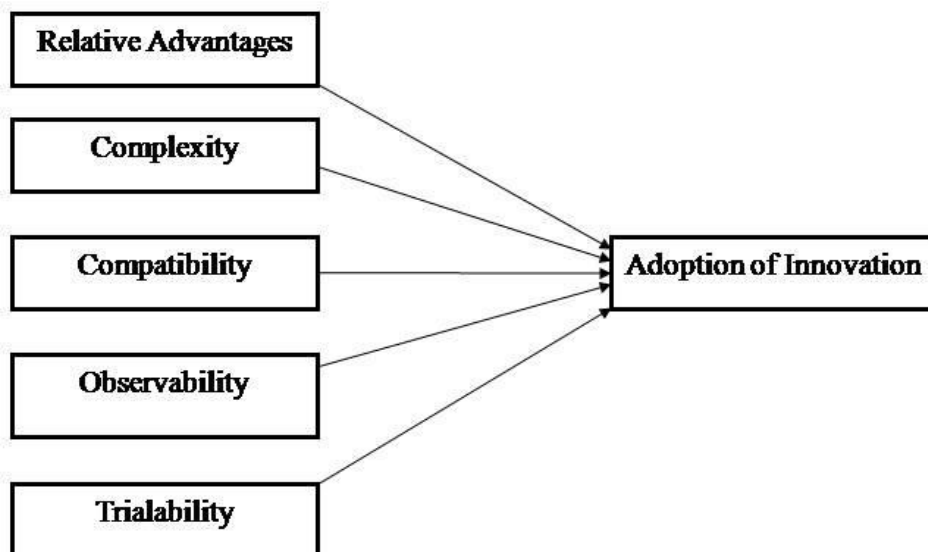


Figure-1: Diffusion of Innovations Theory [12].

2.1.2 Adoption Approach

With an introduction of TAM model, followings we discuss its several extensions.

Technology Acceptance Model (TAM)

TAM model, proposed by [14], is primarily intended to foretell users' acceptance of Information Technology and usage in an organizational perspective. By focusing on the attitude explanations of intention to use a specific technology or service, TAM model deals with perceptions as

opposed to real usage, suggests while a new technology is presented to the potential adopter, two attitude-affecting factors, Perceived usefulness and perceived ease of use, influence their decision about how and when they will use it [14]. As an extension of TAM, [15] proposed the Theory of Reasoned Action (TRA). The main point of this theory is that human behavior originates from their intentions and behavioral intention (BI) is a kind of cognitive activity which consists of two facets, namely attitude and subjective norm. To sum up, according to TRA both attitude and subjective norm component of individual behavior is determined by salient belief.

The Theory of Planned Behavior (TPB)

Recognizing the situations where people might not have complete control over their behavior, an extension of TRA was proposed by [16] and [17] and is known as the theory of planned behavior (TPB). However, TPB also proposed unequivocal formulations of the determinants of the behavioral attitude and subjective norm of the TRA-model. TPB has been applied and proven successful in predicting and explaining several types of behavior. However, in case of ICT systems or services adoption, the model consists of five concepts. As in the TRA- model, it includes behavioral attitudes, subjective norm, intention to use and actual use. In addition to the behavioral attitude and subjective norm element as in TRA, the model includes behavioral control component which is directly related to both intention to and actual use. The resultant is that, actual use is a weighted function of intention to use and perceived behavioral control [18].

In TPB, behavioral control encompasses two elements. The first one is "facilitating conditions" reflecting the resources needed, such as time, financial resources etc., to use a particular system. The second component is self-efficacy; which is described as "an individual's self-confidence in his/her ability to perform a behavior" [18].

When compared to TAM, [17] and [18] found TPB-model explain more of the variance in intention to use than the TAM- model did and therefore they conclude that TPB model with a behavioral control element has more explanatory power than TAM-model and thus must be considered while analyzing factors of technology adoption. However, Critics argued that both TPB and TRA have not specified any determinants of behavioral attitudes, subjective norm and, also to some extent, behavioral control.

