

E-Banking in Bangladesh: The Future of Banking

Kamrul Hasan*

E-banking is the waves of the future. It provides enormous benefits to consumers in terms of ease and cost of transactions, either through internet, telephone or other electronic delivery channels. For many consumers, electronic banking means 24-hours access to cash through an Automated Teller Machine (ATM) or Direct Deposit of paychecks into checking or savings accounts. But electronic banking now involves many different types of transactions. E-banking is a form of banking where funds are transferred through an exchange of electronic signals between financial institution, rather than exchange of cash, checks or other negotiable instruments. With the expansion of global Information and Communication Technology (ICT) infrastructure and the internet, e-banking is set to play a pivotal role in the national economy, proper software, infrastructure, cyber law and skilled manpower are important for the implementation of e-banking in the country. This paper overview the issues associated with e-banking and try to explore the future challenges and prospect in Bangladesh.

Key Words: ATM, SMS banking, EFT, SWIFT channel, POS, Call center, DES, RSA, MAC.

Introduction:

In a constantly changing world of today, where past is replaced by dynamic present and the dynamic present is being replaced by more challenging future, the old ways of doing things is no longer valid. Change is permanent and a reality. Those who are not able to keep pace with the changes are destined to loose the race. Science and technology is changing the way financial institutions perform their transactions. Today's banks are shaking by these technological changes. Life has never been so easy, comfortable, and luxurious. Science and technology have brought our life to this stage. But a new technology brings with it not only the potential for success but also a never-ending series of questions regarding its design, its value to its users, ultimate use and acceptability.

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E-banking is a form of banking where funds are transferred through an exchange of electronic signal between financial institutions, rather than exchange of cash, checks, or other negotiable instruments. For many consumers, electronic banking means 24 hours access to cash through an ATM or direct deposit of paychecks in to checking and savings accounts.

Literature Review

With the extensive technology innovation and telecommunication, we have seen new financial distribution channels increasing rapidly both in the numbers and form, from ATMs, telephone banking, PC banking to internet banking. (Earring Wood and Story, 1996). Developing alternative distribution channels is not only important in terms of reducing costs and improving competitiveness, but also in terms of financial institution's ability to retain the existing customer base. (Kimball and Gregor, 1995) as well as to attract new customers. Sathye (1999) proposed a model for Internet Banking in Australia is significantly influenced by variables of system insecurity, ease of use awareness of service and its benefits, reasonable price, availability of infrastructure and resistance to change. The transformation from traditional brick-and-mortar banking to E-Banking has been Automatic Teller Machine (ATM) and thus the retail banking industry witnessed significant and extensive change. Formally, E-banking comprises various formats or technologies, including telephone (both land line and cell phone banking, direct bill payment (EFT), and PC or internet banking (Power, 2000). Weitzman, (2000), Lassar, Manolits and Lassar, (2005), Ehou and Chou (2000) identified five basic services associated with online banking: view account balances, and transaction histories, paying bills, transferring funds between accounts, requesting credit card advance, and ordering checks. Majority of banks of banks is planning to introduce ICT for integration of banking service and new finance service, which will play a vital role in bringing efficiency in financial sector (Raihan, 2001). The most commonly factors are ease of use, transaction security, convenience and speediness (Wan, Luk and Chow, 2005).

Organization theorists and practitioners have defined e-banking in various ways. A Survey of Electronic Banking, Electronic Cash and Internet Gaming (2003), has defined electronic banking as "an umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick and mortar institution". The following terms all refer to one form or another of electronic banking: personal banking, (pc) virtual banking, on line banking, home Banking, remote electronic banking, and phone banking are the most frequently used designations, (Joris, Claessens, Valentine Dem et.al,2001),on line electronic banking system give every body the opportunity for easy access to their banking activities.

