

Prospects and Challenges of Mobile Banking in Bangladesh

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Abstract: *Mobile banking is a subset of electronic banking which underlies not only the determinants of the banking business but also the special conditions of mobile commerce. Mobile banking (m-banking) is one of the emerging financial innovations introduced by financial service providers. This study evaluates the customer's perspective of the adoption of m-banking in Bangladesh. Questionnaires were administered to customers of banks to obtain their perspective on m-banking. A sample of 50 customers selected at random was employed for this study. The customer's perception was found to be overwhelmingly positive. The most appreciated feature was ubiquity and the overview over bank account. Fast reaction to market developments often cited as one of the most attractive feature of mobile banking did not find high appreciation. Several factors including technical and security standards, regulatory and supervisory issues and business and legal issues were found to be the main factors that might hinder mobile banking implementation in Bangladesh. Connectivity and secure communication platform and encrypted messaging system were found to be the factors that would enhance mobile banking implementation in Bangladesh.*

Keywords: *m-banking, e-banking, short message service (SMS), M-Pin, IT, PIN, ATM*

1.0 Introduction

Technological innovations contribute to improvement in performance of the distribution channels of banks and innovations in banking sector with use of electronic delivery channels are collectively referred to as electronic banking (Goi, 2005). Electronic Commerce is now thought to hold the promise of a new commercial revolution by offering an inexpensive and direct way to exchange information and to sell or buy products and services. The evolution of banking technology has been driven by changes in distribution channels as evidenced by automated teller machine (ATM), phone-banking, telebanking, PC-banking and most recently, internet banking (Chang, 2003;

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Gallup Consulting, 2008) This has set in motion a revolution in the banking sector for the provision of a payment system that is compatible with the demands of the electronic marketplace (Journal of Internet Banking and Commerce, 2008). The abundance of cellular communication has promoted the idea of transactions using mobile phones without the need of internet connectivity at the user level (Foomany et al., 2009; Yuan & Yu, 2009). The SMS based mobile banking approach is very prospective one because of the low costs and bandwidth requirements, simplicity, straightforwardness and easiness involved (Soong et al., 1987) The introduction of Automated Teller Machines (ATMs) was considered as the first and most visible piece of evidence of the emerging electronic banking in Bangladesh (Abor, 2008). This was then followed by the introduction of telebanking, PC-banking and internet-banking. The next imminent step in this evolutionary process inevitably appears to be mobile banking (M-banking). The use of a mobile phone to conduct payment and banking transactions is at an early stage in a number of developing countries. Because mobile banking uses the existing rapidly expanding mobile phone infrastructure, it has the potential to be deployed rapidly and affordably to expand access to financial services among unbanked people. Access to financial services is one of the necessary ingredients to fight poverty (Otabil, 2008).

The term “SMS Banking” refers to the provision and a ailment of banking and financial services via means of text messaging service, known as SMS. SMS banking services are availed via text messages that are carried by SMS. The customer sends a customized SMS to the bank with predefined commands for each offered service. The server of the banks receives the SMS, decodes the commands and executes the instructions, if the request is found to be authorized. The authentication is carried out with the help of a special Mobile Banking Personal Identification Number (MPIN). Furthermore, the requests are only accepted from a mobile phone number that has been registered as authorized number for operating that particular bank account. This service uses “account keys” instead of account numbers so that the number does not need to be typed in and remains confidential (Citibank Philippines, 2005).

The banking sector in Bangladesh is skill not very developed and only 13% of the total population of around 160 million people in Bangladesh have bank accounts.

In the opinion of mangers of Dutch Bangla Bank, the m-banking education service is limited across the country and a lot more of their customers may be willing to change the traditional banking way of queuing in banking halls to avail of the convenience of mobile banking services.

Mainly the banks provide Push/Pull services. Push services are free of charge which banks provide to all SMS banking account holder customers regularly and Pull services

are on request services which are rendered by banks at normal SMS charge rate. SMS banking service includes: balance inquiry, cheque book request, cheque leaf status, foreign currency rate, cheque stop payment instruction, statement request by courier/post, statement request by e-mail, last three transaction statement, available limit of credit card, fund transfer request, PIN(Personal Identification Number) change, utility bill payment, cash deposit alert, help inquiry etc.