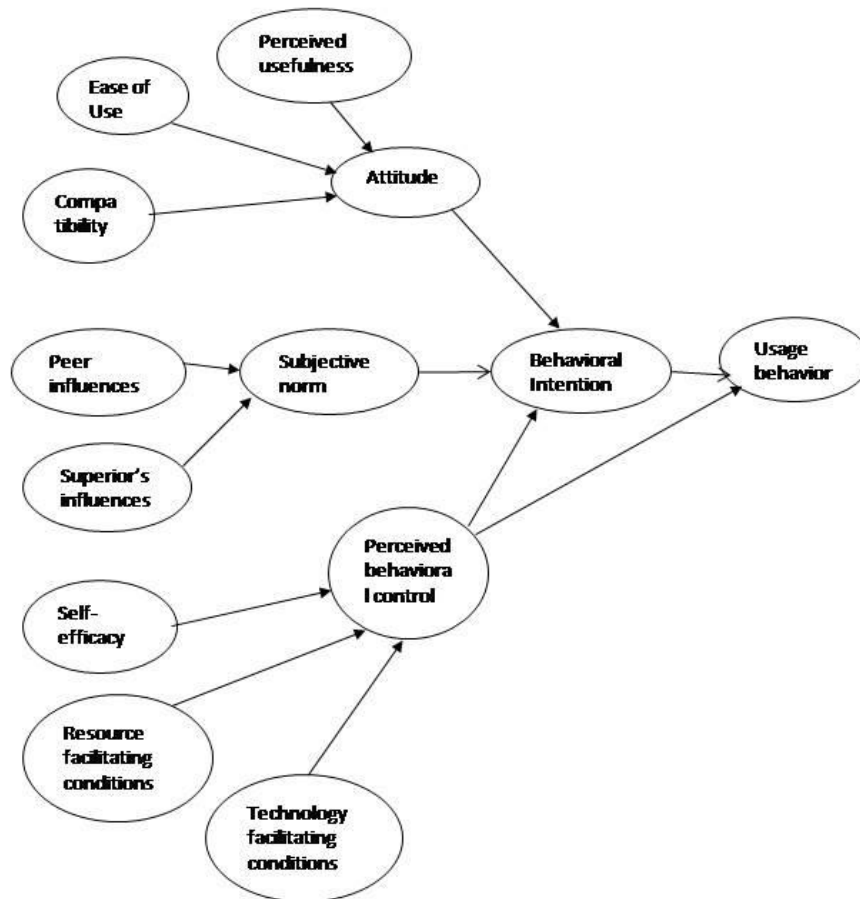


Figure-2: Decomposed theory of planned behavior

The Decomposed TPB Model

The decomposed TPB model, an alternative version of TPB, uses constructs from the innovation literature (e.g., relative advantage, compatibility). This theory (Figure-2) given by [18] assumes that people's intention to adopt technology is driven by attitude, subjective norms and perceived behavioral control. In addition, this model explains the behavioral control and subjective norm component from a specific dimension, thereby provides a more accurate way to understand and investigate person's behavioral intention to adopt or use a particular technology.

Both the decomposed TPB and TAM have some similar advantages, such as both models identify definite salient beliefs which may influence technology adoption and usage. However, TPB is considered better than TAM in understanding technology adoption and usage in that it integrates additional factors which are not present in TAM. Examples of such factors include the influence of significant others, perceived ability and control. These factors have been shown to be significant determinants of behavior [19].

2.1.3 Research Model and Hypotheses

The research framework, (Figure-3), for this study is based on the theory of planned behavior (TPB) [16] and the diffusion of innovations theory [10]. In addition, considering Bangladesh as a developing country, we add a variable, perceived financial cost to the model. All variables

hypothesized in this study and natures of their expected relationships with customer attitude toward adopting (or continuing to use) mobile banking are discussed next.

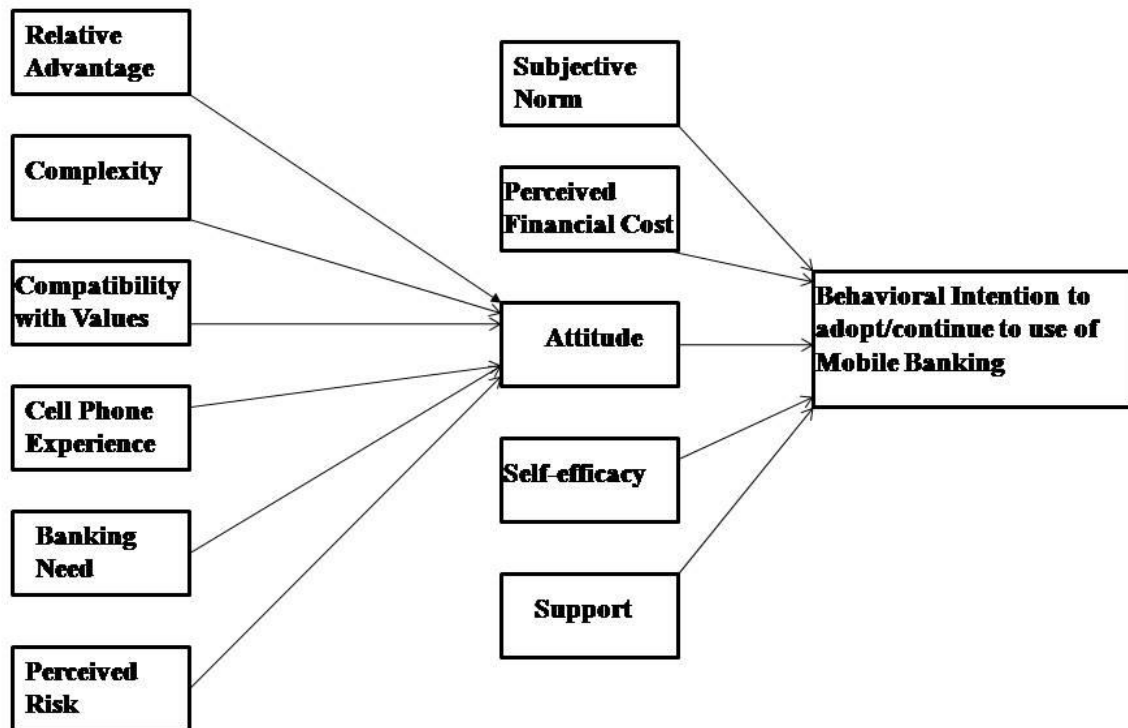


Figure -3 : Research Framework for the Adoption (or continue to use) of Mobile Banking.

Relative Advantage

Perceived relative advantage refers to the degree to which an innovation provides more benefits than its precursor. Relative advantages manifests as increased efficiency, economic benefits, and enhanced status [12]. [11] found relative advantage to be an important factor in determining adoption of new innovations. [10], [20] and [21] theorized and found that perceived relative advantage of an innovation is positively related to its rate of adoption. In general, when customers perceive clear advantages offered by mobile banking, they are more likely to have a positive attitude toward adopting (or continuing to use) mobile banking. The following hypothesis thus is proposed.

H1: Perceived relative advantage has a positive effect on attitude toward adopting (or continuing to use) mobile banking.

Complexity

[12] defined complexity as the degree to which mobile banking is considered difficult to use and understand. An innovation with substantial complexity requires more technical skills and needs greater implementation and operational efforts to increase its chances of adoption [22] and [23]. As the mobile is very user friendly device, it is likely that potential customers may feel that mobile banking system is less complex to use, and hence would be likely to use such services.

However, the size of a cell phone makes working with it difficult and frustrating for some, and so using a cell phone for banking transactions may be perceived as complex. Consequently, the adoption of cell phone banking is likely to be negatively affected, thus the following hypothesis:

H2: Perceived Complexity of using cell phone banking has a negative impact on the attitude toward adopting (or continuing to use) mobile banking.

Compatibility

Perceived compatibility is the degree to which an innovation fits the values, previous experiences and needs of the potential adopter, [12]. [24] identified Perceived compatibility as the best perception-based indicator of attitude towards online transactions. On the basis of the definition given by [12], thus an attempt has been taken to explore the significance of compatibility on attitude toward adoption (or continuing to use) mobile banking from three dimensions as follows: Compatibility with individual values, Compatibility with experience, and Compatibility with banking needs.

