PLS-SEM Based Analysis of Customer Satisfaction of Mobile Banking in Bangladesh: A Study on Users' Perspective

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Abstract

In the present world of information technology and competitive business environment, the cell phone based mobile banking service is considered as one of the most value added multidimensional business events in the banking industry. Because of the fastest growing number of mobile banking users in Bangladesh, the banking companies have enormous opportunities to capture market share by properly adopted the critical aspect of customer satisfaction. This paper focuses on general users of mobile banking. The objectives of this study are to identify most influencing factors and determine how strongly these factors influence customer satisfaction and retaining in mobile banking. It is a quantitative research through self-administered questionnaire as primary data collection instrument. The hypotheses have been developed by reviewing existing literature and published articles as secondary data. 455 usable questionnaires were returned out of 550 questionnaires and these collected data were analyzed by Partial Least Square Structural Equation Model (PLS-SEM) with the use of Smart_PLS (V 327) to validate the model and test the hypothesis. The findings of the research exposed that convenience; expense and responsiveness have significant influence while security and relative advantage have insignificant influence on satisfaction. In spite of having some limitation, the research provides some practical implication for banks with better strategic perception to design mobile banking services to crop higher customer satisfaction.

Key Words: Convenience, Expense, Loyalty, Relative advantage, Responsiveness, Satisfaction, Security.

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Introduction

The development and adoption of information technology in financial sector have given banking services a new dimension in the 21st century. The banking industry has unsurprisingly changed itself for the provision of quick and quality customer services to the customer in the form of modern technology based banking facilities such as online banking, ATM service, mobile banking etc. Mobile banking is one of the most suitable banking services which create the opportunity to bring the people under the shade of banking services that were away from banking services before. Because of mobile banking, previously unbanked rural population can now enjoy various banking facilities like utility bill payment, fund transfer, shopping, cash withdrawal etc. Mobile banking makes banking available to everyone, everywhere, and every time irrespective of branch location and office hour. Simply mobile banking means leading banking transactions via a mobile device such as cell phone. Broadly, it is a multi-platform co-operation between mobile operators and banking industry that integrate mobile communication and electronic money to facilitate bank related various activities through a mobile phone. This mobile banking service is gaining popularity not only in developed countries but also in developing countries like Bangladesh with the rapid improvement of technology and increasing use of mobile phone.

Upward popularity of mobile banking creates a great opportunity for banking industry to enlarge their business, but it passes the challenges for marketers to satisfy and retain customers as well. Therefore, the critical understanding of customer satisfaction in mobile banking is now the demand of time. And also critical evaluation of factors that affect customer satisfaction in mobile banking and confirm retention is important for banking industry to take marketing strategies that will ensure present satisfaction and encourage new dimension for future customer satisfaction in mobile banking in Bangladesh.

Literature Review

With the incredible growth in mobile usage, mobile banking has become very familiar and popular to the customer for relaxed and tension-free banking activities. At the same time, bankers are also concerned to add new features and maintain current value added services in mobile banking. Therefore mobile banking is now a significant issue of research and already there exists many research studies regarding different aspects of mobile banking with special focus on customer satisfaction. Singh (2012) quantified mobile banking as an evolutionary step in banking sector of India where banks work together with mobile operators to offer latest banking service in variety of business field. Younus Z. and Zaman D. S. U. (2021) found that the adoption of mobile financial services had positive impact on the economic indicators in Pakistan. Glavee G. R. et al (2017) provided comprehensive insights which include the deciding factors affecting an individual's intention to adopt mobile banking services in Pakistan. Kahandawa & Wijayanayake (2014) said that the mobile banking creates a new platform in commercial transactions and this platform enables Sri Lankan business trading with minimum time and effort. Rapid transaction and easy access of mobile banking make banking activities convenient for Nepalese people (Shrestha, 2013). Yousuf and Wahab (2017) found the speed of mobile banking as the most significant advantage in Malaysian business sector.

Farah, M.F., Hasni, M.J.S. and Abbas, A.K. (2018) showed that most of the predictors of intention, including perceived value, performance expectancy, habit, social influence, effort expectancy, perceived risk and trust has significant influence on adoption of mobile banking in Pakistan. Laforet & Li, (2005) discovered that Chinese people were unwilling to use mobile banking in the initial stage due to security concern in spite of having various benefits. Achieng & Ingari (2015) showed in their study that cost is also a concerning issue along with security for Kenyan people to use of mobile banking.

