Consumer Adoption of Mobile Banking Services: An Empirical Examination of Factors According to Adoption Stages

Mahmud Akhter Shareef
School of Business & Economics, North South University, Bangladesh
Email: mahmud_akh@yahoo.com

Abdullah Baabdullah
Department of Management Information Systems, Faculty of Economics and Administration, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia
Email: baabdullah@kau.edu.sa

Shantanu Dutta
Telfer School of Management, University of Ottawa, Canada
Email: Shantanu.Dutta@telfer.uottawa.ca

Vinod Kumar
Sprott School of Business, Carleton University, Canada
Email: vinod.kumar@carleton.ca

Yogesh K. Dwivedi[1]
Emerging Markets Research Centre (EMaRC)
School of Management, Swansea University
Bay campus, Fabian Way, Swansea, SA1 8EN, UK
Tel: +44 (0) 1792 602340
Email: ykdwivedi@gmail.com; y.k.dwivedi@swansea.ac.uk

Abstract

Many seminal studies have explored consumers' attitude and perception to adopt mobile banking as a general and unique service channel. However, no empirical studies have so far addressed consumers' intentions to select mobile banking service delivery channel from behavioral, technological, social, cultural, and organizational perspectives for the three distinct stages like static, interaction, and transaction service. This quantitative study investigates consumers' behavioral intentions to adopt mobile banking at the three distinct service stages. It is designed to examine this behavioral pattern based on the theoretical concept of GAM model. In this regard, an extensive empirical study was conducted among mobile banking service receivers in Bangladesh. The results reveal that driving factors of consumers' behavioral intentions to adopt mobile banking at the static, interaction, and transaction service phases are significantly different, providing important theoretical and practical contributions.

[1] **Corresponding Author**

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1. Introduction

The concept of mobile banking – for example, type of service, association of different stakeholders, and scope and boundaries of the service – has been explored by many researchers (e.g. Al-Ghazali et al., 2015; Alafeef et al., 2011; Deb & Lomo-David, 2014; Laukkanen & Lauronen, 2005; Luo et al., 2010; Maroofi & Nazaripour, 2013; McNeish, 2015; Mortimer et al., 2015; Rosmain et al., 2013; Shaikh et al., 2015; Wang et al., 2015; Yu & Fang, 2009; Zhou, 2012). Researchers have also attempted to distinguish this mobile service delivery channel from the generic virtual banking service, i.e., Internet banking, by explicitly setting the periphery of this financial service (Chikomo et al., 2006; Laukkanen & Lauronen, 2005). Combining several discourses (Ashraf, 2012; Chikomo et al., 2006; Laukkanen & Lauronen, 2005), we can summarize the concept of mobile banking as a specific type, as well as an extension of certain functional features, of Internet banking where consumers can seek different kinds of financial services from banks through the use of a mobile device under the wireless application protocol (WAP). Mobile banking is offered through short message service (SMS) of mobile phone, direct telephone call, mobile phone Internet application, and certain specifically designed 'Apps' in mobile data application systems (Ashraf, 2012; Chikomo et al., 2006; Laukkanen & Lauronen, 2005).

While accessibility is an advantage of mobile banking, susceptibility to security risks may considerably inhibit its success (Chikomo et al., 2006; Saxena & Chaudhari, 2013). Like other information and

communication technology (ICT) embedded services, such as electronic-government and electronic-commerce, mobile banking is highly and widely under threat from technological, managerial, and behavioral risks (Chikomo et al., 2006; Saxena & Chaudhari, 2013). These risks include lack of confidentiality between banks and customers for privacy, lack of integrity for originality of communicated information, lack of authenticity for trusted and reliable identification between banks and users, and lack of availability of service due to external interruption during flow of information through connected networks (Chikomo et al., 2006). These risks can arise from many subcomponents and design features of mobile banking, such as users, mobile devices, application software and data, mobile operators, and financial service providers (Ashraf, 2012). Studies (e.g. Adetiloye, 2014; Daramola et al., 2014;Pousttchi & Schurig, 2004) have illustrated that consumer awareness for mobile banking is rooted in the appropriate design of the technology through the protection of security and privacy of consumers. However, the problem is, still the service providers of mobile banking such as financial institutions do not have comprehensive idea about consumers behavioral pattern to accept, use, and be satisfied with mobile banking (Maroofi & Nazaripour, 2013; McNeish, 2015; Mortimer et al., 2015; Wang et al., 2015). Practitioners and existing literature also do not have explicit perception about mobile banking users' requirements at different phases of this virtual service (Dass & Muttukrishnan, 2011; Govindarajan et al., 2014; Masrek et al., 2012; Mishra & Singh, 2015; Natarajan et al., 2010; Wang et al., 2015).

Technology and marketing researchers have explored consumers' behavioral intentions to adopt mobile banking scattered way (e.g. Alemu et al., 2015; Laukkanen; 2015; Mojtahed et al., 2013; Shareef et al., In Press). The salient studies related to the consumer perspective have utilized a number of behavioral theories such as the Technology Adoption Model (TAM) (Davis, 1989), Theory of Planned Behavior (TPB) (Ajzen, 1991), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003; Dwivedi et al. 2017ab; Rana et al. 2016; 2017), Task Technology Fit model (TTF) (Goodhue & Thompson, 1995), and Diffusion of Innovation theory (DOI) (Kapoor et al. 2014ab; Rogers,1995). Some seminal studies are particularly engaged in addressing, exploring, and streamlining consumers' initial trust of mobile banking and its sequential impact on the widespread proliferation of mobile banking through different trust related constructs and models such as McKnight et al.'s (1998) Initial Trust Model (ITM). However, these attempts to reveal consumers' behavioral intentions based on different behavioral theories and technology adoption models have not comprehensively considered the essential features of any virtual medium where communication is established through Internet and mobile phone. Researchers from ICT and human behavior examined these issues of mobile banking and design and present different application services from a solely engineering perspective to recommend better banking services based on consumers' usability requirements. Security features are considered by some seminal research studies (e.g. Chikomo et al., 2006; Elkhodr et al., 2012; Islam, 2014; Kadušić et al., 2011); however, these studies are severely lacking in behavioral features. Consumers' personality traits, compatibility with mobile banking, and awareness of this service are not deliberated over by many researchers. Synergistic combination of technological, behavioral, social, organizational, and cultural issues to set the epistemological paradigms of selection criteria of adopting mobile banking is currently absent in the extant literature. Additionally, many mobile banking studies have collected data from a sample of university students only (e.g. Al-Jabri & Sohail, 2012; Lu et al., 2014; Mojtahed et al., 2013; Pavithran et al., 2014; Wang et al., 2006), with the implication of limited generalizability of results.

The most significant short-coming of existing mobile banking adoption research is with reference to service phases. There are three stages of mobile banking service: static stage, consisting of checking account

balance, and viewing account and investment related information; interaction stage, consisting of two-way communication for any enquiries; and transactional stage, consisting of money transfer from one account to another (Mishra & Singh, 2015; Natarajan et al., 2010; Wati et al., 2009). For different types of services, technological integration and requirements are significantly different. So, different usability is essential from the application software to perform different services having unique functional characteristics. However, no research studies have so far addressed consumers' intentions to select this emerging mobile service from behavioral, technological, social, cultural, and organizational perspective for the aforementioned three stages separately. Academicians and practitioners need to conceptualize and prepare recommendations to formulate consumers' behavior for these three different phases of services separately. Service providers' attempts to design and initiate diffusion strategies for this newly invented service delivery channel depend substantially on the findings of consumers' requirements, attitudes, and perceptions that shape their behaviors at the three service phases. Consequently, this current research is engaged in addressing this potential research gap and identifies and conceptualizes consumers' behavior by revealing their selection criteria of the mentioned three phases separately. The findings of this research can provide potential benefits to the service providers like Banks, government policy makers, and ultimately consumers who are interested to use mobile banking system.

The remainder of this paper is structured as follows. The next section explains the theoretical framework for investigating consumers' behavior for the three phases of mobile banking operation. Following this, there is a section outlining the research methodology and data collection. Then the analysis section is presented proceeded by a discussion of the results. Finally, the paper is concluded, limitations are identified, and avenues for future research are outlined.