Compatibility with Individual Values

[11] found that an innovation is more likely to be adopted when it is compatible with an individual's job responsibilities and value system. [21] described as 'the fact that an innovation is more likely to be adopted if it is compatible with the individual value system. In their study, [25] found that consumer behavior of the base of the pyramid of the market differed from that of their better off compatriots in that they had a different configuration of the perception of value. In general, the more the people perceive mobile banking as compatible with their lifestyle, the more likely that they will have a positive attitude toward adopting (or continuing to use) mobile banking and thus following hypothesis is proposed:

H3: Perceived compatibility with individual values has a positive effect on attitude toward adopting (or continuing to use) mobile banking.

Cell Phone Experience

[26] defined mobile experience as a general with the mobile services such as short messaging service (SMS), mobile broadcasting, mobile gaming, mobile learning and mobile shopping. [26] added that experience was assumed to increase the user's confidence in their ability to master and use computers to support their task performance. This was supported by [27] that the greater the experience using internet, the more likely that internet banking would be adopted. [28] showed that greater Internet experience of an individual is positively related to the adoption of internet banking. In terms of cell phone banking, it follows therefore that those with greater cell phone experience are more likely to use cell phone banking.

H4: Individuals' previous experience of using mobile phone has a positive impact on attitude toward adoption (continue to use) of mobile banking.

Compatibility with Banking Needs

Banking needs refers to the variety of banking products and services required by an individual [28]. [27] theorized that the greater the use of banking products and services, the more likely that m-banking would be adopted. In the context of mobile banking, [29] found that banking needs of individual is positively associated with the adoption of mobile banking. Thus, following hypothesis is drawn.

H5: The greater the extent to which m-banking meets individual's needs for banking products and services, the more likely that mobile banking will be adopted.

Perceived Risk

Risk refers to the perceived sense of risk concerning disclosure of personal and financial information [28]. Lack of security and privacy is considered as a major impediment in electronic commerce. Thus, it is expected that only individuals who perceive using Internet banking as a low risk undertaking would be inclined to adopt it.

[28] found that perceived security and privacy risk could be a major impediment to the adoption of internet banking. According to, [30] and [31] perception of a secure environment in m-banking transactions and protection of privacy of the customers' personal information is positively affects user's behavioral intention to adopt mobile banking. [32] also found that perceived risk was one of the major factors affecting consumer adoption, as well as customer satisfaction of mobile banking services. Perceived risk, in general, arises from uncertainty. Thus, we hypothesize that:

H6: Perceived risk has a negative effect on attitude toward adopting (or continue to use) mobile banking.

Attitude and Behavioral Intention

[15] defined attitude as an individual's positive or negative feelings about performing a target behavior. According to them, attitude is related to behavioral intention because people form intentions to perform behaviors toward which they have a positive effect. The attitude-behavior relationship is fundamental to TRA, TAM, and related models presented by [33] and [34]. [18] suggested that attitude toward an innovation can be measured using the five perceived attributes (relative advantage, compatibility, complexity, trialability, and observability) of an innovation. It has been demonstrated that attitude has a strong effect, direct and positive, on the real individual intentions to use a new system or technology [35] and [36]. Intentions-based models have been successful in investigating attitude as a mediator between beliefs and intentions [14], [15], [18] and [37]. Individual attitude towards system use is expected to influence system use intention. This study expects this relationship to hold in mobile banking context and thus following hypothesis proposed:

H7: Individual's attitude has a positive effect on behavioral intention about adopting (continuing to use) mobile banking.

Subjective Norms

This construct was promoted by [15] and was developed by [17]. Subjective norm refers to the perceived social pressure to perform a behavior; according to what others say or do is important, [17]. This construct is determined by the total set of accessible normative beliefs concerning the expectations of important referents [16]. In this research, subjective norm is defined as customers consider the normative expectations of others they view as important, such as family, friends, and colleague, to decide if whether they use mobile banking services. Previous studies have explored the importance of such construct. Subjective norms have been found to be more important prior to, or in the early stages of innovation implementation when users have limited direct experience from which to develop attitudes [38] and [39]. [40] studied mobile banking usage in Norway and found the subjective norm is an important driver for mobile chatting usage among the Norwegians. Thus, the following hypothesis is proposed:

H8: Subjective norm positively affects behavioral intention to adopt (or continue to use) mobile banking.

Perceived Financial Cost

Perceived cost is defined as the extent to which a person believes that using mobile banking will cost money [30]. The cost may include the transaction cost in the form of bank charges, mobile

network charges for sending communication traffic (including SMS or data) and mobile device cost. According to the study conducted by [30] perceived financial cost significantly affects behavioral intention to adopt mobile banking.

A study by [41] on mobile commerce acceptance showed that perceived cost had minimal significance when compared to other variables such as perceived risk, compatibility and perceived usefulness. A further qualitative investigation on the same study was conducted, which revealed that perceived cost is normally a major concern when a technology is first introduced [41]. For this study, perceived cost is included in the research model as having a direct effect on the adoption of mobile banking. Hence, it is anticipated that the perceived cost of mobile banking services is more likely to negatively influence the adoption of mobile banking.

H9: Perceived financial cost has a negative effect on behavioral intention to adopt (or continue to use) mobile banking.

Self-Efficacy

Perceived behavioral control refers to the factors that may impede the performance of the behavior. This definition encompasses two components. The first component is self-efficacy and is defined as an individual's self-confidence in his or her ability to perform a behavior [42]. The second component is "facilitating conditions" and it reflects the availability of resources needed to engage in the behavior [43].

There are numerous studies supporting the influence of self-efficacy on behavioral intentions. For instance, [44] indicate that persons perceiving low self-efficacy with a new technology will be more resistant than persons perceiving high self-efficacy. Also, [30] and [45] supported that self-efficacy has the positive influence on perceived ease of use and the intention to use mobile services. Thus, an individual confident in having the skills in using the computer and the Internet is more inclined to adopt Internet banking. This is because the individual is comfortable in using the innovation. Therefore, we propose the following hypothesis:

H10: Self efficacy has a positive effect on behavioral intention to adopt (or continue to use) mobile banking.