Mattila (2003) said in the study that security and trustworthiness were most important factors but complexity, compatibility and relative advantage also had significant influence on the people of Finland for the adoption of mobile banking service. Author analyze the relation of five factors (complexity, reliability, relative advantage, compatibly and accessibility) with customers

attitude towards mobile banking and finally find out that relative advantage was the most significant predictors of adoption of mobile banking. Aldiabat K. et. al. (2019) stated that supportive access factor of mobile banking is associated with the user satisfaction related to mobile banking in Jordan. Glavee G. R. et al (2017) found that perceived behavioral control (PBC) has significantly stronger effect on mobile banking adoption intention. Bhatt (2016) found time effectiveness, convenience, safety; responsiveness and simplicity had significant influence on customer's adoption and satisfaction in mobile banking in India. Younus Z. and Zaman D. S. U. (2021) indicated that the perceived trust, convenience and perceived risk had a significant influence on the adoption of mobile banking services but perceived cost and reliability were said to have insignificant influence on its adoption.

Shaikh S. et al (2018) stated that cost efficiency, easiness and security have significant impact on customer E-Satisfaction. But, cost efficiency and security are in negative or inversely in relation although easiness factor is in positive relation. Ravichandran & Madana (2016) used the SPSS V21 and argued that usefulness, perceived risk, and compatibly significantly influence people but social influence and literature have little impact on customer satisfaction in mobile banking in Sri Lanka. Almost same result reveals in a research carried out by Cheah et al (2011) in Malaysia in 2011 and they found out that significant factors influenced mobile banking adoption. They used Technology Acceptance Model (TAM) and found usefulness, relative advantage, ease of use and innovativeness had positive influence but risk had negative influence and social norms had no role in this case. The traditional TAM model suggests security, facilitating condition and performance expectancy can satisfy a customer in mobile banking in Thailand (Boonsiritomachai & Pitachyadejanant, 2017). Leiva et al (2017) identified that adopting an extended TAM, Structural equation Model (SEM) analysis reveals usefulness, trust, easiness and relative advantage as main influencing factor in Spain for mobile banking adoption.

Mobile banking in Bangladesh is now very popular and is also gaining more popularity day by day like other countries. The following table shows an increasing trend on users of both mobile phone and mobile banking.

Table-1: Use of mobile phone and mobile banking

	Nov, 19	Oct, 19	Sep, 19	Aug, 19	July, 19
The total number of Mobile Phone subscribers (in millions)	164.832	164.170	163.415	162.583	162.117
No. of registered clients in mobile banking (in millions)	78.594	77.3.95	75.978	73.585	73.091
No. of daily average transaction	7,680,771	7,330,541	7,078,839	6,587,757	7,335,807
Average daily transaction (in crore BDT)	1,263.96	1,218.15	1,181.11	1,145.57	1,208.95

Source: Bangladesh Bank and Bangladesh Telecommunication Regulatory Commission (BTRC)

There are some research conducted on mobile banking and most of the researches are about implementation, prospect and challenges of mobile banking in Bangladesh. Bhuiyan M.S.R. and Rahman M.M. (2013) showed that tremendous potential for mobile banking in Bangladesh and reveal some of the key barriers to progress as well. Hossain M.A. and Haque M. Z. (2014) found some challenges which might hinder mobile banking implementation in Bangladesh such as technical and security standards, regulatory and supervisory issues and business and legal issues. On the other hand, Kabir (2013) find out that easy use, usefulness, trust and relative advantage positively influenced and risk negatively influenced mobile banking adoption in Bangladesh. By conducting a quantitative research only 2nd generation bank, Jannat and Ahmed (2015) identified ineffective advertisement as negatively influencing factor of mobile banking.

Although mobile banking is an emerging issue in Bangladesh, a few literature scan be found in this field. No significant research was found in existing literature about the measurement of customer satisfaction and loyalty. In addition, TAM and SPSS have been used as statistical tool at present in almost all research in this filed. The Smart PLS is now most popular and accurate tool for determining customer satisfaction at detailed factor analysis. So this study is an attempt to make up the gap of use of modern statistical tool for determining factors and enrich the present literature by measuring which factor/s strongly influence customer satisfaction and loyalty in mobile banking in Bangladesh.

