

A New Approach of E-Banking Through the Use of Mobile, Post-Office and VPN in the Perspective of Bangladesh

Anupam Kumar Bairagi *and* Abdullah-Al-Nahid

Abstract— Diffusion of the Internet, have opened up strategic business opportunities in the financial sector. With deregulation removing entry barriers, an increasing number of online banks are threatening the market share of traditional banks of Bangladesh. To survive this competition, and to leverage the new opportunities of online and mobile banking facilitated by the Internet, many banks have adapted a hybrid model, to increase their profitability and market share while reducing transaction costs. The concept of e-banking includes all types of banking activities performed through electronic networks. But most of the rural people of Bangladesh are unable to take these opportunities of e-banking though they have all kinds of instruments in their hands like mobile phone, post-office. In this paper, we have proposed a new approach of e-banking in Bangladesh to reach the banking to the vast people of urban and rural area through the use of Mobile, Post-office and VPN.

Index Terms— Internet, e-banking, Mobile banking, VPN (Virtual Private Network).

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1 INTRODUCTION

THE concept of e-banking includes all types of banking activities performed through electronic networks. It is the most recent delivery channel of banking services which is used for both business-to-business (B2B) and business-to-customer (B2C) transactions. However, in true sense, e-banking includes activities like payment of bills and invoices, transfer of funds between accounts, applying for a loan, payment of loan installments, sending funds to third parties via emails or internet connections regardless of where the client is located. The definition of e-banking varies amongst researchers partially because electronic banking refers to several types of services through which a bank customer can request information and carry out most retail banking services via computer, television or mobile phone (Daniel 1999; Molls 1998; Sathye 1999). E-banking is considered to be a segment of e-business to the extent that banks are involved in the conduct of business transactions via electronic media; other non banking financial products and services (e.g. insurance), not to mention products and services from other sectors of business, may be sold electronically as well (Deutsche Bundes bank Monthly Report, December, 2000). On the other hand, Burr (1996) describes e-banking as an electronic connection between the bank and customer in order to prepare, manage and control financial transactions. In brief, e-banking is not a banking product or service; rather it explains the way transactions are conducted. Leow, Hock Bee (1999) state that the terms PC banking, online banking, Internet banking, telephone banking or mobile

banking refers to a number of ways in which customer can access their banks without having to be physically present at the bank branch. Therefore, e-banking covers all these ways of banking business electronically. Electronic banking plays a vital role in the economic development of a country. Due to immense advances of information and communication technology (ICT), it certainly introduced new dimensions for the global E-banking community.

Since e-banking offers some smart services benefiting both banks and customers compared with traditional banking system, it has become imperative to make necessary room for the scheduled banks to flourish e-banking. Among others, attractiveness of e-banking includes: it lowers transaction cost; provide 24-hour services; ensure increased security and control over transactions; reduces fraud risk; performs higher volume of transactions with less time; increases number and volume of value payment through banks; allows remote transactions facilities that replace physical presence of a customer in a bank branch and; increases transaction speed and accuracy. On the other hand, traditional banking is time-consuming and more costly and therefore, e-banking is replacing traditional banking all over the world. In Bangladesh, e-banking facilities are yet to be fully developed although some technology driven products and services have been in operation over the last few years. The existing technology driven products and services offered by the traditional banks are ATM services, debit card and credit card, transactions through POS terminals, inter-branch online transactions through individualized online closed network of individual bank, limited customer services provided through internet and membership of SWIFT allowing scheduled banks to conduct wireless transactions especially e-transactions. All these technology based products and services have obviously unlocked the way to step toward e-banking. Moreover, as a part of modernizing national payment and settlement sys-

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- **Anupam Kumar Bairagi** is with the Discipline of Computer Science and Engineering, Khulna University (www.ku.ac.bd), Khulna-9208, Bangladesh. E-mail: cse9620@gmail.com
 - **Abdullah-Al-Nahid** is with the Discipline of Electronics and Communication Engineering, Khulna University (www.ku.ac.bd), Khulna-9208, Bangladesh. E-mail: nahidku@gmail.com

tem, Bangladesh Automated Clearing House (BACH) that includes Bangladesh Automated Cheque Processing System (BACPS), and Bangladesh Electronic Fund Transfer Network (BEFTN), is being implemented under the "Remittance and Payments Partnership" (RPP) project of the Bangladesh Bank funded by DFID-UK is expected to speed up the adoption of e-banking as well.