Support The second component, "facilitating conditions or support," refers to the easy access of technological resources and infrastructure. [46] argued that, as supporting technological infrastructures become easily and readily available, Internet commerce applications such as banking services will also become more feasible. As a result, Internet users would be expected to be more inclined to adopt Internet banking. [46] also suggests that the government can play an intervention and leadership role in the diffusion of innovation. It has been well documented that the local government is a major driving force in the diffusion of information technology [47] and [48]. Mobile banking non-users, in turn, would view new applications such as Internet banking services more favorably, and hence be more likely to use them.

The above arguments lead to the following hypothesis:

H11: Perceived support for Mobile banking has a positive effect on behavioral intention to adopt (or continue to use) mobile banking.

Differences between Mobile Banking Non-Users and Users

There a number of studies argued and found that differential effects of antecedents on the adoption of information technologies [49], [50] and [51]. [50] examined the differences in the antecedents of attitude between potential customers and repeat customers and found significant differences exist between these two subgroups. Above mentioned studies motivated the researchers to study whether there exists any differences between mobile banking non-users and users. Thus, following hypothesis is proposed:

H12: The extent of antecedents of behavioral intention toward adoption (or continuation of use) of mobile banking differs between mobile banking non-users and users.

3. Research Methodology

3.1 Data Collection and Operationalization

In order to achieve objectives of the research, we used a survey conducted in Rangpur district of Bangladesh, during May-June, 2014 to test consumers' behavioral intention to adopt (or continue to use) mobile banking. Simple random sampling method was used. The paper-based questionnaires were distributed to a total of 650 participants (275 questionnaires to self-reported mobile banking non-users and 325 questionnaires to self-reported mobile banking users). Out of the 275 mobile banking non-users, 257 usable respondents were obtained (93% response rate) and out of the 325 mobile banking users, 298 usable respondents were obtained (92% response rate).

Thus, this study's main sample comprised 555 respondents drawn from two populations. One is mobile banking non-users, participants who uses a cell phone and have knowledge about mobile banking, but have not adopted. Another sample is mobile banking users who had continued to use mobile banking. Table 2 provides demographic information of respondents in terms of gender, age, education, income and banking status.

Table-2: Profile of the respondents.

Demographics	Mobile Banking Non-users (m=257)		Mobile Banking Users (n=298)	
	Frequency	%	Frequency	%
Gender:				
Male	152	59.1	196	65.8
Female	105	40.9	102	34.2
Age (in years):				
Less than 18 years	37	14.4	29	9.7
18-25 years	77	30.0	104	34.9
26-35 years	64	24.9	106	35.6
36-45 years	45	17.5	38	12.8
46-60 years	26	10.1	19	6.4
More than 60 years	8	3.1	2	.7
Education:				
No formal education	25	9.7	17	5.7
Primary school	19	7.4	15	5.0
Higher secondary school	77	30.0	66	22.1
College	45	17.5	71	23.8
Bachelor degree	73	28.4	87	29.2
Master degree	17	6.6	35	11.7
Other	1	.4	7	2.3
Income:				
None	121	47.1	90	30.2
Less than 5000 BDT	38	14.8	51	17.1
5000-9999 BDT	44	17.1	61	20.5
10000-19999 BDT	35	13.6	69	23.2
20000-29999 BDT	16	6.2	19	6.4
30000-39999 BDT	1	.4	5	1.7
> 40000 BDT	2	.8	1	.3

Based on the objectives of the research, a survey instrument in the form of two separate questionnaires (one for mobile banking non-users, other for mobile banking users) was developed and adapted from previous studies based on a broad literature review [18], [20], [28], [30], [41], [52], [53], and [54] to ensure content validity. We constructed several questions in the questionnaire. SPSS 17 and Amos 16 package was used for analysis. Each question was measured on a five-point Likert scale, signifying (1) strongly disagree, (2) disagree, (3) Neutral, (4) Agree and (5) strongly agree. Identical questions were asked to both mobile banking non-users and mobile banking users; the wording was modified to reflect either adoption or continued usage behavior.

In order to identify problems with instrument wording, format, content, usefulness and relevance the questionnaire was tested extensively for validity before the actual survey was administered. The survey was pilot tested with 30 respondents (13 for mobile banking non-users and 17 for mobile banking users). On the basis of comments and results found in the pilot test, the survey was redesigned with some minor changes. Questionnaire for mobile banking non-users used in final survey is attached in Appendix A. For mobile banking users, wording was modified to reflect the continuation of use of mobile banking.

4. Data Analysis and Results

4.1 Reliability and Validity of Measurement Tools

Prior to data analysis, the research instrument was assessed for its reliability as well as construct validity. Reliability co-efficient was measured by Cronbach's alpha value. Results (Appendix-B.1 and Appendix-B.2) showed that alpha values for all dimensions in the case of both samples exceed the minimum alpha of 0.65 as suggested by [55]. Thus the constructs measures are deemed adequately reliable.

EFA was applied to 39 questions provided in the questionnaire for each sample. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) was computed to determine the suitability of using factor analysis. Results showed that MSA=. 785, $p < .001$, for mobile banking non-users and for Mobile banking users MSA=. 811, $p < .001$. Thus, it indicates that samples of this study are suitable to conduct an EFA.

According to [56], variables with loadings of greater than 0.3 are considered significant, loadings with greater than 0.4 are important and with loadings greater than 0.5 are considered as very significant. In this research, we applied the general criteria to accept items with loadings of more than 0.4. In the case of mobile banking non-users data, using principal component analysis and varimax rotation method, a total of 12 factors with eigenvalues greater than one were extracted and these factors explained 75.35% of the total variance (Appendix-B.1). And all factor loadings, with no discrepancies, were found as greater than 0.5 which indicates that the minimum factor loadings as suggested by [56] are satisfactorily met. Therefore, on the basis of results of factor loadings provided in Appendix-B.1, 12 factors have been named as shown in the research framework.