Customer Satisfaction Relating to Mobile Banking

Customer satisfaction is a measurement that determines how well a company's products or services meet customer expectations. Customer satisfaction is a measure of how people feel when interacting with the brand. It can be influenced by any number of factors. Customer satisfaction is known as a result of service quality, which implies that it is identified with the nature of the items administrations gave to the client in a positive way (Yeo, Thai, & Roh, 2015).

Mobile Banking is a technique of providing facilities to a consumer to carry out banking transactions on the mobile phone through a data service-provider. On the other hand, mobile banking refers to a system that enables bank customers to access their accounts and general information on bank products and services through mobile devices. Banks need to provide services to their customers whenever they require it and wherever they are. Bank now call this facility as "Anywhere and any moment banking". Banks can provide these facilities through mobile banking.

More than 70% of the population of Bangladesh lives in rural areas where access to formal financial services is difficult. However, these are the people who are in most need of receiving funds from loved ones in distant locations, or to access financial tools to improve their economic condition. Less than 15% of Bangladeshis are connected to the formal banking system whereas over 68% have mobile phones. These phones are not merely devices for talking, but can be used for more useful and sophisticated processing tasks. In this study, Bank-led Mobile Financial Service Provider is also considered who are operating under the license and approval of the Central Bank (Bangladesh Bank) as a

subsidiary of various banks in Bangladesh such as bKash, Upay, Rocket etc. Bank-led Mobile Financial Service Provider provides safe, convenient and easy ways to make payments and money transfer services via mobile phones to both the unbanked and the banked people of Bangladesh.

Research Objectives

The following objectives have been developed for the study by reviewing the above mentioned literature:

1. To identify the factors which affect customer satisfaction of mobile banking.
2. To examine the significance of each factor in Bangladesh perspective.
3. To measure how the factors strongly influence customer satisfaction in Bangladesh.
4. To discover the relation between satisfaction and loyalty in case of mobile banking.

Research Methodology

1. Conceptual Mode and Hypothesis Development

Partial Least Square Structural Equation Model (PLS-SEM) is used for evaluating the factors affecting customer satisfaction. A conceptual model has been designed that expressed the relationship between endogenous and exogenous latent variables. There are 16 factors that have been confirmed based on existing above literature for SEM technique model and these 16 factors have been categorized into five groups namely convenience, security, relative advantage, expense and responsiveness. These five groups of factors are called exogenous latent variable. Satisfaction and loyalty are the endogenous variables each of which consists of three indicators (presented in appendix-1).

For a long duration customer satisfaction is the focal point of marketing research. *Customer satisfaction* indicates positive and happy feelings of a consumer after consuming the product or service (Kheng et al, 2010). Yussoff N. M. & Nayan S.M. (2020) said in their research that customer satisfaction is important because it shows whether the business is accepted by the market or

not. Kotler and Keller (2009) defined customer satisfaction as a person's feeling of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his/her expectations. The customer satisfaction is treated as the necessary premise for the retention of customers. Lam & Burton (2006) identified satisfaction as the main determinants of loyalty. Yussoff N. M. & Nayan S.M. (2020) showed that customer is loyal to a particular brand because they received good products and services from the company. Customer's loyalty is measuredas a significant intangible asset for various companies (Jiang and Zhang, 2016). Customer's loyalty is viewed as a long-term asset (Kandampully et al., 2015). Actually *loyalty* is the degree to which a customer exhibits repeated purchasing behavior from the vendor (Kotler et al, 1999). So, like many other services in case of mobile banking, customer loyalty is also associated with customer satisfaction in Bangladesh.

H_1: satisfaction influence loyalty.

Chikomo K. et al (2006) stated that mobile banking is attractive because it is a convenient approach to perform remote banking. Conveyance is the extent to which mobile banking can serve user's needs. It may include ease of use, usefulness etc. (Kabir, 2013). The results indicated that access convenience, transaction convenience, benefit convenience, and post-benefit convenience have a crucial impact on m-banking adoption intention (Jebarajakirthy C. and Shankar A. 2021).