To get these SMS banking services, a bank account holder needs at first to sign-up for SMS banking and a mobile number. He is to fill-up an application form requesting PIN and send it to the IT division of the bank. After activation of his PIN, he will be able to get his desired services through SMS at his own prescribed cell number.

2.0 Literature Review

Mobile banking is usually defined as carrying out banking business with the help of mobile devices such as mobile phones or personal digital assistant(s) (PDAs) (Georgi & Pinkl, 2005)

Baten (2010) has analyzed economic prospects of e-banking and explained the present scenario of banking sector in Bangladesh and also tried to demonstrate the scope and benefits of e-banking compared with the existing system. He tried to present actual situation of e-banking in the marketing point of view in Bangladesh. The results of his study show that e-banking serves several advantages to Bangladeshi banking sector. The study also shows that the Bangladeshi customers do not have enough knowledge regarding e-banking rendered by banking sector in Bangladesh. Despite huge prospects, only a few banks adopted mobile banking in Bangladesh during the last few years. Avasthi and Sharma (2000 - 2001) point out that advances in technology are set to change the face of banking business, technology has transformed the delivery channels by banks in retail banking and the technology based services has impacted the markets of banks. The study also explored the challenges that banking industry and its regulator face. Bhasin (2001) analyzed the impact of IT on banking sector. It has transformed the repetitive and overlapping systems and procedures into simple single key pressing technology resulting in speed, accuracy and efficiency of conducting business and enabling them to enter into the new activities.

Uppal (2010) has analyzed the explosion of mobile banking in Indian banking industry where cell phone users are increasing at a very high rate. On the basis of analysis, he concluded that the private sector banks are on the top in providing the M-banking services to their customers and have high profitability as compared to other bank groups

under study except foreign banks. He also highlighted the benefits of m-banking to customers as well as to bankers and suggests some strategies with the requested actions like spreading awareness regarding m-banking and increasing its area and scope to enhance m-banking services in India, particularly in rural and semi-urban areas.

Husain (1988) also highlighted the importance of IT in various sectors. Various organizational, financial and functional problems are faced in the initial stages. Introduction of any new technology or system People are generally reluctant to accept new system, howsoever beneficial it may be. This aspect and many other issues, involved in computerization have been critically and vividly discussed.

According to Pathrose (2001), banking throughout the world is undergoing a rapid and radical transformation due to the all pervasive influence of IT and breath taking developments in the technology of telecommunications and electronic data processing. The winds of change are blowing in Bangladesh too. Rao (2002) analyzed the impact of new technology on banking sector. The technology is changing the way the business is done and opened new vistas for doing the same work differently in most cost effective manner. Tele-banking and internet banking are creating such opportunity that branch banking may give to home banking. Shastri (2001) analyzed the effect and challenges of new technology for banks. Technology has brought a sea of change in the functioning of the banks. The earlier manual system of preparing of vouchers and other activities is being replaced by automation thereby saving a lot of time and effort. The use of ATMs and introduction of e-banking network have significantly scenario.

Saxena (2000) also analyzed the importance of IT in the banking sector. According to him, the future promises are even more exciting, interesting and challenging. The internet has enabled us to talk to each customer individually, with different needs and requirements. The IT will affect the productivity and profitability of the banks.

Vageesh (2000) highly appreciated the new private sector banks which have adopted IT. The new private sector banks with their state-of-the-art technology and grandiose plans to make inroads into e-banking are now darlings of the stock markets. Banks like HDFC and ICICI are foraying into net banking offering great convenience to customers on one hand and results in lower transaction cost for the banks on the other hand.

Janki (2002) analyzed how technology is affecting the employees' productivity. He started that there is no doubt, technology to improve operating efficiency and customer

services in Bangladesh particularly public sector banks. Georgi and Pinkl (2005) defined Mobile Accounting as transaction-based banking services that revolve around a standard bank account and are conducted and/or availed by mobile devices. Wikipedia (2008) identified interoperability, security, scalability and reliability, application distribution, personalization as key challenges in developing a sophisticated mobile banking application.