These banking activities may include; retrieving an account balance, money transfers

(Between a user's accounts, from user's account to someone else's account) retrieving an accounting history. Some banks also allow services such as stock market transactions, and the submission of standardized accounting payment files for bank transfer, to third parties. As technology evolves, different kinds of electronic banking system emerge, each bringing a new dimension to the interaction between user and bank. The ATM is the first well-known system that was introduced to facilitate the access of the user to his banking activities, (M. Rahman, 2003), E-banking is a form of banking where funds are transferred through an exchange of electronic signals between financial institution, rather than exchange of cash, checks or other negotiable instruments common wealth bank of Australia, (2006) defined E- banking as "a range of banking services that utilizes electronic equipment". Electronic equipments are ATM machine card (plastic), PIN, password, code or net code etc.

With the extensive technology innovation and telecommunication. We have seen new financial distribution channels increasing rapidly both in the numbers and form, from ATM's, telephone banking, PC banking to internet banking. A broad range of financial distribution channels must be available to deliver varying services needs of customers segments (Earring wood and story, 1996).

Developing alternative distribution channels is not only important in terms of reducing costs and improving competitiveness but also in terms of a financial institution's ability to retain the existing customer case (Kimball and Gregor, 1995) as well as to future attract new customers.

While the trend within the banking industry is to replace human tellers with self-service distribution channel's. the strength of customer intentions for usage of human tellers within the next two years support the concept that the branch will still play an instrumental rate in the delivery of services to customers in the future. (Greenland,1995; Woodruff, 19*95; Thornton and White, 2000).

Sathye (1999) proposed a model for Internet Banking Adoption, which argued that the Intention of Internet Banking in Australia is significantly influenced by variables of system insecurity, case of use awareness of service and its benefits, reasonable price, availability of infrastructure and resistance to charge.

The Willis Report (1997 in Sathye, 1999) Stated that the technology must be reasonably priced relative to alternatives for customers to adopt. Otherwise the acceptance of the new technology may not be viable from customer's stand point. Customers today are more conscious of the expenses associated with the banking as they are generally better informed about alternative option. The total costs incurred in using Internet Banking must be minimal or competitive (Joyawardhena and foley, 2000).

Howard and Moore (1982) reported that consumers must be aware of the new brand before adoption. Therefore it is important factor that the boxes have to create awareness on internet banking to the consumers. Adoption means acceptance and continued use of a

product, service and idea. Customers go through a process of knowledge, persuasion, decision and confirmation before they adopt the product or services.

Offer the internet banking; the greater the awareness level among customers and therefore the higher will be internet banking adoption. Besides awareness, the service provided by the banks should be perceived to be innovative with high quality and user friendliness to meet an individual's expectation. Cooper (1997) reported that ease of use of innovation product or service as one of the three important characteristics for adoption from the customer's perspective. This is related to user friendliness and ease of navigation as well as simple institutions to use the service.

E-banking is the waves of the future. It provides enormous benefits to consumers in terms of ease and cost of transactions, either through internet, telephone or other electronic delivery channels (Nsouli and Schaechter, 2002)

E-banking development would lead to two classes of surviving banks, which are very large banks and small niche ones (Dewan and Seismanm, 2002). Through the E-banking, smaller banks could compete by offering portals to the services offered by larger banks (Holland and Westwood, 2001) with this development, banks could use E-banking to focus on customer need in order to gain the strongest competitive advantage (Wind, 2001).

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ICT networking has offered a wide range of delivering channel's in retail banking. Banking institutions need to exploit opportunities that arise from these development and changes to remain competitive. The successful financial institutions in the future will be those that are able to leverage most from the information and communication technology revolution. Increasingly consumers are also demanding more efficient banking services are becoming more discrediting of the power that the technology brings. The winners will be those financial institutions that are able to harness on the Capability of ICT in making strategies decisions in terms of inability leader alignment of business, enhancing

organizational capacity and capability, risk management and building better customer relationships CC the rapid pace of advancement.