H_2: Convenience influence satisfaction

Users of mobile banking considered the amount of cost or expenses associated with this transaction. Liza F.Y. (2014) found that customers will consider adopting mobile banking for long but cost is the most critical factor. Costs of mobile banking include bank charge, transaction fee, mobile network charge etc. (Achieng & Ingari, 2015). Although mobile banking requires some transaction cost, it may reduce transportation cost. Sometimes, it is helpful to reduce total cost by providing the facility of utility bill payment, discount on shopping, discount on restaurant bill etc. Cost or expense is an important consideration for people in a developing country.

H_3: Expense influence satisfaction

Security is the vibrant issue to customer for virtual transaction. Chikomo K. et al (2006) proposed that security problems can be solved to provide secure and economic communications between the mobile application and the bank servers. The proposed solutions allow the users to bank using secure SMS and GPRS. Wodo W. et al (2021) stated that the security problem can be solved not only in technical areas, but also at the level of awareness and habits of their users. Ghosh and Barua (2014) defined security as the safety and protection of information. But in practice not only information but also monetary issue is closely related with security because of fraud and hacking (Kabir, 2013). Security will ensure assurance. So, assurance should have positive impact on satisfaction.

H_4: Security influence satisfaction

A product's degree of superiority and attractiveness to customers is called the relative advantage. Relative advantage is the degree to which the innovation is observed by users to be better than the existing idea; i.e. perceived cost and benefits (Rogers, 2003). Suleiman (2015) indicate that perceived benefits include 'direct benefits' similar education in transaction costs and transaction errors, improved data accurateness and faster proffering process. Relative advantage means comparative benefits that a user gets from mobile banking. This benefit can be expressed by social prestige, savings in time etc. (Mattila, 2003). Relative advantages have positive relation with any service quality and satisfaction.

H_5: Relative advantages influence satisfaction

Responsiveness is the customer's perception of receiving help when needed (Achieng & Ingari, 2015). Responsiveness creates close satisfying relationship. Immediate response from mobile operator and bank or agent can be an important influencing factor in customer satisfaction.

H_6: Responsiveness influence satisfaction

2. Data Collection

The quantitative research approach has been used in this study. Both primary and secondary data were collected for this research. A self-administered questionnaire has been developed from the literature for collecting primary data. The questionnaire contain twenty two questions which were measured by five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sources of secondary data include website, internet, different working papers and published articles. Secondary data were analyzed to find out research gap and variables for the study. Analysis of secondary data also enriches literature review.

3. Population and Sample

The population of this study is the users of mobile banking services for who are living in Chittagong of Bangladesh. The convenient sampling technique is used to select potential participants for this study. The age range of respondents is 20 to 55 years old. 550 questionnaire had been distributed to respondents. The valid respondents were 455 covering 83% of original sample. A study of mobile banking has been conducted on 400 respondents who are living in Bangkok (Tan B. et. al 2020). Another study of mobile banking is conducted in Pakistan on 250 respondents to get their ideas on mobile banking services (Younus, Z., Zaman D. S. U. 2021). Glavee-Geo R. et al (2017) a survey approach was used with a sample of 189 responses from across Pakistan. Multi-group analysis was performed in order to detect gender differences among men and women in the process of adopting m-banking.

4. Research Tool

Partial Least Square Structural Equation Model (PLS-SEM) has been used for calculating the effect of observed variables and their indicators on satisfaction and loyalty. Data analysis has been done through Smart_PLS, Version-3.2.7.

Smart_PLS is a prominent software application for PLS-SEM which was initially developed by Ringle, Wende & Will (2005). SEM consists of two sub model; one is outer model that specifies the relationship between latent variable and their manifest variables and another one is inner model which specifies the relationship between endogenous (dependent) and exogenous (independent) latent variable.

Data Analysis and Interpretation

PLS-SEM is analyzed and evaluated in a systematic process which consists of two stages-Outer measurement model analysis and Inner structural model analysis. The analysis of outer model involves determining indicator reliability, internal consistency, discriminant validity, and convergent validity (Petera et al, 2017).

Indicator reliability is the square value of outer loading of the items (Wong, 2013). This reliability defines the percentage of variance extracted from the indicators (Hair et al, 2017).The result of indicator reliability of 0.70 or higher is preferable **(**Hussain, 2018**)** and greater than or equal to 0.5 is acceptable (Wong, 2013) but for exploratory research 0.4 can be accepted (Hulland, 1999). The result of indicators reliability of this study is presented in the following table (table-2).