Islam (2005) explained the present scenario of banking sectors in Bangladesh and at the same time he demonstrated the scope and benefits of E-banking compared with the existing system. Then a feasible proposal has been made by using partial utilization of the backbone network owned by Bangladesh Railway. He found out the efficiency, security of the proposed infrastructure under various situation. WAP is a non-proprietary (open), global standard that was introduced in its first version WAP 1.0 in 1998. It has been developed by the WAP Forum, a consortium of leading manufacturers of mobile phones including Ericsson, Motorola and Nokia (WAP-Forum, 2001).

However, there are several issues including the lack of adequate legal framework and security of mobile transactions which tend to hamper the continued progress of developing this sophisticated mobile banking application. Due to the issues raised in this section and the importance of mobile banking, it is important that a study is carried out to identify the prospects and challenges of mobile banking in a developing country like Bangladesh.

Research Gap

Although the literature on e-banking mobile banking is becoming rich very fast, so far, no comprehensive study has been undertaken regarding the prospects and challenges of mobile banking in Bangladesh. The present study is devoted to fulfill this gap and also to propose some suggestions for further development of mobile banking in the country.

3.0 Present Scenario of Mobile Banking in Bangladesh:

In Bangladesh, multinational banks are operating for long there is a significant number of nationalized, and private commercial banks and specialized banks. Multinational banks are said to offer better services than others. In order to improve performance, some banks have started mobile banking service.

Name of Banks	Mobile service operators
Brac Bank	GrameenPhone, Robi.
Dhaka Bank	GrameenPhone, Banglalink.
Bank Asia	GrameenPhone, Banglalink, Robi, TeleTalk.
Premier Bank	GrameenPhone, Citycell, Robi, TeleTalk.
Dutch-Bangla Bank	GrameenPhone, Citycell, Robi, TeleTalk.
Trust Bank	GrameenPhone.
Islami Bank	S.S.L. Wireless

In Bangladesh, three banks currently offer m-banking services. Bangladesh Bank has so far given approval to 10 private banks to introduce mobile-banking nationwide. Dutch-Bangla Bank Limited introduced m-banking services through mobile operators Banglalink and Citycell, primarily using these operators' retail outlets and agents. Islami Bank Bangladesh Limited entered into an agreement with Software Shop Limited Wireless to provide m-banking services to its existing customers. On 22 July 2011, BRAC Bank launched what it describes as Bangladesh's "first complete mobile financial service", offering mobile subscribers a range of banking and other financial services via their mobile phones, regardless of whether they have a bank account or not. The service is being offered through bKash Ltd, a subsidiary of BRAC, in partnership with mobile operator Robi (Axiata Bangladesh). By using Sybase 365 m-banking platform, DBBL can now reach the rural and unbanked population, of which 45% are mobile phone users. As mobile banking continues to progress in Bangladesh, DBBL with Sybase 365 will roll out the next phase of services allowing customers to conduct mobile airtime top-up, merchant payment and micro financing from their mobile device.

Mercantile Bank Limited has taken an initiative to introduce mobile banking with a view to reaching banking service to rural people. In this connection, the bank signed a memorandum of understanding (MoU) with Local Government Division (LGD) and UNDP supported Access to Information (A2I) Programme of the Prime Minister's Office in the city. All banking facilities including opening of bank account, withdrawal and depositing of money and receiving remittances will be available through the mobile banking.

Trust Bank has introduced Trust Mobile Banking service. Trust Mobile Money is a deposit prepaid account facilities for the banked and non-banked citizen of Bangladesh where bank has its branches and accredited pay-points to open/registration prepaid account. Customer will be able to fund transfer; deposit and withdraw money from the accredited pay-points by using mobile/card. Customers will also be able to send remittance faster to the remote place of Bangladesh by availing of this product.

The other banks in process of introducing mobile banking are :

Eastern Bank Ltd, Shahjalal Islami bank Ltd, Arab-Bangladesh bank, United Bank, Standard Chartered Bank, Dhaka Bank.

4.0 Objectives of the Study:

The objectives of this study are to identify

- (1) the perceived advantages and disadvantages of mobile banking to the customers;
- (2) expectations regarding future development of mobile banking;
- (3) factors that may hinder its implementation in Bangladesh; and
- (4) factors that may enhance its implementation in Bangladesh.