2. Theoretical Framework

In the present market economy, financial services need to be dynamic, consumer centric, widely available, and compatible with consumers' and merchants' mobile life pattern (Aderonke & Charles, 2010; Al Alwanet al. 2018; Atulkar & Kesar, 2017; Laukkanen & Lauronen, 2005). Nowadays, financial services like credit cards, money transfer facilities, and bill payments are widely offered by many retail stores, mobile operators, and some other credit companies (Yu & Fang, 2009), increasing competition for financial service providers. Hence, the banking sector must try to ensure consumers' satisfaction with unique services (Gu et al., 2009; Kim et al., 2009). Internet banking and mobile banking have emerged to minimize operational costs, serve customers with competitive advantage, and meet customers' versatile requirements to satisfy them with distinctive value (Agarwal et al. 2009; Ashraf, 2012;Chaouali et al., 2017; 2016;Fonseca,2014; Littler & Melanthiou, 2006). The overarching initiation and implementation of mobile banking is mandated to explicitly fulfill operational, financial, and behavioral requirements of both service providers, e.g. banks, and service users, e.g. consumers. It is clearly evidenced that mobile banking can minimize banks' operational costs significantly in contrast to physical retail banking with the presence of customer service (Ashraf, 2012). Additionally, customers are unrestricted to opening hours or availability of customer service advisors to complete daily banking functions.

Studies (Lu et al., 2015; Masrek et al., 2012; Mojtahed et al., 2013; Natarajan et al., 2010; Negash, 2011; Nisara & Prabhakar, 2017; Oliveira et al., 2014; Shaikh et al., 2015; Wang et al., 2015) have attempted to analyze consumers' trust formation behavior, risks related to hampering of trust, and the effect of trust with the cognitive and affective behavioral acceptance of mobile banking. Numerous researchers (Dass & Muttukrishnan, 2011; Govindarajan et al., 2014; Masrek et al., 2012; Mishra & Singh, 2015; Natarajan et al., 2010; Wang et al., 2015) have identified that trust has a more important role in transaction behavior than behavior for static banking. Exploring effects of different categories of trust on behavioral intention for mobile banking, a few studies found that institutional trust is the primary driving agent for positive intention to adopt mobile banking. However, consumers behavioral pattern, attitudes, and perceptions of risks and trust at different phases of mobile banking is not explored and examined in a single study. Practitioners do not have clear idea if the consumers behavior can vary at different levels of service delivery like, viewing mobile banking information, interacting with the domains, and transacting in the same system.

In the channel structure for mobile banking service delivery two key stakeholders are the users, i.e., customers, and the service providers, i.e., banks. As the intermediary in this channel, the supporting role is played by mobile communication operators. This is purely a service delivery channel where service is provided through mobile communication networks to consumers who want to accept this mobile channel for their financial service (Adetiloye, 2014; Mishra & Singh, 2015; Shin et al., 2014). There are several other service delivery channels for the financial sector such as traditional physical teller service, Internet banking, telephone banking, and automated teller machines (ATMs) (Lee & Im, 2015). Mobile banking has to compete with these existing channels and provide greater advantage to consumers by capitalizing on the ubiquitous benefits of mobile communications, such as accessibility and availability from anywhere and at any time (Govindarajan et al., 2014). Using the mobile service delivery channel, consumers can check account balances anytime, even at point of sale in a retail store. Likewise, consumers can communicate with banks from anywhere regarding any queries where they need two-way communications. Consumers are also able to transfer their funds from one account to another for paying any bills while on the move. All of these different actions represent different phases of mobile banking, which require different features for operations (Govindarajan et al., 2014). For static, interaction and transaction phases of financial operations, from the aspect of service provider's functions, banking service design is different (Mishra & Singh, 2015; Natarajan et al., 2010; Wati et al., 2009). In terms of importance, operations, and involvement, from the aspect of consumers' behavioral intention, consumers' attitude and perception is also different. Similar to electronic government (eGov) services (see Shareef et al., 2011), strategy and operational features for security, risks, accessibility, and usability are different for different phases of mobile banking service. Considering these differences, developing a theoretical framework to explain consumers' intentions to use mobile banking during the three distinct phases is a valuable and significant concern which has so far not been addressed by extant research.

Several authors (e.g. Gu et al., 2009; Luarn & Lin, 2005; Mohammadi, 2015; Riquelme & Rios, 2010; Sripalawat et al., 2011) have investigated the determinants of behavioral intention to adopt mobile banking based on TAM. Gu et al. (2009) extended TAM with constructs such as trust, which was found to have a significant effect on behavioral intention to adopt mobile banking. Some authors have used other models such as DOI (e.g. Al-Jabri & Sohail, 2012), TPB (e.g. Püschel et al., 2010), UTAUT (e.g. Oliveria et al., 2014; Zhou et al., 2010), and the IS Success Model (e.g. Zhou et al., 2011) to explore mobile banking adoption. However, a literature review by Ha et al. (2012) revealed that TAM has dominated the theoretical underpinnings of mobile banking adoption research. The theoretical frameworks used to date are not

derived to consider consumers' behavioral intention for the three phases of service separately. Rather, researchers who conducted empirical studies to conceptualize behavioral intention under the aforementioned behavioral and technological theories were solely concerned with adoption as a single phased unique behavior. Consequently, this current research did not attempt to design the theoretical framework, develop hypotheses, and establish the paradigms based on the traditional behavioral models to predict consumer behavior at the three phases of mobile banking service.

To predict consumers' eGov adoption behavior and reveal behavioral intentions at different service levels, Shareef et al. (2011) devised a unique model named GAM, with GAM (S) for the static stage and GAM (I) for the interaction stage. In further research, the authors also revealed a distinct model GAM (T) to reflect consumers' behavior at the transaction stage (Shareef et al., 2014). Since mobile banking adoption behavior resembles eGov adoption in the aspect of technology, operation, self-service technology, virtual medium, security requirements, and service delivery channel, this study adopts the GAM model and applies it to the mobile banking context (Figure 1). Citizens use eGov domain for finding information (static stage), interacting with public service providers through two-way communication (interaction stage), and paying taxes and other bills (transaction stage). In transaction stage, consumers or citizens frequently associate their banking account which is similar to mobile banking money transfer. So, GAM model can have potential to explore mobile banking adoption. The following Figure 1 is a generic model, not specific to any distinct phase. Depending on the phase, the causal relations can be changed; however, this is the basic theoretical framework for GAM model.