Similarly, in case of mobile banking users' data, using principal component analysis and varimax rotation method, a total of 12 factors with Eigenvalues greater than one were extracted and these factors explained 77.68% of the total variance (Appendix-B.2) and all factor loadings were found as greater than 0.5 which indicates that the minimum factor loadings as suggested by [56] are satisfactorily met. Therefore, on the basis of results of factor loadings provided in appendix-B.2, 12 factors have been named as shown in the research framework.

4.2 Analysis of the Measurement Model

CFA is a technique to check the model fitness and determine whether the concepts and constructs are harmonious with a researcher's understanding of those factors [57]. A number of tests were used to check and examine the model fit. Examples include χ^2/df , the comparative fit index (CFI), the Tucker-Lewis index (TLI), the goodness of fit index (GFI), AGFI and the normed fit index (NFI). The values of these tests vary from 0 to 1, with a larger value equal to 0.90 or above indicating a better model fit [58] and [59]. [60] suggested that χ^2/df can be as large as 5. Root mean square error of approximation (RMSEA) is another test that is used to measure the model fitness. Confirmatory factor analysis was performed separately for mobile banking

non-users and mobile banking users' data to understand the harmony of different constructs with factors, respectively.

In case of mobile banking non-users data, χ^2/df for both factors influencing attitude (shown in table-5; figure-4) and factors influencing behavioral intention (shown in table-3; figure-5), the values are 1.9 and 1.3 respectively and thus the null hypothesis of being poor fit was rejected. Similarly, in case of mobile banking user data, null hypothesis of poor fit was also rejected since χ^2/df found for factor influencing attitude as 1.54 (shown in table-3 and figure-6) and 1.7 for factors influencing behavioral intention (shown in table-3; figure-7).

As shown in table-3 (also in their respective figure) the values of GFI, AGFI, NFI, IFI, TLI in both samples are found greater than 0.90 and RMSEA in each case found to be lesser than .06 as suggested by [58]. Since all indices exceeded their commonly accepted levels, it can be argued that with collected data, the measurement model demonstrated a good fit.

Fit Index	Recommended value	Study values of this Research			
		Mobile Banking Non-users		Mobile Banking users	
		Factors affecting attitude (figure-4)	Factors affecting Behavioral Intention (figure-5)	Factors affecting attitude (figure-6)	Factors affecting Behavioral Intention (figure-7)
χ^2/df	<5	1.9	1.3	1.64	1.7
GFI	>0.90	0.902	0.945	0.925	0.938
AGFI	>0.80	0.87	0.92	0.898	0.91
NFI	>0.90	0.89	0.95	0.921	0.948
IFI	>0.90	0.94	0.98	0.971	0.977
TLI	>0.90	0.93	0.98	0.964	0.971
CFI	>0.90	0.94	0.989	0.971	0.977
RMSEA	<.06	0.051	0.33	0.043	0.049