To measure Internal Consistency, Cronbach's Alpha is traditionally used but literatures suggest that using composite reliability can be the best substitute in this regard (Bagozzi & Yi, 1988; Hair et al, 2012; Wong, 2013). Composite reliability should be 0.7 or higher. If it is an exploratory research, 0.6 or higher is acceptable (Bagozzi and Yi, 1988). The result of composite reliability for internal consistency of this study is presented in the following table (table-2).

Table-2: Result Summery of Outer Measurement Model

Latent Variable	Indicators	Outer Loading	Indicator Reliability = (Loading)2	Composite Reliability	Convergent Validity=AVE
Convenience	conv-1	0.793	0.629	0.878	0.592
	conv-2	0.721	0.520		
	conv-3	0.791	0.626		
	conv-4	0.706	0.500		
	conv-5	0.828	0.685		
Expense	Exp-1	0.801	0.642	0.863	0.677
	Exp-2	0.838	0.702		
	Exp-3	0.829	0.687		
Loyalty	Loyal-1	0.705	0.510	0.767	0.523
	Loyal-2	0.703	0.500		
	Loyal-3	0.760	0.578		
Relative advantage	R-Adv-1	0.811	0.658	0.876	0.702
	R-Adv-2	0.847	0.717		
	R-Adv-3	0.855	0.731		
Responsiveness	Res-1	0.780	0.608	0.825	0.611
	Res-2	0.768	0.590		
	Res-3	0.796	0.634		
Satisfaction	Sat-1	0.790	0.624	0.845	0.645
	Sat-2	0.786	0.618		
	Sat-3	0.833	0.694		
Security	Sec-1	0.874	0.764	0.869	0.768
	Sec-2	0.878	0.770		

Average Variable Extracted (AVE) is used to check convergent validity and according to the rules of thumb, the minimum acceptable value is greater than 0.5 in order to confirm convergent validity. Table-2 presents values of AVE of this study.

The table-02 shows that, it can be seen that all the indicators have individual indicator reliability values that are much larger than the minimum acceptable level of 0.4 and close to the preferred level of 0.70. The table-02 also shows a higher level of internal consistency among all five reflective latent variables as all the values are larger than the minimum threshold level of 0.7. Again from table-02, it is found that all of the AVE values are greater than the acceptable threshold of 0.50 and so convergent validity is confirmed.

According to Fornell and Larcker (1981) criterion, the square root of AVE of each latent variable should be greater than the variables correlation with any other variables in the model to ensure discriminant validity. Another discriminant method is cross loading of the indicators outer loading. All loadings of a variable on its assigned variables must be higher than all other cross loadings of other variables. This study ensures validity in both measures (Table-3 & Appendix- 3).

Table-3: Fornell-Larcker Criterion Analysis for Checking Discriminant Validity

	Conveyance	Expense	Loyalty	Relative Advantage	Responsiveness	Satisfaction	Security
Conveyance	**0.769**						
Expense	0.685	**0.823**					
Loyalty	0.634	0.588	**0.723**				
Relative Advantage	0.583	0.549	0.559	**0.838**			
Responsiveness	0.677	0.622	0.613	0.566	**0.781**		
Satisfaction	0.824	0.746	0.695	0.710	0.777	**0.803**	
Security	0.692	0.605	0.597	0.597	0.652	0.784	**0.876**

From the above table-03, the latent variable Conveyance's AVE is found 0.592 (from table-02) hence its square root becomes 0.769. This number is larger than the correlation values in the column of Conveyance and also larger than those in the row of Conveyance. It is found that the square root value of AVE of Expense, Loyalty, Relative Advantage, Responsiveness, Satisfaction and Security are larger than the correlation values in their respective columns and also larger than those in their respective rows.

Subsequently analyzing the measurement model and confirming reliability, consistency and validity, the next step is to analyze the inner structural model which includes measurement of path coefficient, explanation of endogenous variables variance (R^2), multi-collinearity check (VIF) and Measurement of effect size (f^2).