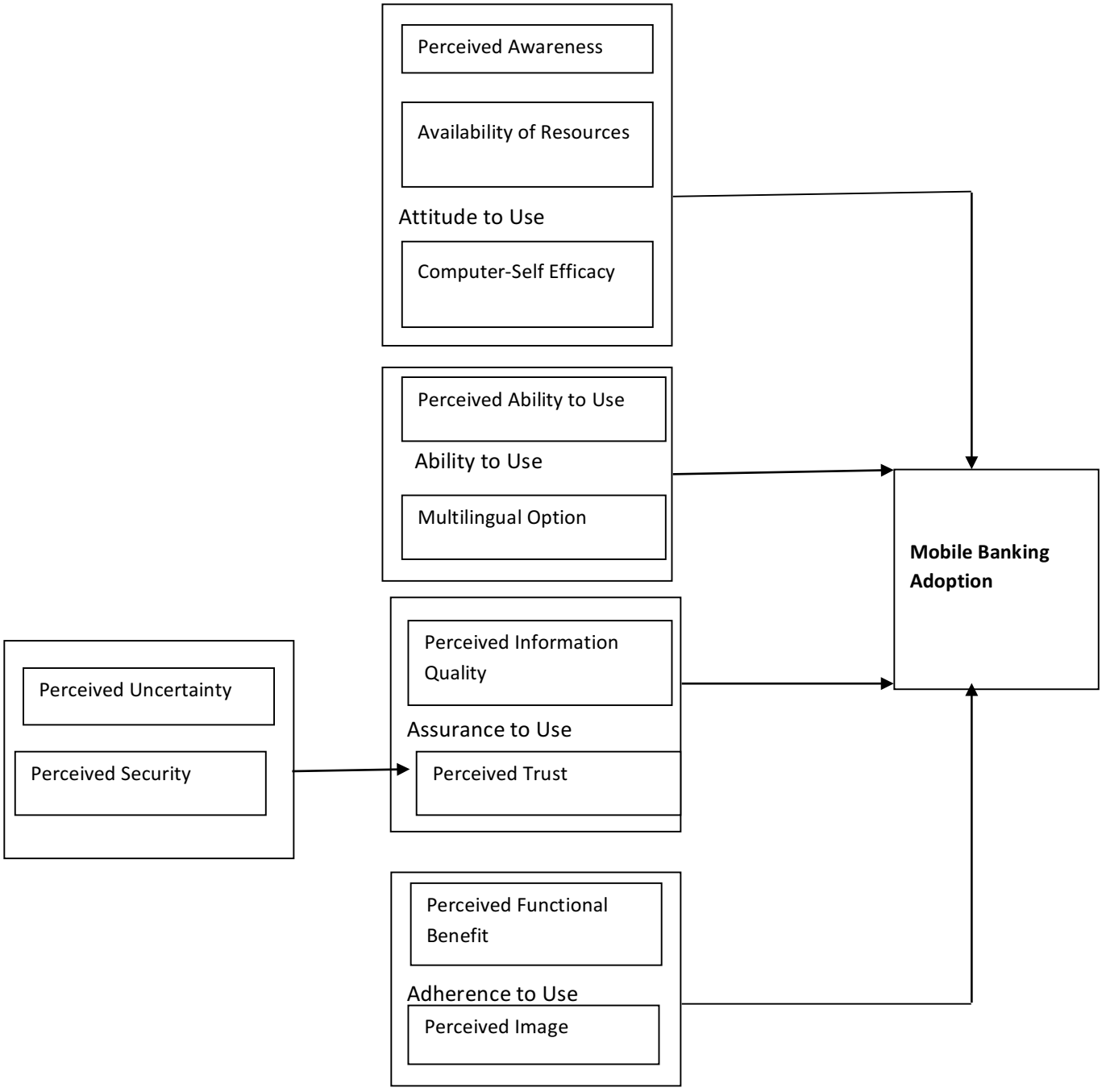

Figure 1: Proposed Theoretical Model (Adapted from Shareef et al. 2011)

Following the GAM model, conceptual definitions of the constructs are revised for mobile banking and the causal relations are hypothesized. This is shown in Table 1.

Table 1: Conceptual Definitions of the Constructs and Hypotheses

Exogenous Variable	Conceptual Definition	Hypothesis
Perceived Awareness (PA)	Gaining and acquiring knowledge, education, and consciousness as much as users perceive to be sufficient to learn the characteristics of mobile banking system, use it with skill, and realize its strategic functionality and competitive advantages and disadvantages	Perceived Awareness (PA) has a positive relation with Adoption of mobile banking
Availability of Resources (AOR)	The availability and freedom of using mobile phone, Internet, and ICT with competitive features like access, speed, and cost	Availability of Resources (AOR) has a positive relation with Adoption of mobile banking
Computer-Self Efficacy (CSE)	The judgment of users' technological capability to use, interact, and transact in an mobile banking system based on prior knowledge, experience, and skill as they perceive it is required to do so	Computer-Self Efficacy (CSE) has a positive relation with Adoption of mobile banking
Perceived Ability to Use (PATU)	The degree to which a user perceives his/her competence in and comfortable ability for using mobile banking system technologically, organizationally, and psychologically that match with individual's values, social needs, and overall attitudes	Perceived Ability to Use (PATU) has a positive relation with Adoption of mobile banking
Multilingual Option (MLO)	Inclusion of different prime languages in mobile banking system to facilitate stakeholders in viewing, selecting, downloading, interacting, and transacting with their convenient language in the absence of human interaction	Multilingual Option (MLO) has a positive relation with Adoption of mobile banking
Perceived Information Quality (PIQ)	Information quality covers the extent to which complete, accurate, organized, understandable, up to date, and timely information is provided in mobile banking system for the customers to obtain information about any of their intended objectives	Perceived Information Quality (PIQ) has a positive relation with Adoption of mobile banking
Perceived Trust (PT)	The degree to which users have attitudinal confidence for reliability, credibility, safety, and integrity of mobile banking system from the technical, organizational, social, and political standpoints and also from the effective, efficient, prompt, and sympathetic customer service response, if required	Perceived Trust (PT) has a positive relation with Adoption of mobile banking
Perceived Uncertainty (PU)	The degree to which users perceive risk in transactions due to uncontrollable and unknown situations in the virtual environment associated with mobile banking system	Perceived Uncertainty (PU) has a negative relation with Trust of mobile banking

Perceived Security (PS)	The degree to which users perceive that it is safe to disclose personal and financial information during interaction and transaction with mobile banking system, and users are also assured that the system does not disclose or share their information with others or misuse for any purpose	Perceived Security (PS) has a positive relation with Trust of mobile banking
Perceived Functional Benefit (PFB)	The degree to which consumers perceive the overall functional benefits, both absolute and relative—including cost, time, efficiency, and effectiveness of using mobile banking system—instead of using traditional physical office functions.	Perceived Functional Benefit (PFB) has a positive relation with Adoption of mobile banking
Perceived Image (PI)	The degree to which consumers behaviorally and culturally perceive that adoption of mobile banking system enhances and improves social status and prestige	Perceived Image (PI) has a positive relation with Adoption of mobile banking

3. Research Methodology

The independent constructs and their measuring items were taken from the final GAM (Shareef et al., 2011) but were refined and revised for the context of mobile banking (Appendix 1). In accordance with GAM, three adoption behavior variables and their respective measuring items are chosen and revised. Here the dependent variables are mobile bank adoption at the static stage (MBA-S), interaction stage (MBA-I), and transaction stage (MBA-T) (Appendix 2).

The procedure and strategy used in this research is similar to that of Shareef et al. (2011) in development of GAM. However, this research was conducted in four cities of Bangladesh. Consumers of Bangladesh were chosen to frame behavioral intention for the following reasons:

1. In Bangladesh, there are 57 commercial and specialized banks currently operating including foreign, private, and public banks. The central bank of Bangladesh has approved almost half of the banks to operate mobile banking operations. This substantial number explains the variability in design, operation, and features of mobile banking. Also in Bangladesh, mobile banking system offers many kinds of services like, downloading account opening application and other forms, viewing information, chatting briefly, transacting for money transfer etc. As a result, studying mobile banking in Bangladesh is very much appropriate.
2. Although in Bangladesh only around 13% of 16 million people are using direct banking service, several researchers asserted that mobile banking is a very popular concept in Bangladesh and people have great interest for this (Ahmed et al., 2011; Islam, 2013). Starting from the beginning of this century, mobile banking operation and scope is expanding very fast. Due to inclusion of some easy Apps and availability of mobile phone, mobile banking is used by all demographic segments in Bangladesh (Islam, 2013). Around 48% of current banking service users are somehow using mobile banking which is around one million people (Islam, 2013). In terms of population of mobile banking users, it is extremely huge. So, any sample in Bangladesh to capture consumers'

mobile banking adoption behavior at the three stages can provide real behavior phenomena (Islam, 2013).

3. In Bangladesh all three phases of mobile banking services, namely static, interaction, and transactional, are available.

Sample of this study was chosen completely randomly. For random and even distribution of questionnaires among consumers, each city was divided into five regions: east, west, north, south, and center, so that we can get a sample quite representative of the population. With the help of four research assistants, 800 questionnaires were physically distributed into houses and apartments in those regions over a two week period. Those Research Assistants went to the respondents' places directly and distributed after brief discussion. The responses were collected physically. Respondents were required to have experience of using all three stages of mobile banking services(see Appendix 2) to be eligible to participate. A total of 201 complete surveys from suitable respondents were returned. After statistical analysis, a panel of five bankers from Bangladesh was formed to look at the findings and provide their insight about its implication. Those five members are the departmental head or vice president of information technology (IT) department of five leading commercial banks in Bangladesh.