Table-3: Fit indices of Confirmatory factor analysis

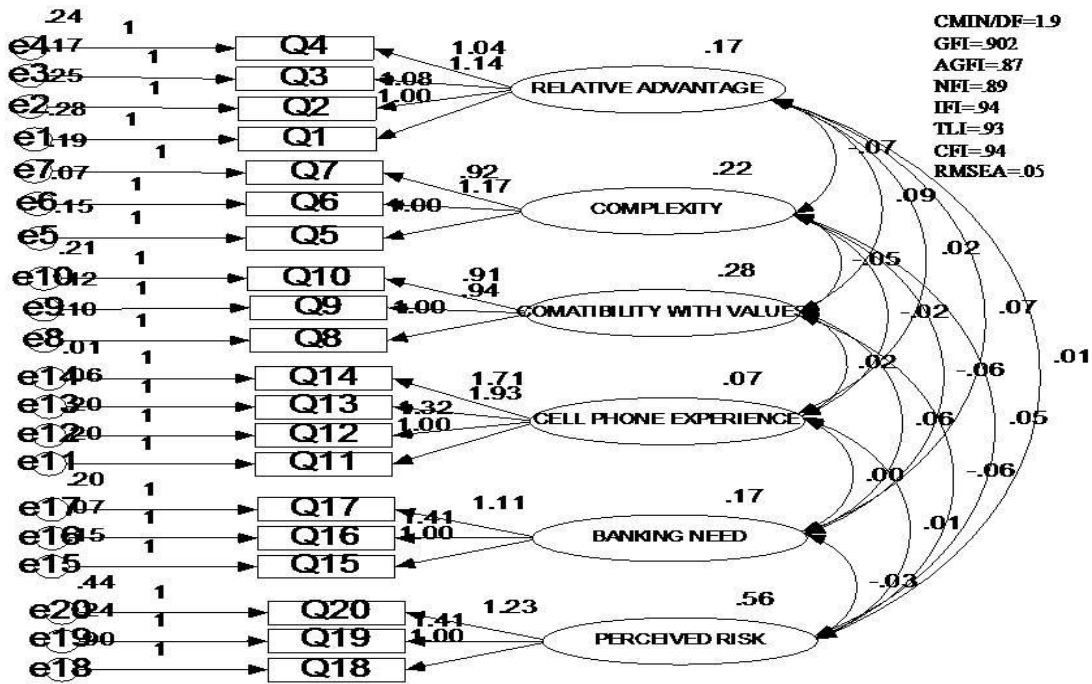


FIGURE 4: CONFIRMATORY FACTOR ANALYSIS OF FACTORS INFLUENCING ATTITUDE OF MOBILE BANKING NON-USERS

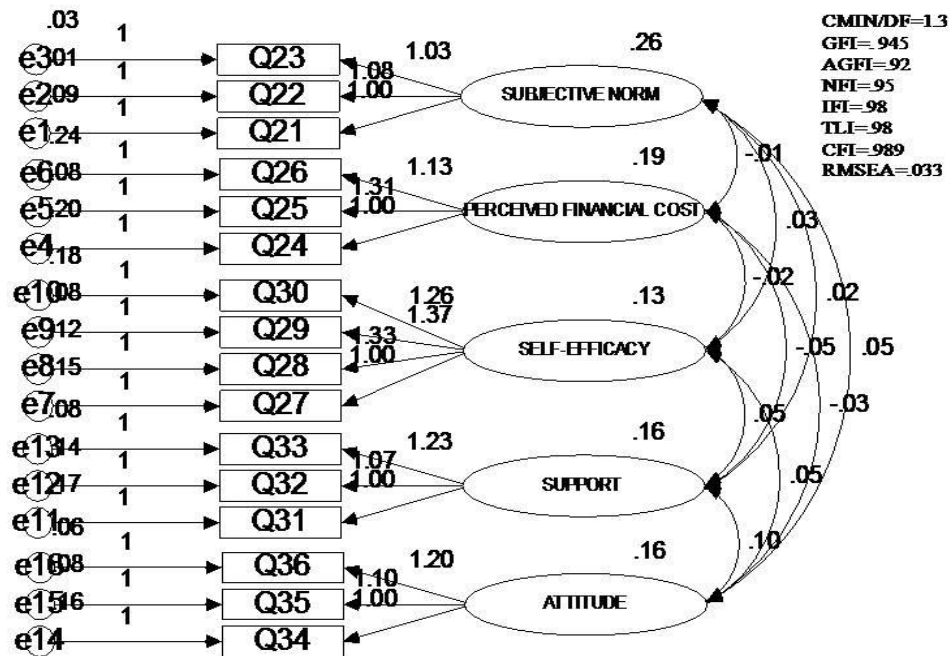


FIGURE 5: CONFIRMATORY FACTOR ANALYSIS OF FACTORS INFLUENCING BEHAVIORAL INTENTION OF MOBILE BANKING NON-USERS

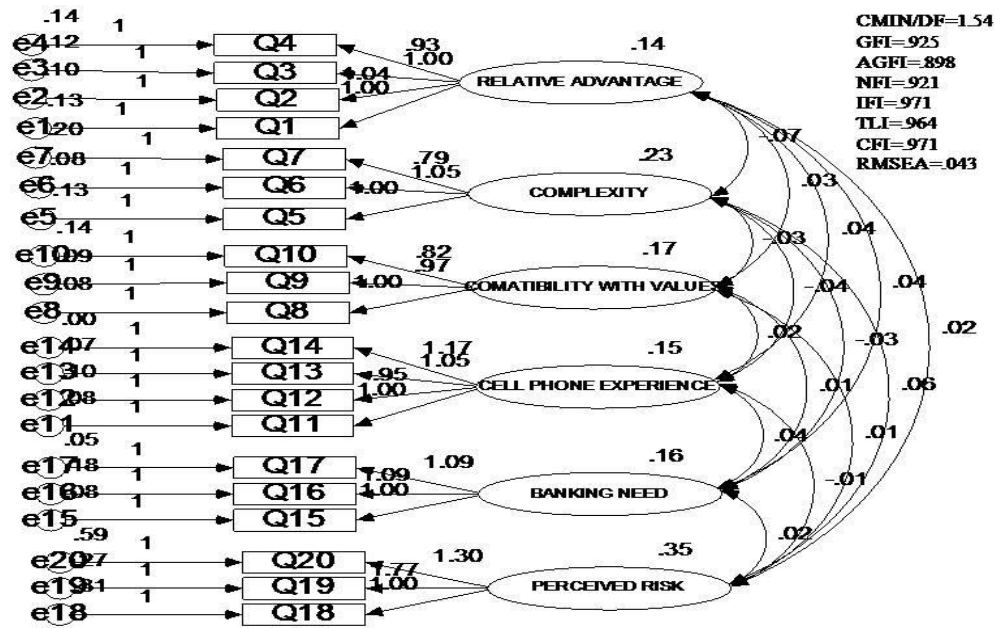


FIGURE 6: CONFIRMATORY FACTOR ANALYSIS OF FACTORS INFLUENCING ATTITUDE OF MOBILE BANKING USERS

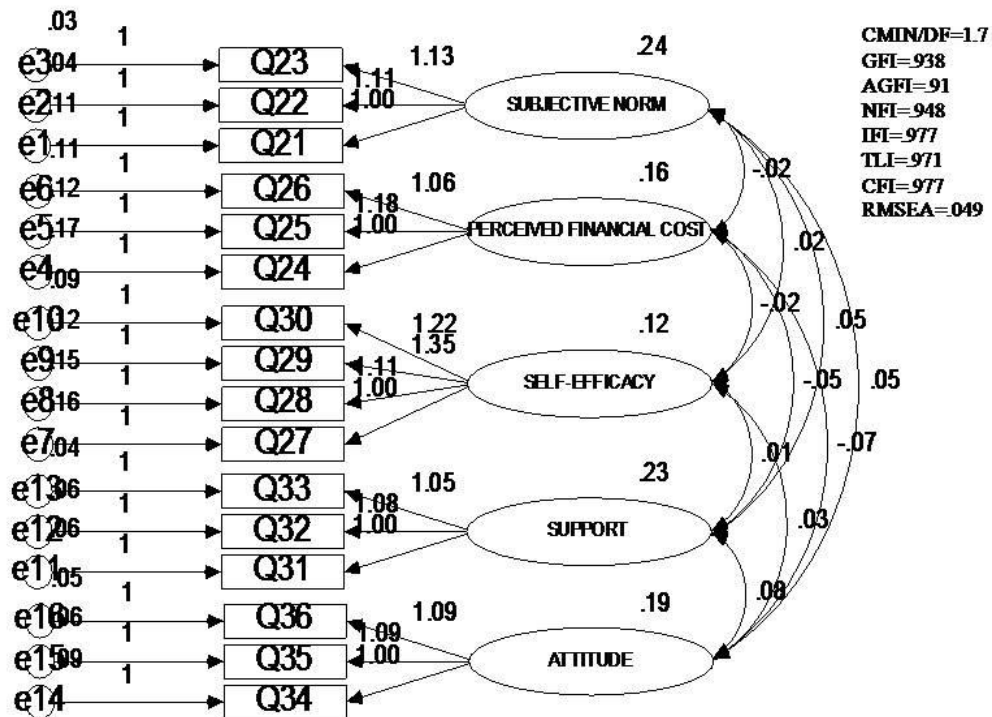


FIGURE 7: CONFIRMATORY FACTOR ANALYSIS OF FACTORS INFLUENCING BEHAVIORAL INTENTION OF MOBILE BANKING USERS

4.3 Analysis of the Structural Model

The fit indices of the structural equation model are presented in the table-4. It has been found that all the indices meet their requirement which indicates a validity of the model fit.