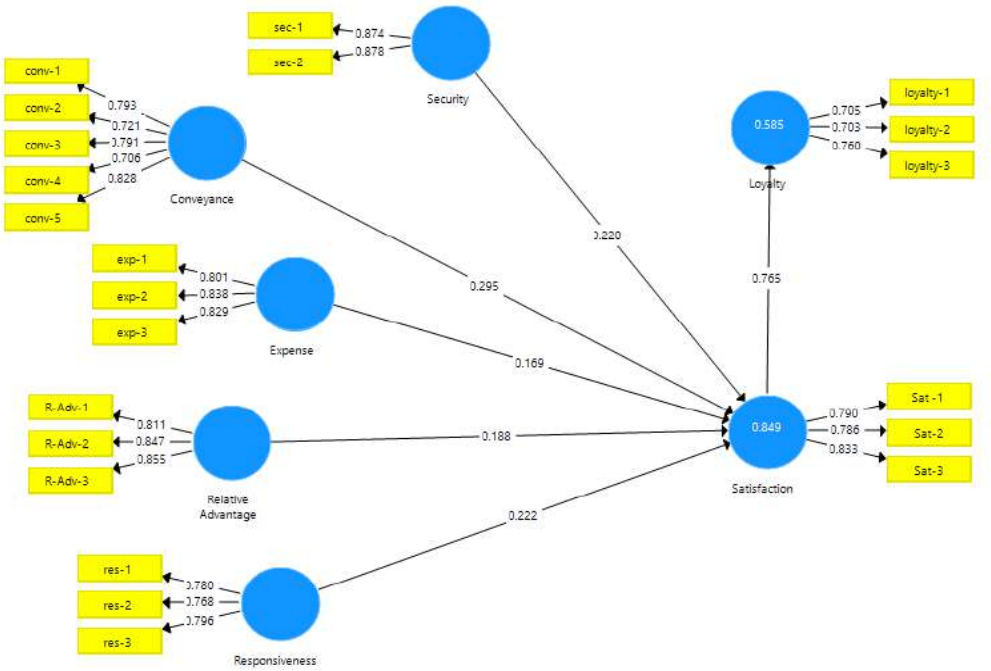
The basic criteria for evaluating the structural model in PLS-SEM are the measurement of significance of path co-efficient. The inner model suggest that convenience has the strongest effect on satisfaction (0.295) followed by responsiveness (0.222), security (0.220), relative advantage (0.188) and expense (0.169). The path coefficient of satisfaction to loyalty in this model is 0.765 and it indicates the most significant relation between them (Figure-1). The alternative way to test the significance of structural path under PLS_SEM is the bootstrap procedure using *t statistics*. As per rules of thumb, the value of t test is significant if it is higher than 1.96 at 5% level of significance for two tailed test. If *P* value is considered, it must be smaller than 0.05 at 5% level of significance (Wong, 2013). In this model the following table (table-4) confirms the significance of all hypothesized path except the relation between relative advantage and satisfaction.

Table-4: Path co efficient

Relationship	t statistics	P value
Convenience Satisfaction ⟶	3.551	0.000
Expense Satisfaction ⟶	2.061	0.040
Relative Advantage Satisfaction ⟶	1.503	0.134
Responsiveness Satisfaction ⟶	2.453	0.015
Satisfaction Loyalty ⟶	8.928	0.000
Security Satisfaction ⟶	3.034	0.003

After reviewing table-4 of the path coefficient for the inner model, all of the *T*-Statistics are larger than 1.96 except relation of relative advantage and all of the P values are smaller than 0.05 except relation of relative advantage. Therefore, all factors have significant influence on satisfaction except relative advantage and satisfaction has significant influence on loyalty.

The amount of variance in endogenous variable explained by the exogenous variables linked to it is termed as coefficient of determination (R^2). It is the measure of predictive value of the model. In this study the value of R^2 is 0.849 for customer satisfaction and 0.585 for loyalty. It means five independent variables substantially explain 84.9% variance in the satisfaction but satisfaction and responsiveness together can change only 58.5% of loyalty. According to Wong (2013), R^2=0.75 is substantial, R^2=0.50 is moderate and R^2=0.25 is weak. So, this study indicates a substantial and moderate variance of satisfaction and loyalty respectively (figure-1).



A detailed PLS_SEM analysis includes multi-collinearity assessment. As the rules of thumb, the Variance Inflation Factor (VIF) need to have a value of 5 or less in order to avoid potential collinearity problem (Hair et al, 2011). Since the VIF values of all the indicators are less than five (Apendix-2), it confirms that there is no issue of multi-collinearity problemin this model.