4. Statistical Analysis

Respondents have different ages starting from 19 to 67 and different professional involvement like students, jobless, private and government service holders, businessmen, and house wives. Their educational backgrounds are also versatile, but mostly are highly educated. Demographic analysis of the sample revealed that the average age of respondents who had experience of using all three phases of mobile banking services was 27. The male to female ratio was 10:4. In Bangladesh, males tend to be more advanced in adopting technology and in many families male counterparts are traditionally responsible for engaging with banking services (Ahmed et al., 2011; Islam, 2013). Average amount of experience for mobile banking service among respondents was 2.45 years, which was quite representative as this emerging channel has been available in Bangladesh from mid-2011 (Islam, 2013).

Since the constructs and their measuring items were verified through both exploratory and confirmatory factor analysis (EFA and CFA) in Shareef et al.'s (2011) study, the reliability of the constructs in this study were assessed using coefficient alpha to examine if there was acceptable internal consistency among the scale items to measure the respective constructs. The reliability scores for all the independent and dependent variables ranged from 0.713 to 0.978, which is acceptable as per the suggested cutoff level for internal reliability by Nunnally & Bernstein (1994).

4.1 Causal Relationship by Path Analysis

Statistical analysis of the model was undertaken using structural equation modeling (SEM) through LISREL using maximum likelihood estimation. SEM enables analysis of interrelated questions in a single analysis by simultaneously modeling relationships between independent and dependent constructs. One analysis was conducted for each of the phases of mobile banking service. The study used a 5 point Likert scale (ranging from strongly agree to strongly disagree), so it was not perfectly continuous (Kline, 2005). For this kind of data, path analysis of structural equation modeling (SEM) is suitable. For each phase of interactions, we took the average of the scale items of each of the variables individually for 201sample. As

the data input, a correlation matrix (see Appendix 3) was used for a maximum likelihood procedure of LISREL for each path analysis.

4.1.1 Static Phase (MBA-S)

For the adoption of mobile banking at the static phase, the primary model fit indices did not fit well with the collected data. Statistical model results recommended some modifications based on the internal correlations of the variables to improve the model fitness. Therefore, causal relations from perceived ability to use (PATU) to perceived trust (PT) and error covariance between perceived security (PS) and perceived trust (PT), perceived ability to use (PATU) and PS, and perceived functional benefit (PFB) and PT were added. Following these modifications, good model fit was achieved as per literature recommendations (see Table 2).

Like GAM-S model, perceived awareness (PA) and PATU are significant on MBA-S at the 0.05 level (Figure 2). Unlike GAM-S model, PFB is a strong predictor, significant at the 0.05 level. Also unlike GAM-S model, PT and information quality (PIQ) have significant effect on MBA-S to adopt mobile banking operation at the static stage. Other variables remained insignificant even at 0.10 level. The five significant variables PA, PATU, PFB, PIQ, and PT combined explained 39.3% of variance in mobile banking adoption at static phase. For any exploratory study in social science where consumers are responding based on their perception about any emerging service, this amount of variance explained by the independent variables is quite satisfactory (Kline, 2005). Identifying consumers' perception about mobile banking at different phases is an exploratory type study. This study was attempted to develop a parsimonious model which might not be completely exhaustive.

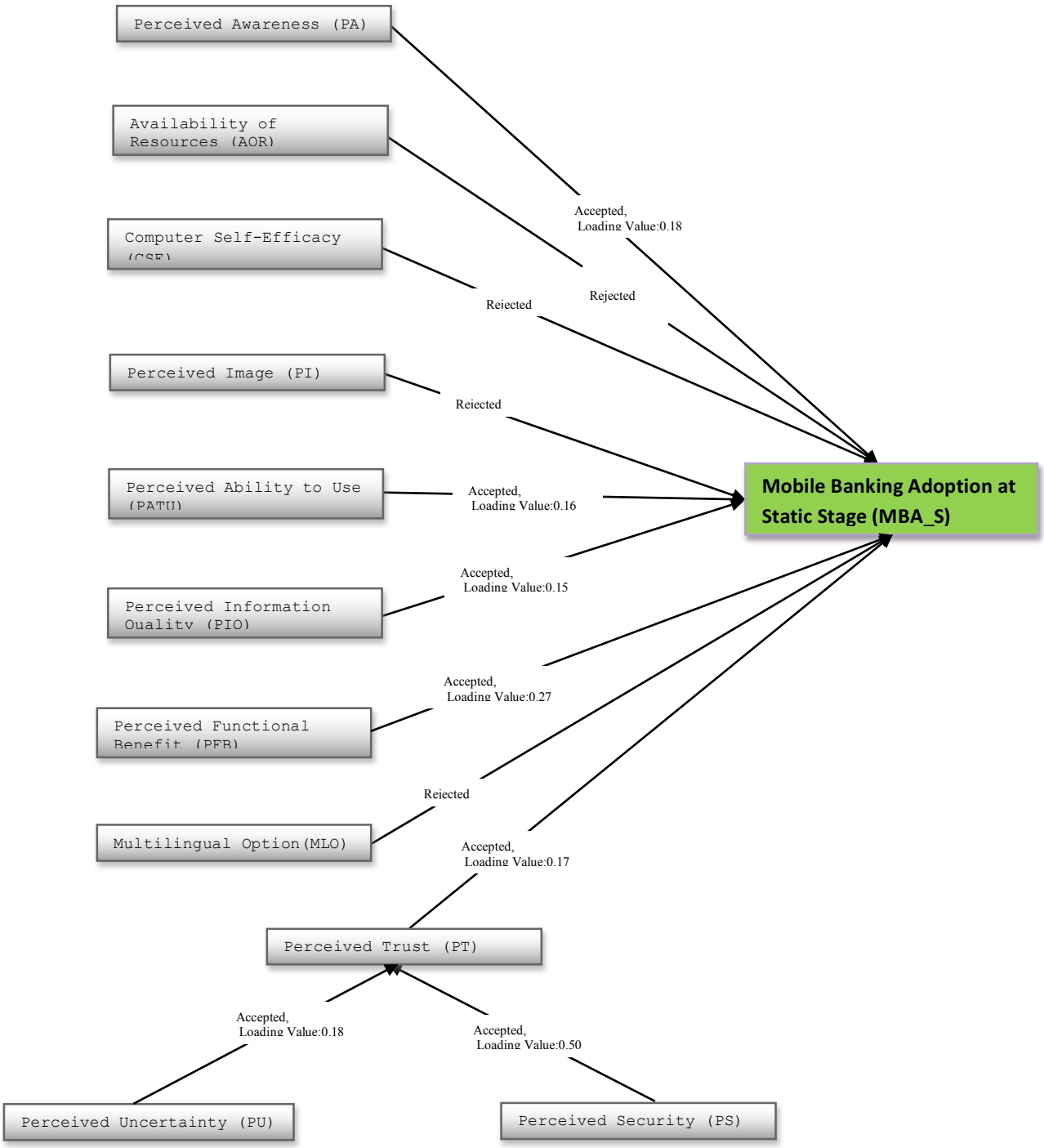

Figure 2. Mobile Banking Adoption at Static Phase (MBA-S)

4.1.2 Interaction Phase (MBA-I)

Following the procedures aforementioned and making modifications based on initial analysis results, the final MBA-I model was derived (Figure 3)achieving good model fit statistics (Table 2). Three significant variables PATU, PFB, and perceived information quality (PIQ) explained 31.8% of variance of mobile banking adoption at the interaction phase. Unlike GAM-I model, PA, perceived image (PI), and PT are not contributing significant effect in adopting mobile banking at the interaction phase. We also observed a modification in MBA-I model in terms of the pursuing effect of PIQ; unlike GAM-I model, PIQ is the strongest predictor for MBA-I model. The significant effects of perceived uncertainty (PU) and PS on PT were also revealed. For MBA-S model, PFB is the strongest predictor whereas at the interaction phase PIQ is the strongest and has significant contributions in affecting adoption of mobile banking at this service phase.

4.1.3 Transaction Phase (MBA-T)

For the adoption of mobile banking at the transaction phase, the primary model fit indices did not fit well with the collected data. Statistical model results recommended some modifications based on the internal correlations of the variables to improve the model fitness. Therefore, causal relation from perceived security (PS) to MBA_I and error covariance between PS and PT and PATU and PS were added. Following these modifications, good model fit was achieved as per literature recommendations (see Table 2). For the transaction phase, a number of variations from GAM-T model were observed. Here PATU, PFB, and PS are significant predictors (Figure 4). That means PFB and PATU are the only strong pursuing constructs for mobile banking adoption at all three service phases. The causal effects of PU and PS on PT are also revealed. Unlike MBA-S and MBA-I models, for the transaction phase, PS is a strong direct predictor of mobile banking adoption in addition to its indirect contribution to the adoption of mobile banking through PT. At the transaction phase, PATU is the strongest predictor, although marginally ahead of PS. Three significant variables PATU, PFB, and PS explained 55% of variance of mobile banking adoption at the transaction phase.