Fit Index	Recommended value	Study values of this Research	
		Mobile Banking Non-users	Mobile Banking Users
χ^2/df	<5	3.877	4.729
GFI	>0.90	.929	.927
AGFI	>0.80	.837	.833
NFI	>0.90	.911	.901
IFI	>0.90	.928	.929
TLI	>0.90	.940	.917
CFI	>0.90	.913	.921
RMSEA	<.06	.043	.0531

Table-4: Fit Indices of SEM

Figure-8 exhibits the path coefficients and the significance level of the structural equation modeling. The standardized R^2 for attitude of both mobile banking non-users and users were 0.35 and for behavioral intention of mobile banking non-users and users were found 0.33 and 0.69 respectively which accounted for the variances explained in those variables. Among the influencing factors of attitude, in case of mobile banking non-users, complexity, banking need and perceived risk are the most influencing (the values of paths are -.173, .157 and -.138 respectively) whereas in case of mobile banking users cell phone experience, compatibility with values and Perceived risk are found to be the most influencing factors (path values are .281, .235 and -.223 respectively). However, banking need is found to be insignificant factor by the mobile banking users.

In case of influencing factors of behavioral intention, the mobile banking non-users data revealed that their attitude, subjective norm, support and perceived financial costs (path values are .33, .172, .171 and .170 respectively) significantly affects their behavioral intention to adopt mobile banking. Whereas mobile users' data explored that perceived financial cost, subjective norm, support (path coefficients are -.429, .383, .268 respectively) are the most influencing factors affecting their continuation of the use of mobile banking. Self-efficacy was found insignificant in case of both samples which is consistent with the findings of [29], [61] and [62]. More importantly in the context of a developing country like Bangladesh, this study found that perceived cost is the most influencing factors that affects people to adopt (or continue to use) the mobile banking.

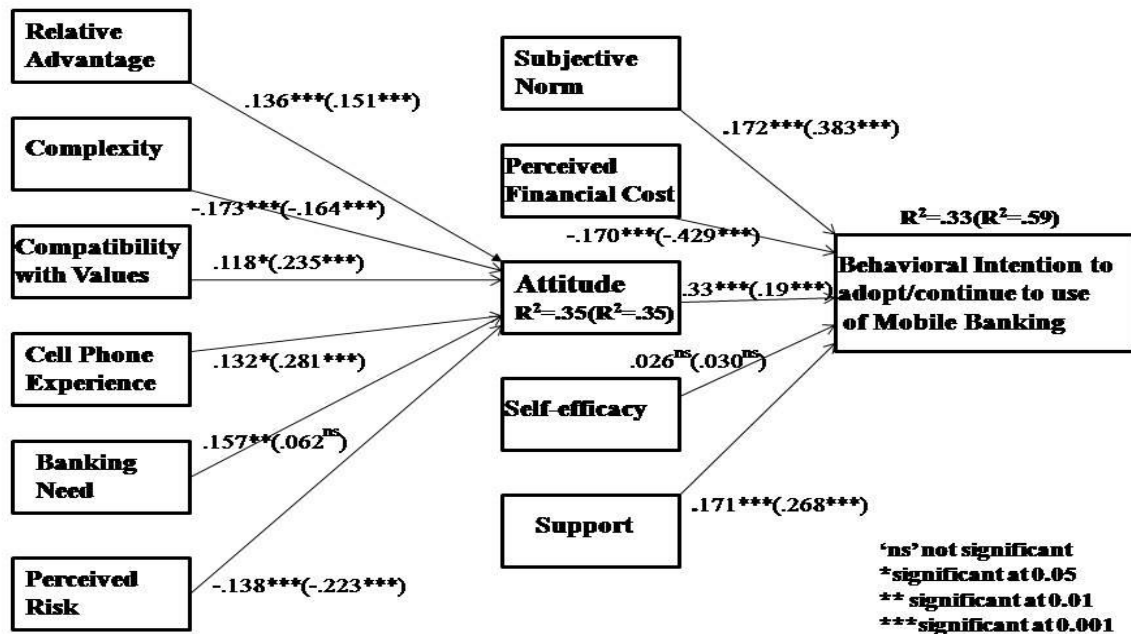


Figure-8 : Empirical results for mobile banking Non-users and Mobile banking Users (Estimates on the Mobile banking users are shown in parentheses)

4.4 Mobile Banking Non-Users versus Mobile Banking Users

A multi-group analysis with t statistics as suggested by [63] was conducted to examine the differences between the mobile banking non- users and mobile banking users. According to Chin, the t statistics of a cross group can be determined as follows:

$$t = \frac{Path_{sample_1} - Path_{sample_2}}{\sqrt{\frac{(m-1)^2}{(m+n-2)} * S.E.^2_{sample1} + \frac{(n-1)^2}{(m+n-2)} * S.E.^2_{sample2}}} * \left[\sqrt{\frac{1}{m} + \frac{1}{n}} \right]$$

In this study,

Path_{sample_1} = path co-efficient in the structural model (Mobile banking non-users)

Path_{sample_2} = path co-efficient in the structural model (Mobile banking users)

m = sample size of mobile banking non-users = 257

n = sample size of mobile banking users = 298

S. E = Standard Error of paths in the structural model.

Table-5 demonstrates the statistical comparison of mobile banking non-users and users. From this table, it is evident that cell phone experience, attitude, subjective norm and perceived financial cost exhibit statistical differences between mobile banking non-users and users. Cell experience has been found greater effect on attitude for mobile banking users than on mobile banking non-users. And attitude has a significantly greater effect on behavioral intention of mobile banking non-users while subjective norm, perceived financial cost have more effect for

mobile banking users. These results indicate differential effects of the factors influencing adoption (or continue to use) of mobile banking and also provide support for H12.