Effect size (f^2) is the measurement of contribution of an exogenous variable to the endogenous variables R^2 value. The effect size helps to assess the overall contribution of a research study (Hussain et al, 2018). According to Barclay (1995), the f^2 value of 0.35 indicates very strong effect, 0.15 means moderate effect and 0.02 means weak effect. Table-5 shows a moderate effect of convenience, responsiveness, security and relative advantage and weak effect of expense on customer satisfaction. In case of loyalty, satisfactions effect is very strong.

Table-5: Value of f^2

	Convenience	Expense	Loyalty	Relative Advantage	Responsiveness	Satisfaction	Security
Convenience						0.212	
Expense						0.087	
Loyalty							
Relative Advantage						0.129	
Responsiveness						0.144	
Satisfaction			0.407				
Security						0.135	

Findings and Managerial Implementation

On the basis of the above analysis and their interpretation, the following table is prepared as the result of the study.

Table-6: Results of Hypothesis

Hypothesis	Path coefficient		Support
	t test	P value	
H_1: Satisfaction influence loyalty	8.928	0.000	Yes
H_2: Convenience influence satisfaction	3.551	0.000	Yes
H_3: Expense influence satisfaction	2.061	0.040	Yes
H_4: Security influence satisfaction	3.034	0.003	Yes
H_5: Relative advantages influence satisfaction	1.503	0.134	No
H_6: Responsiveness influence satisfaction	2.453	0.015	Yes

From the study it is clear that, satisfaction has strong influence on loyalty in mobile banking in Bangladesh. There are several factors that influence the satisfaction of users of the country in the use of mobile banking. Among those factors, the most influencing factor is convenience. Although this factor does not directly influence loyalty, it has significant influence on satisfaction. General users of mobile banking usually use mobile banking for easy accessible and function; reduced physical and mental effort and continuous update etc. That is why, convenience is the main concern for them in case of satisfaction.

The second strong affecting factor is security. Now-a-days, security is a crucial pillar of mobile banking. In order to ensure more security, mobile banking providers can properly train up their agent or staff and to update security network service. Mobile banking service basically provides their service through virtually or digitally. To survive in the competitive market, banks need to give deep attention to customers demand, their requirement, their choice and have to provide prompt security service in case of any cyber-attack.

The third strongest factor is Responsiveness. Mobile banking is gaining continuous popularity because of customer care, available agents and prompt correction of error and 24/7 service. So, banking is available at every time.

Expense and relative advantage are comparatively weak factors because their relation with satisfaction is insignificant. The f^2 value shows these factors have weak effect on the variance of satisfaction. It means customer satisfaction from mobile banking is not much fluctuating for these two factors. There might be several reasons behind this.

Limitation and Future Research Direction

This research focuses only on five independent factors. But there might be many other factors that can influence customer satisfaction. Moreover, this study does not analyze demographic factors such as, gender, age, generation wise, race etc. that may have relation with mobile banking adoption and satisfaction. The study can be done on target customer such as, college students, university students etc. in future. Therefore, this phenomenon requires investigation on a wide scale.

Conclusion

Mobile banking and bank led financial service is a banking process without bank branch which provides financial services to banked and unbanked communities efficiently and at affordable cost. It provides banking and financial services, such as cash-in, cash out, merchant payment, utility payment, salary disbursement, foreign remittance, government allowance disbursement, ATM money withdrawal through mobile technology devices as per need of customer satisfaction. This study tries to identify the factors that influence satisfaction of users or customers of mobile banking service. The result reveals that convenience, security and responsiveness strongly influence customer satisfaction but expense and relative advantage are the insignificant factors in this regard. With some limitation, this study provides valuable knowledge and information to the banks, bank led financial service provider, software engineer to design their product with respect to the factors that have influence on satisfaction & loyalty and implement mobile banking service in such a way that will result in more customer satisfaction and loyalty. A densely populated country like Bangladesh is now a good market for mobile banking because of large number of smart phone users. The mobile phone access rate in this country is one of the highest in Asia after China and India. So, with proper guideline and security policy, mobile banking will be leader of e-payment system in Bangladesh as well as in the world.