To verify the convergent and discriminant validity, this research has conducted a confirmatory factor analysis (CFA) to examine the validity and contribution of the measuring items and formative constructs having significant causal relations (PA, PATU, PIQ, PFB, PT, PU, and PS) with MBA-S, MBA-I, and MBA-T. Seven constructs were identified significant for the three models combined with measuring items. They showed an over-identified model and satisfied both the requirements of the CFA and were loaded on the respective constructs with a causal effect over than 0.50, except some scale items. One item from PATU (item 15), one item from PIQ (item 21), two items from PFB (item 30, 32), and one item from MLO (23) failed to satisfy the minimum cut-off point requirements of 0.5 (Fornell & Larcker, 1981; Kline, 2005). It means, these scale items are not contributing significant variance to the respective constructs. We also verified correlation matrix of the scale items under each construct. It was observed that those insignificant items have high correlations with the existing items. So, these scale items were dropped (see Appendix 1) and CFA was done again for those constructs. This time result was acceptable. In this way, convergent validity is confirmed, as the retained scale items for each construct have average variances extracted (AVE) for each factor and measuring items of at least 0.50 (Fornell & Larcker, 1981).

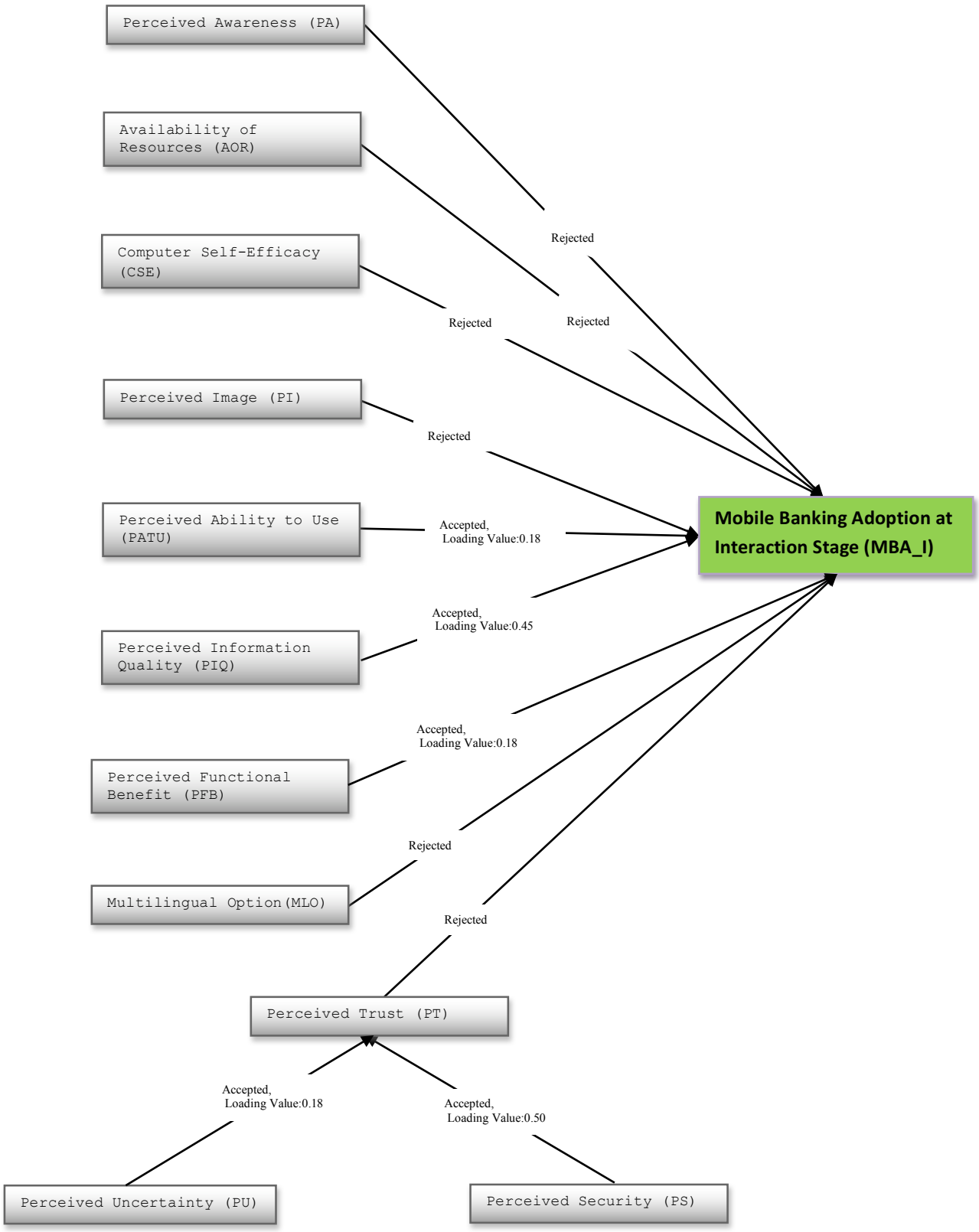

Figure 3. Mobile Banking Adoption at Interaction Phase (MBA-I)

Discriminant validity among the seven constructs was also verified as the largest shared variance between these factors is lower than the least AVE value for each factor and its measures (Espinoza, 1999). We also verified the correlation matrix of the items under each factor. All the items individually under each factor have moderate to strong correlation coefficients. This result also justified convergent validity.