Table-5: Statistical comparison of mobile banking non-users and mobile banking users.

Path in SEM	Mobile Banking non-users (n=257)		Mobile banking users (n=298)		t statistics
	Path coefficient	Standard error	Path coefficient	Standard error	
ATTITUDE ← RELATIVE ADVANTAGE	.136	.039	.151	.046	-0.24488
ATTITUDE ← COMPLEXITY	-.173	.045	-.164	.049	-0.13395
ATTITUDE ← COMPATIBILITY WITH VALUES	.118	.042	.235	.066	-1.44564
ATTITUDE ← CELL PHONE EXPERIENCE	.132	.046	.281	.055	-2.04399*
ATTITUDE ← BANKING NEED	.157	.048	.062	.051	1.345485
ATTITUDE ← PERCEIVED RISK	-.138	.032	-.223	.051	1.363539
BEHAVIORAL INTENTION ← ATTITUDE	.330	.044	.189	.038	2.442745*
BEHAVIORAL INTENTION ← SUBJECTIVE NORM	.172	.047	.383	.035	-3.66575*
BEHAVIORAL INTENTION ← PERCEIVED FINANCIAL COST	-.170	.049	-.429	.060	3.283125*
BEHAVIORAL INTENTION ← SELF-EFFICACY	.026	.021	.030	.032	-0.1012

5. Conclusion

5.1 Findings and Implications

This research explores and examines factors affecting behavioral intention to adopt (or continue to use) mobile banking in Bangladesh. Based on diffusion of innovation theory and Decomposed TPB, in the context of a developing country we added one variable, called perceived financial cost and 12 factors were identified, namely, Relative advantage, complexity, compatibility with the values, cell phone experience, banking needs, perceived risk, subjective norm, perceived financial cost, self-efficacy, support, attitude and behavioral intention.

The empirical analysis exhibited several major findings. Perceived financial cost has been found as the most significant factor affecting the behavioral intention which indicates that banking via cell phone is considered costly to the people, thereby hindering them to adopt (or continue to use) mobile banking. Therefore, considering this factor, banks can make effective strategy to reduce cost to the customers so that they feel attracted to the service.

The second most influencing factor is the subjective norm which can be thought of a positive sign for the banks. It indicates banks should try to emphasize more on broader dimension of services so that one peer group can have influence on other peers to conduct mobile banking transactions.

Thirdly, facilitating conditions found as the 3rd most significant factor implying that people want to get support whenever they need. For example, if in any case, the money is lost or taken out of the account, and then who will give them support, either Government, or mobile company or the bank. In a nutshell, if they get support they will exhibit more positive intention to adopt or continue to use of mobile banking.

Fourthly, The factor 'compatibility with values' found to have significant positive effect on people's attitude implying that the better the services fit their lifestyle, the more they will adopt mobile banking. Thus, banks should design their products in such a way so that it fits best to the people's lifestyle.

Fifthly, Perceived risk is hindering people to adopt or continue to use of mobile banking. People feel insecure about their money, information kept on the mobile bank account. This is consistent of some unexpected events such as, hacking, occurs in Bangladesh. Thus, effective strategy should be taken by the banks and the government to reduce such risks.

However, Self-efficacy was found to be insignificant implying that people have confidence on themselves over mobile banking transaction procedure. In other words, they feel they are able to conduct this type of transactions. Another factor banking need is also found insignificant in case of mobile banking users, which means that present mobile banking products are unable to meet

their demands. This is consistent with present mobile banking products in Bangladesh as it mostly limits to remit money from one place to another. In fact, most of the respondents said that by mobile banking they mean transferring money from one place to another. Other banking transactions through mobile are not in a broader scale. Thus, diversification of products is needed so that mobile banking can fulfill the people's banking need.

Overall, this study draws several implications for academicians, business organizations (such as banks) and policy makers who are engaged in the financial inclusion campaign program.

By combining elements of two theories, namely innovation diffusion theory and decomposed theory of planned behavior, this research added an important contribution to the theoretical perspectives to identify and examine factors influencing adoption (or continue to use) of mobile banking. And thus findings of this research are a basis for the researchers, scholars who are concerned to develop further research on this issue to practical application.

Most importantly, based on the findings of this study, commercial banks will consider the factors that affect behavioral intention of the individual toward adoption (or continue to use) of mobile banking and thus make an effective strategy to attract potential customers and repeat customers by enhancing customer satisfaction and improving operational efficiency which, in turn, will have a progressive impact on the financial inclusion of the country. Findings and recommendations of this study provides more important insights to the financial inclusion policy makers of the country. Since, the study looked on perceptions of demanders (i.e. individuals) toward mobile banking adoption (or continues to use), policy makers can get an insight into the challenges of mobile banking and take necessary steps to foster financial inclusion.

5.2 Limitations of the Study

As in most empirical research, this study has several limitations which actually create scope for future researches.

Firstly, this study is conducted in Rangpur district, Bangladesh, where most of the people live in rural areas. Due to limited time and cost, the research surveyed about 555 respondents chosen randomly from four (4) Upazilas of Rangpur district.

Secondly, the sample size of this study is 555 respondents only, and thus these findings may not be generalized to the broader m-banking adoption based on this study alone. Therefore, in future research, it would be logical to elevate sample size and testing this model more extensively, hence this future research would be more generalizable.

Lastly, as individuals gain experience over time, their perception and attitude changes. The conclusions drawn from this study are based on cross-sectional data, so it would be interesting to use a longitudinal study to assess the effects of these factors on adoption (or continue to use) of m-banking. A longitudinal study would provide greater insight into the causality and the interrelationships between variables and thus make comparisons with our model.

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