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Appendix-1: Primary List of Factors

Code	Factors	Reference
Sec-1	Monetary safety	Laforet & Li, 2005, Boonsiritomachai & Pitachyadejanant, 2017; Achieng & Ingari, 2015
Sec-2	Safety of personal information	Ghosh and Barua, 2014; Achieng & Ingari, 2015; Kabir, 2013
Exp-1	Transaction fee	Achieng & Ingari, 2015
Exp-2	Transportation cost	Jannat & Ahmed, 2015
Exp-3	discount	Focus group
R-Adv-1	Time savings	Kabir, 2013
R-Adv-2	Social image	Mattila, 2003
R-Adv-3	Retrieval of account balance and history.	Kahandawa &Wijayanayake, 2014
Res-1	Customer care	Ghosh and Barua,2014
Res-2	Agent and helpline	BB & DU, 2017
Res-3	Prompt correction of error	BB & DU, 2017
Conv-1	Accessibility	Islam &Himel,2015
Conv-2	Continuous update	Boonsiritomachai & Pitachyadejanant, 2017

Conv-3	Reduce physical and mental effort	Achieng & Ingari, 2015
Conv-4	Easy function	Jannat & Ahmed,2015
Conv-5	Proper instruction	Leiva et al, 2017
Sat-1	Choice preference	Ghosh and Barua,2014
Sat-2	Pleased feelings	Islam & Himel, 2015; Kheng et al, 2010).
Sat-3	Satisfying experience	Kabir, 2013
Loyal-1	Continuity	Lam & Burton, 2006
Loyal-2	Objection	Ghosh and Barua, 2014
Loyal-3	Recommend	Wong, 2013

Apendix-2: Variance Inflation Factor (VIF)

Items	VIF
Rel-Adv-1	1.527
Rel-Adv-2	1.695
Rel-Adv-3	1.823
Sat-1	1.451
Sat-2	1.369
Sat-3	1.477
Conv-1	1.731
Conv-2	1.508
Conv-3	2.014
Conv-4	1.471
Conv-5	2.306
Exp-1	1.521
Exp-2	1.650
Exp-3	1.492
Loyalty-1	1.137
Loyalty-2	1.165
Loyalty-3	1.141
Res-1	1.334
Res-2	1.307
Res-3	1.331
Sec-1	1.403
Sec-2	1.403

Appendix-3: Cross Loading

	Convenience	Expense	Loyalty	Rel-Adv	Responsiveness	Satisfaction	Security
Rel-Adv-1	0.522	0.342	0.404	**0.811**	0.468	0.583	0.481
Rel-Adv-2	0.489	0559	0.509	**0.847**	0.466	0.622	0.478
Rel-Adv-3	0.454	0.473	0.490	**0.855**	0.488	0.579	0.543
Sat-1	0.695	0.542	0.500	0.583	0.598	**0.790**	0.597
Sat-2	0.602	0.559	0.662	0.555	0.613	**0.786**	0.518
Sat-3	0.690	0.687	0.669	0.576	0.659	**0.833**	0.761
Conv-1	**0.793**	0.571	0.562	0.496	0.638	0.733	0.637
Conv-2	**0.721**	0.519	0.555	0.568	0.519	0.591	0.451
Conv-3	**0.791**	0.476	0.430	0.414	0.492	0.627	0.525
Conv-4	**0.706**	0.455	0.413	0.352	0.419	0.552	0.482
Conv-5	**0.828**	0.601	0.467	0.405	0.509	0.644	0.546
Exp-1	0.562	**0.801**	0.456	0.488	0.542	0.568	0.486
Exp-2	0.580	**0.838**	0.458	0.435	0.488	0.603	0.481
Exp-3	0.551	**0.829**	0.532	0.437	0.508	0.664	0.524
Loyalty-1	0.448	0.395	**0.705**	0.442	0.492	0.534	0.513

Loyalty-2	0.381	0.361	**0.703**	0.397	0.275	0.495	0.352
Loyalty-3	0.531	0.505	**0.760**	0.381	0.540	0.619	0.520
Res-1	0.539	0.410	0.494	0.424	**0.780**	0.595	0.441
Res-2	0.492	0.553	0.458	0.454	**0.768**	0.587	0.516
Res-3	0.553	0.495	0.486	0.448	**0.796**	0.638	0.567
Sec-1	0.597	0.543	0.550	0.521	0.530	0.682	**0.874**
Sec-2	0.616	0.518	0.579	0.525	0.612	0.692	**0.878**