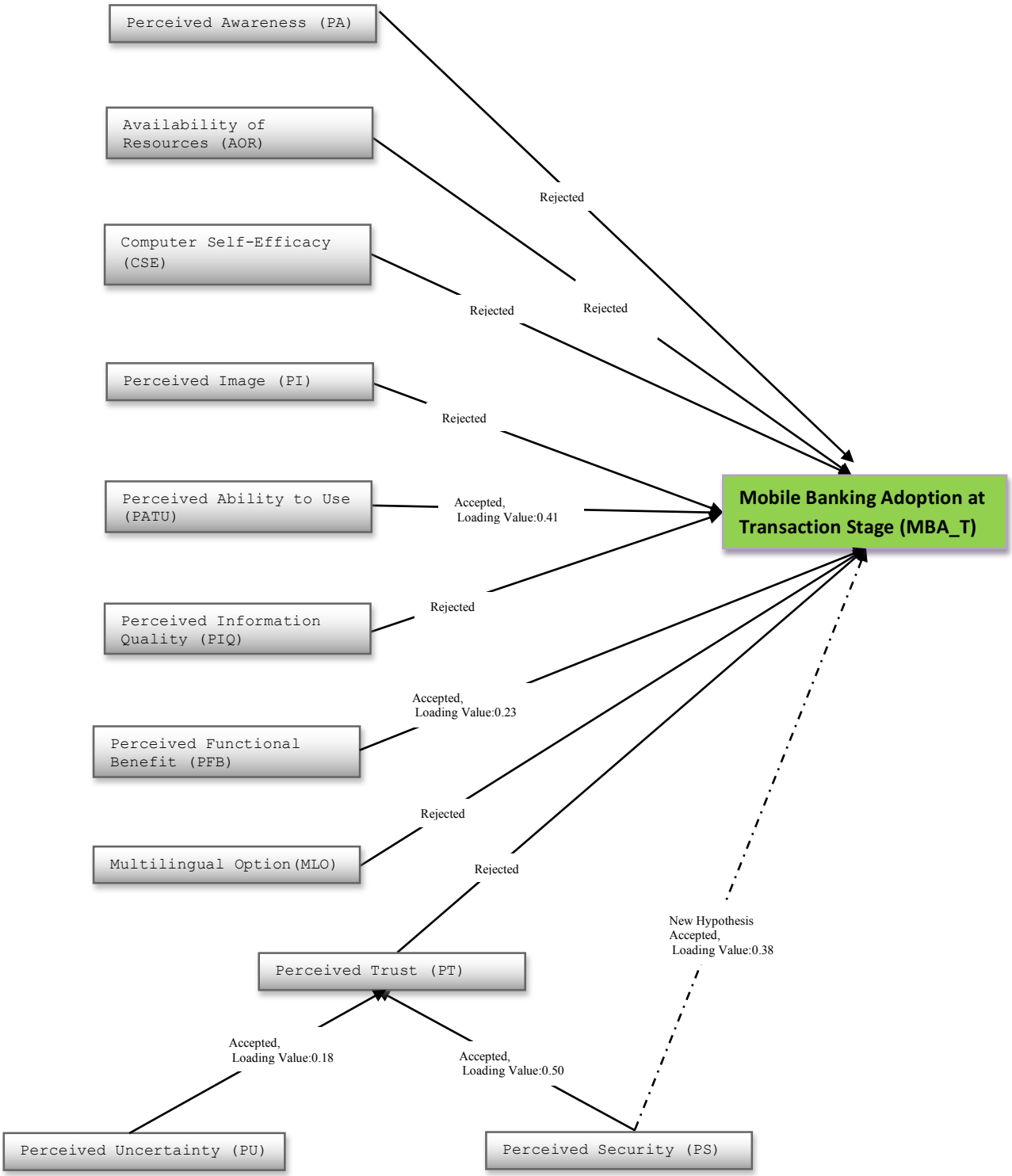

Figure 4 Mobile Banking Adoption at Transaction Phase (MBA-T)

In regression or SEM analysis, we attempt to maximize the correlation between exogenous and endogenous variables. On the other hand, we always prefer that explanatory variables and also measuring items are not highly correlated; they can completely measure different constructs, and contribute different variances on the dependent variable (Stevens, 1996, pp. 91-93). We examined multicolinearity problem by investigating Variance Inflation Factor (VIF) values that are ranging from 1.03 to 2.86 (much less than 10). These values imply that there is no severe multicolinearity (Netter et al., 1996; Allison, 1999).We have verified the normal Q-Q plots for all the retained constructs with the measuring items for normality. Though some data distributions are skewed and have kurtosis, still these are not highly non-normal. (Curran et al., 1996, acceptable range for skewness is ±2, and kurtosis for ±7). Therefore, we conclude that our data has roughly normal distribution. We have examined the data for outliers by Weisberg test (with standardized residuals) and Mahalanobis distances. It is acceptable (z scores less than 3, Stevens, 1996).

Table 2: Fit Measures from Path Analysis

Fit Measures	Recommended Values (Churchill, 1979; Segars and Grover, 1993; Chau, 1997; Kline, 2005)	Adoption Model		
		MBA-S	MBA-I	MBA-T
χ2/Degree of freedom (DF)	≤3.0 p≥0.05	1.652 (0.085	1.634 (0.09927	1.656 (0.0846
Root Mean Square Residual (RMR)	≤0.05	0.0279	0.0271	0.0276
Comparative Fit Index (CFI)	≥.90	0.984	0.983	0.988
Goodness of Fit Index (GFI)	≥.90	0.987	0.987	0.988
Adjusted Goodness of Fit Index (AGFI)	≥.80	0.897	0.897	0.899
RMSEA	<0.06	0.0571	0.0573	0.0563
Normed Fit Index (NFI)	≥0.90	0.966	0.964	0.973

5. Discussion

Original theoretical framework of this study — GAM model, is developed based on extensive literature review of ICT, eGov, consumer behavior, behavioral psychology. This model is also developed, extended, and supported by several behavioral and marketing theories like TRA, TPB, TAM, DOI, TCA, ITM, and UTAUT (Shareef et al., 2011/13). For different types of functional assignments with different phases including different requirements of the three phases in terms of technology, operation, self-service technology, security requirements, and service delivery, the generic model of Figure 1 has been changed into Figure 2, 3, and 4 for static, interaction, and transaction stage respectively. If we look at TRA and TPB, we can get logical underpinnings that due to differences in functional characteristics among static, interaction, and transaction stages, contributions of consumers' beliefs in forming their attitude and subjective norm potentially differ. This finding is also supported by TTF model. According to Goodhue & Thompson (1995), compatibility between task and technology substantially depends on the type of technological complexity and importance related to accomplishment of the task. As a result, static,

interaction, and transaction stages clearly demonstrated different requirements from the users as their security features, awareness, technological complexity, behavioral urge, application, and involvement significantly differ. At the static stage, functional benefit is the strongest predictor for adoption of mobile banking. At the interaction stage, it is information quality whereas, at the transaction stage, both ability to use and security are mostly contributing in pursuing attitude to adopt mobile banking. This finding was supported by the panel members of the five bankers formed after analysis. From their experience and perception of operating this channel, they asserted that consumers' feedback about service performance of mobile banking is also symmetrical to this conclusion. Consumers often showed different technological requirements concerning security features of mobile banking operation while doing personal banking for static, interactive, and or transactional tasks. For direct comparison of the factors driving adoption of mobile banking at the three service phases - static, interaction, and transaction - Table 3 depicts the significant variables from this study's results. The results also vary from GAM model as shown in Table 3.

Table 3: Factors Affecting Mobile Banking Adoption at Different Service Phases (Compared with GAM Model)

Driving Constructs	Adoption at Different Service Levels			Trust Formation at Different Service Levels		
	Static	Interaction	Transaction	Static	Interaction	Transaction
Perceived Awareness (PA)	√ (MBA-S) **√ (GAM-S)**	- **√ (GAM-I)**				
Perceived Ability to Use (PATU)	√ (MBA-S) **√ (GAM-S)**	√ (MBA-I) **√ (GAM-I)**	√ (MBA-T) **√ (GAM-T)**			
Perceived Functional Benefit (PFB)	√ (MBA-S) **√ (GAM-S)**	√ (MBA-I) -	√ (MBA-T) -			
Perceived Information Quality (PIQ)	√ (MBA-S) -	√ (MBA-I) **√ (GAM-I)**				
Perceived Trust (PT)	√ (MBA-S) -	- **√ (GAM-I)**				
Perceived Image (PI)		- **√ (GAM-I)**				
Perceived Security (PS)			√ (MBA-T)	√ (MBA-S)	√ (MBA-I)	√ (MBA-T)

Driving Constructs	Adoption at Different Service Levels			Trust Formation at Different Service Levels		
	Static	Interaction	Transaction	Static	Interaction	Transaction
			√ (GAM-T)	**√ (GAM-S)**	**√ (GAM-I)**	**√ (GAM-T)**
Perceived Uncertainty (PU)				**√** (MBA-S) **√ (GAM-S)**	**√** (MBA-I) **√ (GAM-I)**	**√** (MBA-T) **√ (GAM-T)**

For MBA-S model, a unit positive change on PFB causes .274 unit positive change on adoption of mobile banking at the static stage when PA, PATU, PIQ and PT are constant. As this is the most significant contributor affecting adoption of mobile banking at the static stage, e.g. to view account balances, consumers need to achieve functional benefits from this service delivery channel. Therefore, availability of account information from anywhere and accessibility to accounts at any time with expected efficiency is the prime concern of consumers instigating them to use this service delivery channel. Nevertheless, trust, ability, information accuracy, and familiarity are also important. Consumers' awareness about scope, facilities, and benefits of this new service delivery channel is logically a driving force for adoption at the static stage when the service is so novel.

At the interaction stage, information quality is the most important factor in affecting consumers' adoption of mobile banking. The emerging importance of PIQ at the interaction stage may be a result of the dissemination of information in the two-way communication that characterizes this phase. At this phase, to facilitate two-way communication, information accuracy is the key issue for users to use this technology driven virtual environment. Similar to the static stage, consumers are inclined to use mobile banking because they can avail it from anywhere and at anytime. Also, they have positive attitude to use this channel, because they have the ability to work in a virtual environment through self-service technology. So, PFB and PATU are potential contributing constructs for MBA-I. These findings suggest that consumers' ability to send any query and receive customer service, information quality to be gratified through the interaction from this virtual medium, and perception of relative advantages are important predictors to shape consumers' adoption of mobile banking at this stage. Interestingly, unlike GAM-I model, for MBA-I model, consumers' self-image, i.e., their self-concept and personality and its compatibility with the system, is not an important factor to affect adoption of the service at the interaction stage. When GAM-I model was derived in 2009, consumers perceived prestige to interact in virtual medium; however in 2017, interacting through virtual medium cannot pursue any feelings of image as it is now very common. It has lost its conspicuous characteristic. This finding is also supported by the panel board member of five bankers.