5.0 Research Methodology

The research design adopted for this study is descriptive in nature. Descriptive research includes surveys and fact finding enquires of different kinds (Kothari, 2006, p. 2). Since research in to the diffusion of technological innovation has a long tradition and since electronic banking has received a good deal of research attention in recent years. At this point exploratory research would probably be unnecessary and the research design could be begin with descriptive research (Malhotra, 2008, p. 91). For descriptive research design two method can be employed: survey and observation (Malhotra, 2008). Survey method was used for this study to collect primary data from the user of mobile banking through a structured questionnaire.

The questionnaire was designed in close cooperation with the experts involved both in practice and research. The questionnaire was pre-tested on a reference group who did not participate in real survey, but who matched the composition of true sample. During the pre-testing each question are discussed and analyzed in order to check the readability and comprehensiveness. Most questions market the points on the scales with number; it has been found that use of such label can significantly improve the reliability and validity (Krosnick, 1999).

It was used to obtain both explicit and implicit information. The implicit information was used to cross-check the validity of the explicit information provided by the user. The customer's perspective for mobile banking was surveyed by face to face interviews with 50 people during the period between 27.09.2011 and 10.12.2011 mainly in Dhaka city. They have been interviewed at their workplaces, university campus and home. A total of 50 persons in the age-group of 18 to 51+ years were randomly selected to answer the 3-page long questionnaire. A structured questionnaire was developed to measure the view of mobile banking users. The questionnaire contained two parts: Part-I pertained to the general demographic variable and some basic information of the respondents like age, gender, education, profession, awareness of mobile services, last 3 month used m-services and possession of handset and bank account. Part-II contained 7 questions to measure the view of respondents regarding m-banking prospects and challenges. There was only one open ended question for providing their opinion in descriptive manner. The data was analyzed in a descriptive, multi-dimensional manner using SPSS, So as to illuminate various aspects of mobile banking. Frequencies and percentages were also computed to analyze the research questions.

6.0 Results and Discussion

Background Information

Age of Respondents: The age of the respondents range from 21 to 51 years. Most respondents (46%) were of 21 to 30 years. They are followed by those between 31 to 40 years (38%), 41 to 50 years (8%), less than 20 years 6% and 51 years or more (2%) respectively. See table 1 for details.

Table 01: Age of the Respondents

		Frequency	Percent
Valid	Less than 20	3	6.0
	21-30 years	23	46.0
	31-40 years	19	38.0
	41-50 years	4	8.0
	51 or more	1	2.0
	Total	50	100.0

Source: Field survey.

Having approximately half of the respondents falling within the age of 21 to 30 years, followed by 38% falling within the age of 31 to 40 years confirms Tiwari, R., & Buse, S. (2007), study which refers to 29 members within these segments as technology and innovation friendly. Members of these groups are generally well educated and economically well-off. They are often on the move for professional reasons. Therefore, they carry mobile devices to ensure accessibility. For this reason they are ideal candidates to use services offered via mobile devices

Gender of Respondents

Most of the respondents representing 90% were males and the rest (10%) were females as shown in table 2.

Table: 02 Gender of Respondents

		Frequency	Percent
Valid	Male	45	90.0
	Female	5	10.0
	Total	50	100.0

Source: Field survey.

This result of the survey are consistent with the common belief that the early adaptors of new product are male in most technology market (Lu et al, 2003)

Profession of Respondents

Table 3 shows that most of the respondents (38%) are students and 34% are service holders, 24% businessman and 4% are of other professions.

Table 03: Profession of Respondents

		Frequency	Percent
Valid	Service holder	17	34.0
	Businessman	12	24.0
	Student	19	38.0
	Others	2	4.0
	Total	50	100.0

Source: Field survey.

The table demonstrates a trend that the use of emerging technology and of mobile phone services for financial transaction is more popular among the students and service holders than the other professions.

Possession of Mobile Phone by Respondents

When asked whether they owned a mobile phone, all respondents reported to have own mobile phones.

Table 04: Possession of Mobile phone

		Frequency	Percent
Valid	Yes	50	100.0

Source: Field survey.

Again when asked which mobile services they are aware of, most respondents (34%) said that they are aware of using phone to make payment. This is followed by those who are aware of accessing internet using a mobile phone (28%), playing and storing music using mobile phones (14%), using phone for sending and receiving text message 14% and check bank balances using mobile phones (6%). 2% of the respondents are aware of playing games using a mobile phone. Another 2% are aware of the usage of mobile phones to send emails. See table 5 below for details.