2 INTERNET BANKING

Internet banking would free both bankers and customers of the need for proprietary software to carry on with their online banking transactions. Customer behavior is changing rapidly. Now the financial service is characterized by individuality, independence of time and place and flexibility. These facts represent huge challenges for the financial service providers. So the Internet is now considered to be a 'strategic weapon' for them to satisfy the ever-changing customers' demand and innovative business needs.

Adequate legal framework and maximum security are the two essential factors for Internet banking. The comprehensive security infrastructure includes layers of security from the network to the browser, including sophisticated encryption that protects customers' from intrusion when they access the bank over the public network. Actually mobile banking is a variation of Internet banking. Mobile banking is a good example of how the lines between the various forms of e-banking are becoming gradually blurred. Due to the new transmission technologies such as WAP (Wireless Application Protocol), portable terminal like mobile phones, personal digital assistant (PDA) or small handheld PCs are providing bank customers with access to the Internet and thus paving the way to Internet banking [4].

It assures immense flexibility and makes the financial services independent of time and place. However, the use of mobile banking is still in a nascent state. The slower transmission speed of the WAP standard and the limited amount of information available are just two of the factors inhibiting the use of those terminals.

3 GLOBAL SCENARIO OF E-BANKING

The effect of e-banking is to augment or facilitate existing banking and payment mechanisms, primarily by making many transactions cheaper, faster, more secure, and more convenient. As a result such types of banking have been expanding day by day. According to Forrester (November 2007), Online banking has grown gradually in the UK over the past decade and is now used by 31% of adults, or 15 million people. But growth has slowed in the past couple of years. That's odd because only 46% of UK Net users access their bank accounts online, yet 74% regularly shop online. By 2012, it is expected that 44% of adults to use online banking in the UK, or nearly 22 million people. Forrester (June 2009) projects that, between 2009 and 2014, the total number of US online bill payment households will increase from 48 million to 63 million.

Online banking has grown steadily in France over the

past decade, boosted by the growth in Net use overall, and is now used by 31% of adults, or 15 million people. Growth to continue at a similar rate for the next five years because French Net users are becoming increasingly confident with the channel and because banks can still do more to persuade customers to bank online, starting with reducing or eliminating the charges that many still impose on customers who bank online. By 2013, it is expected that 42% of adults to use online banking, or more than 22 million people. (Forrester, February 2008).

With only 12% of Swedish banking customers using branches, Sweden has the lowest branch use in Europe. Swedish banks have successfully migrated the majority of their customers to ATMs and online banking — 83% and 71%, respectively. (Forrester May 2009). Forrester also projects that, by 2012/2013, 81% of Dutch and 47% of German consumers will use Internet banking. (April 2008, November 2007).

4 E-BANKING IN BANGLADESH

In Bangladesh, there is huge demand for e-banking from the business community as well as the urban retail customers. But it is still not much available due to a number of constraints such as unavailability of a backbone network connecting the whole country; inadequacy of reliable and secure information infrastructure especially telecommunication infrastructure; sluggish ICT penetration in banking sector; insufficient legal and regulatory support for adopting e-banking and so on.