As a mobile technology driven channel, operated and supported with the help of self-generated passwords and identification code, for many consumers their technological ability to avail, access, and use this service securely is of paramount importance in their adoption decision of mobile banking at the transaction phase. This current research identified similarly that in the transaction stage where consumers generally use this mobile channel for transferring money from one account to another and paying bills, security of the channel

is extremely important in affecting adoption. If consumers have trust about security in this service delivery channel at the transaction stage, they will be more inclined to adopt the service. For consumers, the results highlight that security is the greatest predictor of trust at this service phase. Security is more related to technological issues, so mobile banking, while transferring money or paying bills, is accentuated by the technological phenomenon, making security measures an important issue for adopting mobile banking at the transaction stage. Similar to static and interaction stages, customers' ability to use this service from anywhere and at any time can enhance their perception of functional benefits and thus, pursues them to adopt this service. So, PFB is also an important predictor at the transaction stage. In this context, other constructs have non-significant contribution in shaping consumers' behavioral intentions to adopt mobile banking at the transaction stage.

Researchers have explored the effects of numerous factors on consumers' intentions to adopt mobile banking (e.g. Gu et al., 2009; Luarn & Lin, 2005; Mohammadi, 2015; Riquelme & Rios, 2010; Sripalawat et al., 2011). However, none of the existing research has considered whether the importance of factors affecting adoption of mobile banking changes at different service levels. These findings have also justified that consumers behavior for virtual medium is very complex and cannot be completely predicted by traditional dimensions of TPB and TAM.

In static, interaction, and transaction stages, consumers' service output demand is different and thus, service output supplied is also potentially different in terms of constructs and their level of effect or contribution in shaping behavioral intention to adopt this service delivery channel. Different types of functional services offered at different stages represent different functions of services, different patterns of service characteristics, different levels of technological sophistication, different strategies and design, different types of involvement of customer services, and different orientations of stakeholders' association (Afshan & Sharif, 2016; Gu et al., 2009; Mallat et al., 2004; Mohan et al., 2015; Pousttchi & Schurig, 2004; Sangle & Awasthi, 2011). Each level is associated with different objectives, functions, orientations, presentations, transparency, technological interaction, and interaction with internal and external stakeholders. Banks, i.e., service providers, can post information related to different accounts, financial investment, and interests associated with different investments and different forms related to account opening and simply facilitate viewing of that information at the static level of mobile banking. The most important service at this stage is to check personal or corporate account balance or check any prior deposition or transfer of any bills. Instead of going to the bank physically, they perform their required tasks (which are simply viewing information, downloading forms etc.) through mobile banking. So, at this stage, perception of functional benefits is utmost important. In the interaction level, consumers, after viewing account opening and other related information, can communicate, send queries, or provide personal information through mobile banking. In this context, service providers' timely response with up-to-date and authentic information is the predetermined issue to adopt. At the transactional stage, consumers have enough familiarity with and control on this service delivery channel where the essential conditions are self-service technology and virtual interactions. Therefore, functional characteristics and thus, service output demand at the transactional level is quite different. At this stage, consumers frequently transfer money and pay bills through virtual medium where there may be no retained confirmation of service fulfillment. So, they require higher level of ability in interactive technologies and perception of security to facilitate the mobile transactions. Conducting any or all of these levels of mobile banking service from anywhere and at any time, is important.

5.1 Theoretical Contributions

The aforementioned findings have potential implications for behavioral theory development in conjunction with consumer behavior, technology adoption, and financial service delivery channel. As a paradigm of grounded theory for this mobile banking service delivery channel, it is asserted that consumers' behavioral preference to adopt this channel should be categorized reflecting functions of service related to static, interaction, and transaction stages. Applying GAM model of eGov adoption, MBA-S, MBA-I, and MBA-T for mobile banking service delivery channel have captured significant variance by the explanatory constructs of the model. So, GAM can provide a theoretical base for this financial services' adoption to predict consumers' behavior with certain deviations to reflect specific characteristics at different service levels. Shedding light on the theory of planned behavior, we can formidably argue that PATU, PFB, PIQ, PS, and personal component of trust of PT act as the foundation beliefs for positive motivations toward this mobile service delivery channel. On the other hand, social and institutional components of trust of PT can sufficiently contribute in forming subjective norms leading to behavioral intention for adopting mobile banking. External effect of PA and PU can influence perceived behavioral control. Panel members of five bankers also acknowledged this identification.

Technology adoption model (TAM) can be directly acknowledged by the findings of this study; however TAM has partial capacity to explain the variance of consumer behavior to adopt mobile banking which deals with very sensitive financial information flowed through virtual medium where self-service technology is the dominating characteristic. Actually, PFB and PIQ can develop the base of perceived usefulness of the channel. PATU can be the base belief of perceived ease of use. However, in addition to the regular constructs of TAM, formation of trust and controlling measures of security are important beliefs in forming behavioral intention.

Therefore, rhetorically, this study has broadened theoretical aspects of technology adoption where consumer behavior has extensive impact. Any complex and technology dominating consumer behavior for adopting any sensitive service should be analyzed considering service output demand from the channel where initial trust formation is an important predictor to reshape behavior.

5.2 Managerial Implications

Practitioners involved in financial service design and service output supplied for banking operation, technology development, mobile communication management, and channel design and strategy development for online consumer marketing can get deep insight from the explicit findings of this study.

Management of financial institutions who are responsible for designing services and initiating innovative strategies for creating competitive advantage should realize that financial service delivery through this virtual medium potentially differs at different levels considering types of association of customer service and consumers perception of risks. Therefore, controlling measures of security should have different importance for different types of functional activities through the same service delivery channel. Consumers' initial trust formation should be carefully handled for customer service at the static stage and for security risks, accountability, and transparency deriving from institutional, social, and personal trust at the transaction stage.

Managers concern for predicting online consumer behavior and channel design can understand that since functional characteristics and activities of this service delivery channel differs significantly at static, interaction, and transaction stages, any generalized service output supplied will be erroneous. Technology

designers and mobile operators can get extensive knowledge from consumers' heterogenic characteristics about usage and capitalization of benefits of mobile technology. For the success of this channel which is entirely designed as an alternative to traditional financial services, risks of service security is an important concern for consumers. These service oriented risks include absence of confidentiality between banks and customers for privacy, occurrence of service breaking during service flow, lack of integrity for originality of communicated information, lack of authenticity for trusted and reliable identification between banks and users, and incidence of external interruption during flow of information through connected networks. These risks are generated from the associated technologies, devices, mobile networks, and servers of the banks. However, potential impacts of these risks differ at different levels of service namely static, interaction, and transaction phases. So, designers of technology have different concerns in controlling those technology and human related risks in service delivery channel.

6. Conclusion

This consumer behavior study for mobile banking service delivery channel is designed on the theoretical concept of GAM model. Traditional researchers of mobile banking have conducted extensive research on consumers' behavioral intention to adopt mobile banking as a general and unique service channel. This methodological procedure indicates, marketing and behavioral researchers of mobile banking assumed that for all kinds of services offered through mobile banking, consumers' service output demand is consistent, similar, and generalized. However, this current research categorized mobile banking service into three phases namely, static (where consumers can only check account balances or view account and investment related information and interest), interaction (where consumers can communicate with service providers for two-way communication), and transaction (where consumers can accomplish some sensitive financial operations such as money transfer from one account to another and payment of bills). Since, operations, functional activities, service patterns, association of technologies, sensitivity of operations, and vulnerability of risks are quite different and distinct to each specific service level, categorization of services for the three stages and conceptualization of consumers behavior reflecting their service output demand for these three channels separately is of significant benefit for both theory and practice.