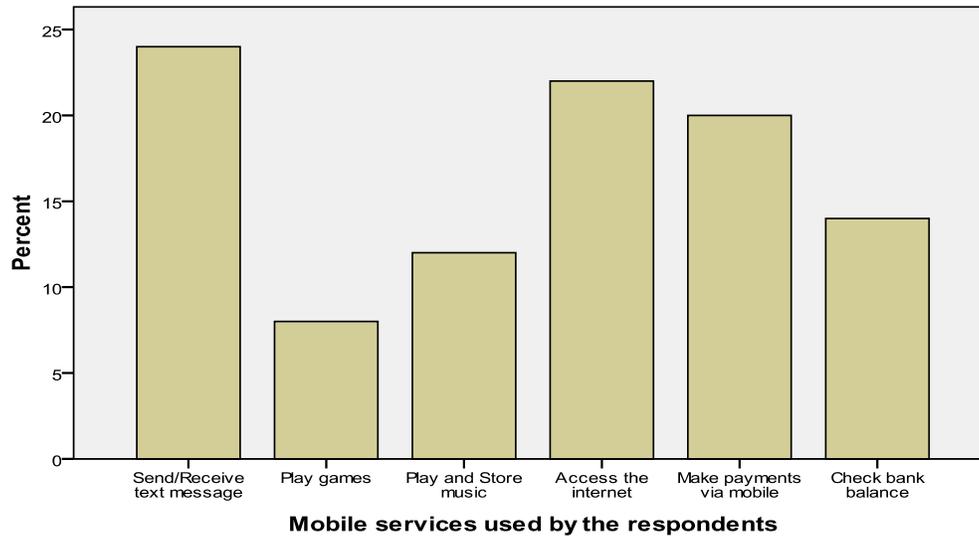
Table 05: Awareness of Mobile Services by Respondents

		Frequency	Percent
Valid	Send/Receive text message	7	14.0
	Play games	1	2.0
	Play and Store music	7	14.0
	Access the internet	14	28.0
	Make payments via mobile	17	34.0
	Check bank balance	3	6.0
	Email	1	2.0
	Total	50	100.0

Source: Field survey.

This suggests that there is an opportunity to boost uptake of mobile banking services since majority of the respondents know that the mobile phone can be used as a medium of payment for financial transaction. Moreover the communication between the bank and the customer will be carried out via text messages. These messages may be triggered automatically by the bank whenever certain predefined events occur, for example whenever a transaction is performed on the account. Alternatively, the messages may be sent by the bank as a response/confirmation to customer requests. A customer message may contain an instruction, example to carry out a transaction or an information request example for an account status. This message can come in the form of SMS. It is therefore important to note that familiarity of this mobile service present a great prospect for banks.

Chart 01 below provides the details of responses to the query which mobile services they have used for the last three months. Most respondents representing 24% have used send/receive text messages within the past 3 month. This is followed by those who have accessed internet using a mobile within the past 3 months (22%), those who make payment using mobile phones (20%) and those who have checked balance using mobile phones (14%) respectively within the past 3 months. 12% of the respondents have used mobile phone foe playing and storing music and remaining 8% have used the mobile phone for playing games.

Chart 1 : Mobile Services used by the Respondents

Source: Field survey.

When asked whether they own a bank account and also whether their banks offer mobile banking, 96% respondents claimed that they own a bank account. 82% of them claim that their banks offer mobile banking services. 12% of them informed that their banks do not offer mobile banking services and the rest of the respondents representing 6% said that they do not know whether their banks offers mobile banking service or not. Table 06 below provides details of this result.

Table 06 : Bank offers the Mobile Services

		Frequency	Percent
Valid	Yes	41	82.0
	No	6	12.0
	Don't know	3	6.0
	Total	50	100.0

Source: Field survey.

Mobile Banking

When asked which mobile services they will be interested in, most respondents representing 36% were found interested in account balance enquires. This was followed by those who want to make payments via mobile phones (36%), transferring fund using a mobile phone (22%), and remaining 6% are interested in reporting potentially fraudulent transactions. Table 07 below summarizes these results.