Total numbers of Banks in Bangladesh are forty seven. Although all branches of foreign commercial banks (FCBs) and 99 percent branches of private commercial banks (PCBs) in Bangladesh were computerized by December 2006, the average for all bank branches was 37 percent since only 4 percent and 16 percent of specialized banks (SBs) and state-owned commercial banks (SCBs) respectively were computerized. Out of a total of 6,565 branches in 2006, 2,426 were computerized of which 651 branches of 22 PCBs and 7 FCBs together were providing any-branch banking facility under respective bank online network. During the period, the number of ATM booths and POS terminals stood at 478 and 4,647 respectively covering important merchant outlets in six divisional cities and some other important district towns in Bangladesh while 43 banks became the member of SWIFT and 25 banks adopted router connection. Since about 50 percent of total bank branches belong to SCBs spread throughout the country including the rural areas, ICT penetration is crucial for this category of banks. The recent corporatization of the NCBs, would influence the banks in this category to be competitive through improving their service quality incorporating these of modern technology. Although all these are positive developments, more attention is needed to enhance ICT capabilities of the banking system especially the SCBs for successful implementation of e-banking all over the country [5].

In our country different banks are offering electronic

banking services in different ways, some are offering ATM (Automatic Teller Machine) services, some are tele-banking and some are electronic fund transfer, debit card, credit card etc. The Table 1 shows the different electronic banking services in our country [6].

The foreign commercial banks operating in Bangladesh

TABLE 1
ELECTRONIC BANKING SERVICES IN BANGLADESH [% OF BANKS]

Electronic Banking Service	2004	2005	2006
Tele Banking	35	46	54
Online corporate banking	---	17	28
Electronic fund transfer	27	25	36
ATM	25	34	48
Credit Card	10	23	---
Debit Card	---	13	28
Merchant account service to merchant	---	13.8	21
Internet banking	---	16	22

like Standard Chartered Bank, Citi Corp. N.A. and the HSBC are the pioneers to introduce the electronic banking facilities. They provide ATM, Debit Card, Credit Card, Home Banking, Internet Banking, Phone Banking, on line banking etc. services. Among the indigenous banks, the Private Banks are ahead of the public banks. Prime bank Ltd., Dhaka bank Ltd., BRAC bank Ltd., Dutch-Bangla bank Ltd., Eastern and Mercantile bank Ltd., are already stepped on towards electronic banking facilities. Apart from these banks, Mutual Trust Bank Ltd., also introduced ATM service. Among the four Nationalized Commercial Banks (NCBs), Janata bank Ltd., has some access to the electronic banking facilities. Bangladesh Bank, the Central Bank of Bangladesh, is also trying to formulate the wide structure of electronic banking facilities. All of these private banks offering limited on line banking services. Most of these banks only offer services by providing ATM card. Most of them do not offer wide range of internet banking facilities which is the main advantages of e-banking. Can deposit money in any branch and withdraw money from ATM machine- is treated the best e-banking facility available in Bangladesh While electronic money transfer starts in a limited edition. Sonali and Agrani bank Ltd., is also providing on line banking services in a limited scale. Rupali Bank Ltd. Is also developing online banking. BASIC bank which is 100 percent public owned but served as private sector banking has a technological advancement. Table 2 shows the scenario of customer response in Dhaka and Chittagong city about on-line banking [2].

A broad spectrum of Internet banking services, a subset of electronic finance, is available in Bangladesh with different degree of penetration. The credit card is available from VISA, MasterCard and VANIK. Some foreign banks provide electronic fund transfer (EFT) services. It is at an early stage and used on a very limited scale. Microchips embed-

ded Smart Card is also becoming popular in the country, particularly for utility bill payment. Automated teller machine (ATM) is expanding rapidly in major cities. A group of domestic and foreign banks operate shared ATM network, which drastically increase access to this type of electronic banking service. The network will gradually be extended to other parts of the country.

Clearing house on trail basis from 8th November, 2009.