Shedding light on consumers' behavioral intentions at the three stages of mobile banking service, we can observe that PFB and PATU are the common driving forces for consumers. Adopting this service at the primary static stage, intermediate interaction stage, and ultimate transaction stage, consumers should understand and become familiar about the scope, background, and functions of this alternative mobile technology driven channel which has risks of security but this is very dynamic, robust, and has compatibility with mobile life. However, one of the important essences of this behavioral intention is the capability of consumers to access and avail this service. Since it is highly technology oriented, and self-service technology is the prime controlling variable to be able to learn how to seek service through this service delivery channel, consumers should have confidence and competence in availing, accessing, and using this channel. Nevertheless, transaction stage offers advanced service where users have already gained enough competence and knowledge about this channel. Accordingly, PFB and PATU are the driving forces shaping behavioral intention at all the stages. However, at the static stage, in addition to these constructs, consumers' awareness of availability of this service, information quality, and trust on this virtual medium are also potential issues for users to pursue positive attitude to adopt this channel. This research identified that at the initial stage (static stage), trust is a potential issue in affecting adoption of mobile banking. Trust has direct effect on adopting mobile banking for just checking account balance and viewing other information related to accounts. This belief is justified, as at this phase consumers need to dispose trust on this virtual

environment; they do not find any visible external support to check account balances or view other account related information. But at the interaction stage, consumers find two-way communication from service providers in dealing with their financial information during enquiries. As consumers conduct very sensitive functions and activities at the transaction stage, the direct impact of security on adoption is the prime issue. For all three stages of mobile banking service, initial trust is presumably formed by the conjoint effect of uncertainty of this virtual medium and technological security.

6.1 Limitations

As an exploratory study, this research is not without limitations. It has captured consumers' perception of a developing country only. For many issues of security and privacy, consumers of developed countries may differ significantly (Dwivedi et al., 2016; Shareef et al., 2014). Therefore, the study should be replicated among mobile banking users from developed countries. Nevertheless, this research is conducted based on the theoretical paradigm of GAM which was verified in Canada. Additionally, cultural issues and demographic variables are not used in the model of MBA-S, MBA-I, and MBA-T. Therefore, future research could incorporate the moderating effects of age, education, gender, income, and uncertainty avoidance characteristics to give a deeper insight.

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Appendices

Appendix 1: Scale items

Construct	Item
Perceived Awareness (PA)	1. I am aware of mobile banking service channel. 2. I know the benefits of using mobile banking service channel. 3. I have gone through educational/training programs about the overall features of mobile banking service channel.
Availability of Resources (AOR)	4. The Internet connection I use through my mobile phone is not costly. 5. I have adequate mobile connection to use mobile banking service channel from anywhere. 6. I always have access to a high-speed Internet connection from anywhere through mobile phone to use mobile banking service channel.
Mobile Computing-Self Efficacy (CSE)	7. I have qualifications to use mobile banking service channel through mobile phone. 8. I have qualifications to use mobile banking service channel through the Internet of mobile phone. 9. I have skills in using mobile banking service channel. 10. I am confident of using mobile banking service channel.
Perceived Image (PI)	11. People/business organizations who use mobile banking service channel to receive financial service have a high profile. 12. People/business organizations who use mobile banking service channel to receive financial service have more prestige than those who do not. 13. Interacting with mobile banking service channel to receive financial service enhances a person's/business organization's social status.
Perceived Ability to Use (PATU)	14. Learning to interact with mobile banking service channel is easy for me. 15. **It is easy to navigate mobile banking service channel. (dropped)** 16. Interactions with mobile banking service channel are clear and understandable. 17. I can easily do my tasks while using the mobile banking service channel.
Perceived Information Quality (PIQ)	18. Information provided at mobile banking service channel is up-to-date. 19. Information provided at mobile banking service channel is easy to understand. 20. Mobile banking service channel provides all relevant information necessary to fulfill my needs. 21. **Mobile banking service channel provides accurate information about the services it provides.(dropped)** 22. Mobile banking service channel provides information sequentially and systematically.
Multilingual Option (MLO)	23. **Availability of native language (Mother Tongue) option on mobile banking service channel could help to perform tasks better. (dropped)** 24. Availability of native language (Mother Tongue) option on mobile banking service channel could make performing tasks easier. 25. Without getting the native language option (Mother Tongue), I cannot perform my tasks on mobile banking service channel. 26. Without getting the native language option (Mother Tongue), I cannot understand my tasks on mobile banking service channel.

Construct	Item
Perceived Functional Benefit (PFB)	27. It is important to use mobile banking service channel from anywhere convenient for me. 28. It is important to use mobile banking service channel at any time convenient for me. 29. Using mobile banking service channel is more costly in terms of the service it provides than using physical teller service of the bank. 30. **It does not take too much time to seek service from mobile banking service channel, as compared to traditional teller service of the bank. (dropped)** 31. Using mobile banking service channel enhances overall efficiency of my desired financial tasks. 32. **Using mobile banking service channel improves the quality of decision-making. (dropped)**
Perceived Trust (PT)	33. Mobile banking service channel is overall reliable. 34. Service through mobile banking channel is guaranteed. 35. The bank takes full responsibility for any type of insecurity during operation at mobile banking service channel. 36. Legal and technological policies of the bank adequately protect me from problems on mobile banking service channel.
Perceived Uncertainty (PU)	37. Interaction with mobile banking service channel is unmanageable due to the absence of direct personnel. 38. Interaction in the virtual environment is uncomfortable. 39. Outcome from the interaction with mobile banking service channel is uncertain due to the absence of direct personnel.
Perceived Security (PS)	40. Mobile banking service channel is safe to interact with for financial purposes. 41. Mobile banking service channel protects information about my account information. 42. Mobile banking service channel does not share my personal information with other sites.

Appendix 2:Scale items for dependent variable

Construct	Item	Stage description
Adoption at Static Stage (MBA-S)	43. To view/search **account related information**, I use mobile banking service channel 44. To download **forms for account related functions as the user requires,** I use mobile banking service channel 45. To view/search **account related information**, I like to use mobile banking service channel in future. 46. To download **forms for account related functions as the user requires,** I like to use mobile banking service channel in future.	Decision to accept and use mobile banking service channel to check account balance, account status, and account transaction, to view/search account and investment related information and interest rates, and/or download forms for account related functions as the user requires with the positive perception of receiving a competitive advantage.
Adoption at Interaction Stage (MBA-I)	47. To **contact/make query/e-mail**, I use mobile banking service channel. 48. To **contact/make query/e-mail**, I like to use mobile banking service channel in future. 49. To **get customer service**, I use mobile banking service channel. 50. To **get customer service**, I like to use mobile banking service channel in future.	Decision to accept and use mobile banking service channel to interact with and seek customer services for queries for different financial reasons as the user requires with the positive perception of receiving a competitive advantage.
Adoption at Transaction Stage (MBA-T)	51. To **transfer money from one account to another**, I use mobile banking service channel. 52. To **transfer money from one account to another**, I like to use mobile banking service channel. 53. To **pay bills as the user requires**, I use mobile banking service channel. 54. To **pay bills as the user requires**, I like to use mobile banking service channel.	Decision to accept and use mobile banking service channel to transact to transfer money from one account to another and/or pay bills as the user requires with the positive perception of receiving a competitive advantage

Appendix 3: Correlation Matrix

PA	AOR	CSE	PI	PATU	PIQ	PS	PFB	PT	PU	MLO	MBA_S	MBA_I	MBA_T
1													
.334	1												
-.270	-.150	1											
-.023	-.075	-.083	1										
.302	.129	-.134	.061	1									
.258	.497	-.036	-.048	.062	1								
.265	.203	-.152	.223	.433	-.040	1							
.333	.193	-.140	.050	.312	-.078	.355	1						
.201	.086	-.164	.126	.321	-.056	.510	.335	1					
-.174	-.285	-.035	.059	.049	-.170	-.050	-.202	-.202	1				
.014	-.025	.014	.112	-.139	-.134	.027	.078	.071	.074	1			
.435	.270	-.247	.110	.386	.189	.380	.460	.377	-.180	.040	1		
.254	.325	-.083	.036	.285	.462	.133	.224	.129	-.187	-.065	.237	1	
.256	.119	-.178	.120	.607	-.007	.588	.452	.339	-.015	.015	.386	.169	1