Table 07 : Bank offers the Mobile Services

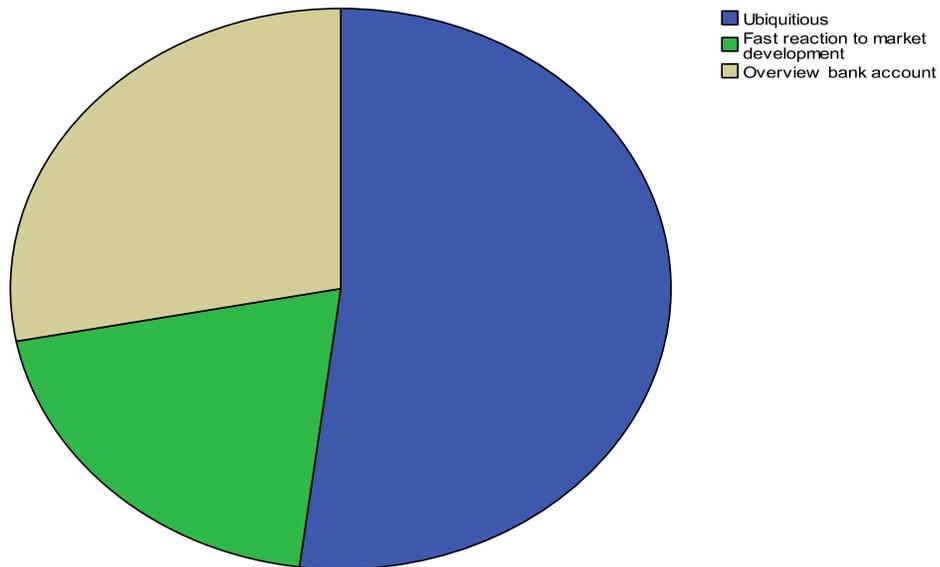
		Frequency	Percent
Valid	Account balance enquiries	18	36.0
	Fund transfer	11	22.0
	Payments via mobile	18	36.0
	Reports of potentially fraudulent transactions	3	6.0
	Total	50	100.0

Source: Field survey.

The results of the study indicate that respondents are interested in accessing a wide range of banking services via mobile phone. This is consistent with the definition of mobile banking by Georgi and Pinkl, (2005). They defined mobile banking to include a wide range of services categorized as mobile accounting, mobile brokerage, and mobile financial information.

When asked about the advantages of mobile banking, most respondents representing 52% expressed that the biggest advantage of mobile banking is ubiquity (i.e. conducting of bank business anytime, everywhere). 28% of them claim that the main advantage is over viewing bank accounts. 20% of them are of the opinion that fast reactions to market developments are the main advantage of mobile banking. Chart 02 gives the summary of the above findings.

Chart: 02
Respondents opinion for the advantage of m-banking



The respondent's perception was found to be overwhelmingly positive. These outcomes are consistent with previous studies by Luber, (2004), on how mobile banking may help a bank increase the customer satisfaction ratio. Mobile banking may help increase customer satisfaction ratio by adopting the following means:

- Innovative “anywhere, anytime” services customized for individual preferences and the current geographical location of the customer provide value-added to the customer.
- More attention and better consulting for individual customers due to automation of routine processes.
- Streamlining of business processes to increase efficient

Table 08 shows the results, when asked of the disadvantage of mobile banking. Most of the respondents representing 48% claim that the biggest disadvantage of mobile banking is security concerns or risk. 32% of them think that the main disadvantage is complicated or uncomfortable usage of mobile service. 2% of them were of the opinion that expensive nature is disadvantage of mobile banking. 16% of the respondents say that mobile banking has no disadvantage whereas the rest (2%) stated other forms disadvantages of mobile banking.

Table 08 : Disadvantages of Mobile Banking

		Frequency	Percent
Valid	Security concern	24	48.0
	Complicated	16	32.0
	Too expensive	1	2.0
	Nothing	8	16.0
	Others	1	2.0
	Total	50	100.0

Source: Field survey.