TABLE 2
CUSTOMERS' RESPONSE WHO HAVE BEEN USING ON LINE BANKING SYSTEM (% OF RESPONDENTS WHO EXPRESSED "YES" COMMENT)

Comment	Dhaka (%)	Chittagong (%)
On line Banking services is relatively good than manual system	79%	65%
On line banking provides good Customer service	72%	61%
Just in time services in Banking can be provided	56%	48%
Bank Personnel behave properly	52%	56%
Dealing officer is well conversant about their respective Desk work	48%	47%
Technologically improved but quality of banking services worsen off	51%	44%
Better E-business environment	67%	61%

Bangladesh Bank also declared that the clearing house won't accept any cheque from 1st April 2010 if size of the cheque is not as per the guideline of the MICR system. However, in Bangladesh digital divide among the Dhaka city and rest of the country is conspicuous. E-business as a whole is confined among very few business organizations and on line banking business is expediting process of the e-business of the country.

5 PROSPECTS OF E-BANKING IN BANGLADESH

If E-banking is now a global phenomenon. Apart from the developed countries, the developing countries are experiencing strong growth in e-banking. The government's emphasis on building a digital Bangladesh, setting up ICT park, raising allocation for developing ICT infrastructure, waiving taxes on computer peripherals and other measures including the automation program of banking sector led by the Bangladesh Bank and competition among the scheduled banks in improving customer services have accelerated the prospects of e-banking in Bangladesh.

The Bangladesh Railway owns a high-speed optical fiber network (1,800 km) parallel to the railway path that covers most of the important parts of Bangladesh. This optical fiber

network can be used as the backbone network of e-banking in Bangladesh. For example, mobile phone operators such as Grameen Phone and Ranks IT of Bangladesh use this optical fiber network through which they reach even in rural areas with their services [4]. It is encouraging that some of the FCBs and PCBs are already using this optical fiber network for conducting online transactions, ATM and POS services.

In addition, Bangladesh Bank is implementing the RPP project for modernizing national payment and settlement system. The project plans to go for real time gross settlement (RTGS) by 2012. It has been made mandatory for all head offices of the scheduled banks to be connected with Bangladesh Bank for satisfying BACH and BEFTN. These efforts would allow the scheduled banks to be connected to each other for conducting inter-bank online transactions in near future and this would smoothen the introduction of e-banking in Bangladesh.

Internet services came to Bangladesh with connectivity in 1996. Digital telephone exchanges have been established in 389 upazilas and 17 growth centers. Work is underway to cover the rest of the upazilas under digital exchange system. Meanwhile, Bangladesh has joined the information super-highway by connecting itself with international submarine cable system in 2006. A total of 159 Internet Service Providers (ISPs) have now been connected with this system of which 64 are actively providing services. Internet connection is slow with bandwidth range 32 kbps to 56 kbps for dial up and 64 kbps to 8 mbps for broadband. The establishment of internet exchange is under implementation. Encryption laws to accept electronic authentication of transactions has been enacted in 2006 and Voice over Internet Protocol (VoIP) has been legalized. Under this scenario, as a part of government decision of building digital Bangladesh, the existing capabilities of ICT sector is likely to increase rapidly in bringing all upazilas under internet services and this will contribute in widening the scope of e-banking throughout the country.

After connecting with the information superhighway, the total country will be connected by fiber optic backbone; certainly it will be a milestone for infrastructure of implementing electronic banking in Bangladesh. In Bangladesh most of the banking hardware are available. The hardware available for electronic banking is entirely procured from foreign origins with a local distributor. Electronic banking operation hardware includes; servers, workstation, printers, scanner ATM, POS terminals, etc and networking hardware includes switch, Router, V-SAT connectivity etc. All hardware is available in our country. At the head office level 95.45 percent of banks use banking software, 46 different types of software are in use in different banks in Bangladesh [1].

6 PROPOSED SYSTEM

Most of the areas of Bangladesh are now in mobile network coverage. There are six mobile operators working in Bangladesh and they have reached in every corner of

the country. Grameenphone (GP) has the largest network with the widest coverage in the country. The GP network now covers over 98 percent of the population and over 87 percent of the land area [3]. There are about 10,000 post offices in Bangladesh and a great number of that are located in rural area. In this approach one can transact with his/her bank using the knowledge of mobile operation with the help of post-office which are available to the urban and rural area of Bangladesh.