The result is consistent with previous studies by Bank Systems and Technology, (2008), on mobile banking in America. They identified that security of handheld device, security for the application running on the device, authentication of the device with the service provider before initiating a transaction, password authentication of the customer, encryption of data being transmitted over the air, encryption of data that will be stored in the device for later review by the customer is a complex process.

Again the result is consistent with the previous studies by Wikipedia, (2008), which identified security of financial transactions as the most complicated challenge that needed to be addressed jointly by mobile application developers, wireless network providers and banks IT departments.

Table 09 shows the results, when asked about what will make mobile banking more attractive. Most respondents representing 38% are of the opinion that cheaper costs of utilization will make mobile banking more attractive. This was followed by those who suggested higher speed of data transmission (22%), better input devices (22%), mobile devices with bigger displays 16%, and others (2%) respectively.

Table 09 : Factors that make Mobile Banking Attractive

		Frequency	Percent
Valid	Mobile devices with bigger display	8	16.0
	Better input devices	11	22.0
	Higher speed of data transmission	11	22.0
	Cheaper cost of utilization	19	38.0
	Others	1	2.0
	Total	50	100.0

Source: Field survey.

The result is consistent with previous studies by Atkins, (2010), on Nordea Bank. Nordea Bank, one of the pioneers in the field of mobile banking grew by 30% in 2009. Nordea reported cost reduction by motivating customers to shift to electronic/mobile forms of banking.

When asked about their opinion on the factors that may hinder mobile banking implementation in Bangladesh, most respondents representing 90% were of the opinion that technical and security standards was the main factor affecting the implementation of mobile banking in Bangladesh. This is followed by those who think business and legal issues (8%) is the main hindrance to mobile banking implementation and the rest (2%) think that business and legal issues is the main obstacle to the implementation of mobile banking in Bangladesh. Details of the results are shown in table 10 below.

Table 10 : Factors that hinder of Mobile Banking

		Frequency	Percent
Valid	Technical and security standard	45	90.0
	Business and legal issues	4	8.0
	Regulatory and supervisory issues	1	2.0
	Total	50	100.0

Source: Field survey.

This means that banks must deploy only secure channels that provide a non-repudiable platform to transact. It also means that the technology used must be secure, and at the same time convenient to deploy, and cost effective

When asked about factors that enhance mobile banking implementation in Bangladesh, most respondents representing 54% expressed the opinion that secure communication platform is the main factor enhancing the implementation of mobile banking in Bangladesh. This is followed by those who think connectivity (24%) is the main factor enhancing the implementation of mobile banking and the rest (22%) are of the view that encrypted messaging system is the main factor enhancing the implementation of mobile banking in Bangladesh. Table 11 gives details of this finding

Table 11 : Factors that enhance Implementation of Mobile Banking

		Frequency	Percent
Valid	Connectivity	12	24.0
	Secure communication platform	27	54.0
	Encrypted messaging systems	11	22.0
	Total	50	100.0

Source: Field survey.

This means that secure communication platform should be introduced for enhancing the m banking in Bangladesh. Given the mobile tele-density and the development of secure mobile technology solutions, banks are well – positioned to bridge the digital divide and introduce the unbanked sector to the financial mainstream.

Additional information collected from the respondents and from the Wikipedia (2008) on challenges of mobile banking in Bangladesh

Interoperability: There is lack of common technology standards for mobile banking. Many protocols are being used for mobile banking – Hypertext Mark-up Language (HTML), Wireless Application Protocol (WAP), to name a few. There are a large number of mobile phone devices and it is a big challenge for banks to offer mobile banking solutions on any type of device. Some of these devices support WAP browser or only SMS.

Security: Security of financial transactions, being executed from some remote location and transmission of financial information over the air, is the most complicated challenge that needs to be addressed jointly by mobile application developers, wireless network service providers and the banks IT departments.

Scalability & Reliability: Another challenge for the banks is to scale-up the mobile banking infrastructure to handle exponential growth of the customer base. With mobile, the customer may be sitting in any part of the world (true anytime, anywhere banking) and hence banks to ensure that the systems are up and running in a true 24 x 7 fashion.

Application distribution: Due to the nature of the connectivity between banks and its customers, it is impracticable to expect customers to regularly visit banks or connect to a web site for regular upgrade of their mobile banking application. It will be expected that the mobile application itself check the upgrades and updates and download necessary patches (so called Over The Air updates).

Personalization: It would be expected from the mobile application to support personalization such as: 1. Preferred Language 2. Date/Time format 3. Default transaction 4. Amount formatting 5. Standard Beneficiary list 6. Alerts

7.0 Recommendations

The findings of this study has implication for mobile banking system implementation. It is important to ensure that bank customers use mobile banking as a new form of banking. In order to achieve this goal, the following suggestions may render ways to attract bank customers to utilize mobile banking.

- Banks should keep preferences of mobile financial information admirers in sight when determining technical and pricing issues related to this service.
- Banks should develop the belief of perceived benefits by providing sufficient information on the advantages of mobile banking. In order to achieve this, banks should provide user manual that contains details on mobile banking, including the ability to assess wide range of banking services such as account balance enquiries, funds transfers via mobile phone. Banks should also have counters for mobile banking customers.
- Banks should also consider making mobile banking services more affordable to customers in order to make it more attractive.

- Banks should ensure that safety measures such as firewalls, intrusion detection and other related security devices are properly developed and enforced in the mobile banking systems. In addition, banks should also stress the importance of confidentiality of personal identification number (PIN) in mobile banking.
- The technology used must be secure and at the same time convenient to deploy and cost effective i.e, banks must deploy only secure channels that provide a non-repudiable to transact.
- The existing regulatory framework over banks should be extended to mobile banking.
- Bangladesh Bank should issue guidelines on mobile banking operation and act as a supervisor over the entire risks associated with mobile banking as a part of its regular inspection of banks.
- Bangladesh Bank should also urge banks to put in place a robust technological and information control and security measures to ensure confidentiality and integrity of financial transactions while limiting operational risks and build confidence in such mobile banking services.
- As a regulator, Bangladesh bank should continue to exercise firm oversight of the payment system as needed to safeguard the soundness of the financial system.
- The overall security framework should be ensured.
- Encrypted messaging/session between consumer's phone and third party service provider/telecom company. Minimum encryption standards to be specified to make the transaction banking grade.
- All subsequent routing of messages to the bank's servers must be with the highest level of security with dedicated connectivity like leased lines.
- All transactions that affect an account (those that result in to an account being debited or credited, including scheduling of such activity) should be allowed only after authentication of the mobile number and the PIN associated with it.

8.0 Conclusion

Though banking customers grow increasingly with the digital lifestyle, most Bangladeshi customers are not aware about m-banking in the country. They are not fully aware of the power of technology and do not seek to leverage it to enjoy better control over their banking operations and reap the benefits of m-banking. Instance, creating new markets, and reducing operational costs, administrative costs and workforce are increasingly important aspects for the banks' competitiveness, and m-banking may improve these aspects as well. As mobile banking is still relatively new in Bangladesh, an understanding of the prospects and challenges to use mobile banking may influence its implementation. The findings of this study offer insight to commercial banks in Bangladesh in promoting the use of mobile banking among bank customers. In order to achieve this it is important for commercial banks to take into account the factors that this study had found on the use of mobile banking. The study results indicate that consumers are interested in assessing a wide range of banking services via mobile phone. The ability to access account balance enquiries via a mobile phone is the most compelling consumer banking service, followed by mobile fund transfers. A second-tier of mobile banking opportunities includes reports for potentially fraudulent behavior, which reflect some of the security concerns around mobile banking and stock market information. The customer's perception was found to be overwhelmingly positive. The most appreciated feature was ubiquity and the overview over bank account. Fast reaction to market developments often cited as one of the most attractive feature of mobile banking did not find high appreciation. Security concern was found to be widespread followed by the cost of using mobile banking services. This means that the technology used must be secure and cost effective and at the same time convenient to deploy. The plea for lower cost was found to be the preferred factor that will make mobile banking more attractive. This is followed by high speed of data transmission. Several factors including technical and security standards, regulatory and supervisory issues, and business and legal issues were found to be the main factors that may hinder mobile banking implementation in Bangladesh. Connectivity and secure communication platform and encrypted messaging system were found to be the factors that will enhance mobile banking implementation in Bangladesh. So, Bangladeshi banks should take the advantages of m-banking in the country and also take care of the factors that can make the m-banking service more attractive and user friendly.

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