In the proposed system all the post office of Bangladesh, mobile operators and banks will come in a virtual private network. The conceptual interconnection is shown in the Fig 1.

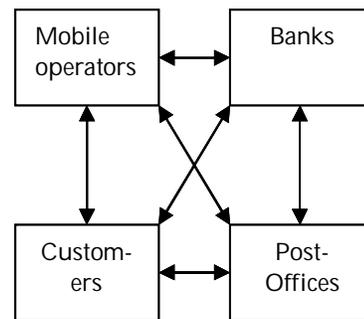


Fig. 1. Conceptual interconnection scheme.

6.1 Account Opening

Mobile-Phone user will come first to the post office and with the help of the post office customer will fill up an account form. All the information of customers will be send to the corresponding bank through the VPN. In response the customer's mobile number will be registered and the account number as well as a PIN number will be send to the corresponding mobile number of the customer. The process is shown in the Fig 2.

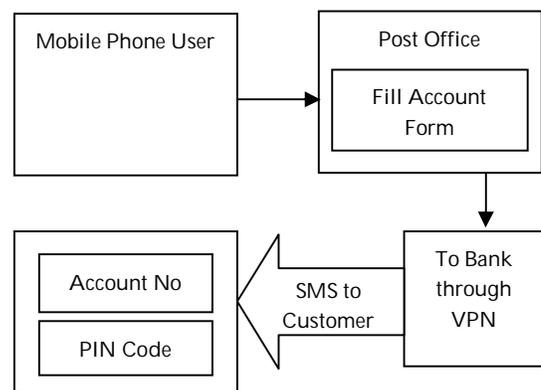


Fig. 2. Conceptual interconnection scheme.

6.2 Deposit Procedure

Customer can deposit money in the following way:

- Person can come to the bank and deposit money.
- Person can come to the post office and deposit

money.

- Person can deposit money through SMS.

When a person wanted to deposit money through SMS, first he have to re-charge his mobile phone balance then sending an SMS in the following way:

<Account Number> <> <Amount>

Then the bank will update the amount to the customer's account and return an SMS informing the transaction number with the current balance of his/her account.

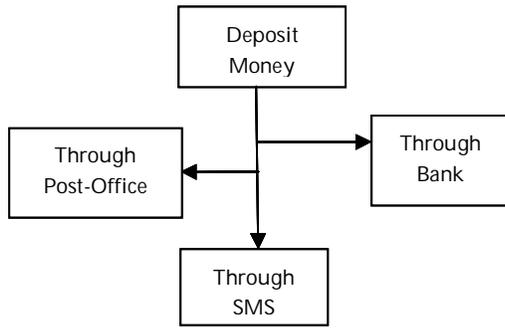


Fig. 3. Process of depositing money.

6.3 Withdraw Procedure

In this procedure at first customer must send a SMS bearing some security information. The message will be the following form: <Account Number> <> <PIN code> <> <Amount>

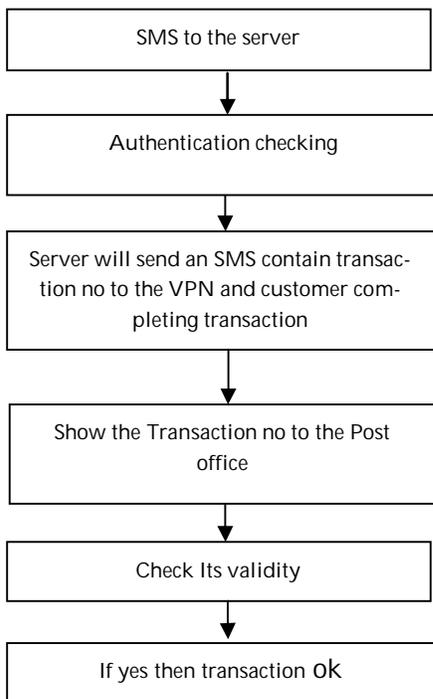


Fig. 4. Process of withdrawal.

Bank will check all the authentication of the customer (Mo-bile number, Account Number, PIN Number) and if the amount is available then transaction information will up-date and a return SMS will come bearing a transaction number to the customers mobile phone, at the same time the transaction number will be send to the VPN. Now if the customer goes to the post-office with this transition number, the post office will check this transaction validity and the customer will able to collect the money. The process is shown in the Fig. 4. Though the process for the post-office is complicated, skilled and trained ICT person in the post-office can reduce the banking cost dramatically and integrate vast rural people to the banking service.

6.4 Transfer Procedure

Bank will check all the authentication of the customer (Mo-bile number, Account Number, PIN code) and if the amount is available then send a message with receiver's account number and account name for customer's confirmation. If he/she confirms then transaction will be completed and a return SMS will come bearing a transaction number to the customer's mobile phone with remaining balance amount in the account. The process is shown in the Fig. 5.

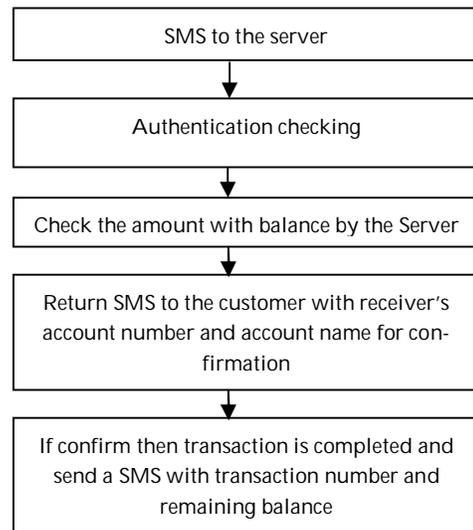


Fig. 5. Process of transfer money.

7 CHALLENGES AND CONSTRAINTS

Though mobile operators and banks can be connected together easily through the use of VPN but problem is to connect the post offices with banks and mobile operators (es-pecially in rural area). Some of the obstacles to the processes are:

- Awareness: There is currently a lack of awareness and knowledge in the rural area of Bangladesh about ICT and electronic banking.
- Infrastructure and access: Physical infrastruc-

ture barriers including inadequate telecommunication systems, poor Internet connectivity and lack of access to the necessary hardware and software.

- Human capacity and skills: E-banking requires a different mix of capacities and skills, which is another major constraint in our country to run the system.
- Lack of trust and touching feelings: In developing countries, there is lack of trust on electronic money and so as to e-banking in the mind of huge percentage of population. They want to feel the things by touch and this is a hindrance for boosting e-banking in the region.
- Power Crisis: In Bangladesh, where electricity/power is still our main problem and most of the rural areas are out of electricity. So it is very difficult to expand e-banking through post office in every corner in Bangladesh.

Countries: Role of Finance, including E-finance to Enhance Enterprise Development”

Anupam Kumar Bairagi has been serving as a Lecturer in the Discipline of Computer Science and Engineering (CSE), Khulna University, Khulna-9208, Bangladesh. He joined at KU in November 2009. Before that he taught in Khulna Polytechnic Institute, Khulna as an instructor in the department of computer technology about five years. He has five published books for diploma level students in computer technology. He is a member of IEB.

Abdullah-Al-Nahid has been serving as a Lecturer in the Discipline of Electronics and Communication Engineering (ECE), Khulna University, Khulna-9208, Bangladesh. He joined in the discipline 2008. He has several published articles.

8 CONCLUSION

In this age of information technology and competitive world, banking sectors should be modernized. In order to keep pace with the changing world we have to replace our traditional banking systems by electronic banking systems. To bring the vast people in the rural area of Bangladesh under banking linkage, the proposed system can be implemented without huge investment as mobile and post office are very much usual. The country can be benefited through successful utilization of e-banking. This will be helpful to enhance productivity and customer satisfaction.

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