A survey of electronic cash, electronic banking and internet gaming (2002) reported that the term electronic cash, e-cash or e-money refer to electronic payment schemes that enable consumer to store and redeem financial value. They operate via stored electronic units of value. Paid for in advance by conventional money and representing equivalent units in real currency, these funds can be transferred between vendors and individuals using compatible electronic system, in some cases consumers report to banks or other financial intimidators. E-cash (e-money) comes in two forms: smart card e-cash and computer e-cash

Major Research Questions

- Q1. What is the present (April, 2009) status of e-banking in Bangladesh?
- Q2. What are various forms of E-banking available in Bangladesh?
- Q3. What are the differences between e-commerce and e-banking?
- Q4. What are the operational issues of E-banking in Bangladesh?
- Q5. How much secure is the E-banking in Bangladesh?
- Q6. Where is E-banking going in Bangladesh?

Objectives of the Study

The following are the major objectives of this study:

- (i) To examine the present (April, 2009) status of E-banking in Bangladesh.
- (ii) To identify various forms of E-banking available in Bangladesh.
- (iii) To trace out similarities and differences between E-commerce and E-banking.
- (iv) To examine the three factor authentication for E-banking in Bangladesh.
- (v) To provide guidelines how can we assure the highest standards of security to combine with maximum flexibility?
- (vi) To identify the future challenges posed by the E-banking in Bangladesh.
- (vii) A few recommendations on the policy issues regarding E-banking in Bangladesh.

Methodology of the Study

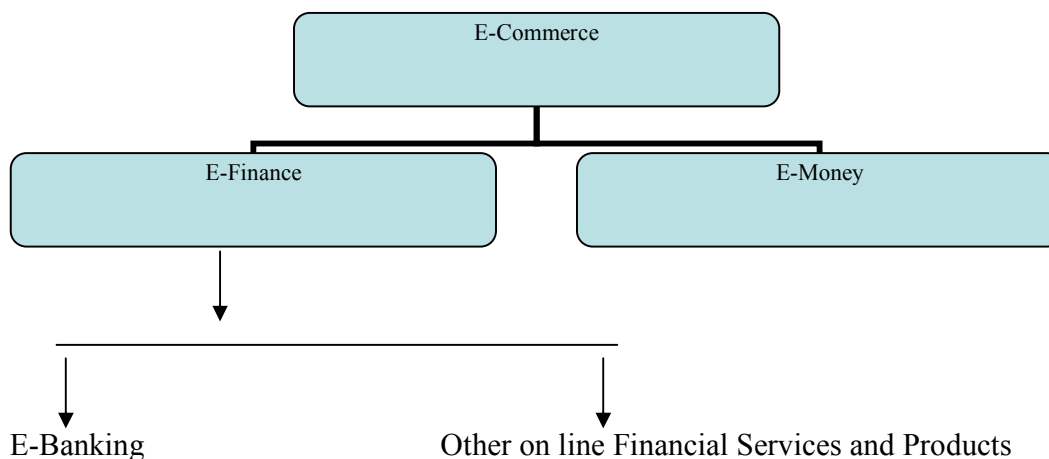
Both primary and secondary data collection methods are applied for this study purpose. I have collected data through check list, interview with the head of IT and from some published sources. This research is basically exploratory and descriptive in nature.

Limitations of the study

- a) We have not focused on various modes of E-banking.
- b) We have not made comparison with banking practice around the world.
- c) We have not provided insight for security in e-banking system.
- d) We have not focused on the critical issues on security in e-banking.

What is E-Banking?

The following chart exhibits the definition of E-Banking.



- ATM Services
- Any branch banking
- Internet Banking
- Virtual Banking
- SMS banking
- Wireless Application Protocols
- Telephone Banking
- Electronic Fund Transfer (EFT)
- SWIFT Channel
- Other electronic delivery channels

E-Commerce:

The Phenomenon of Electronic Commerce has permeated into every aspect of our life today. Electronic Commerce has been around for the last two decades in some form or the other, but the new force that is driving Electronic Commerce is the Internet, which is revolutionizing the way companies around the globe conduct business. Internet based electronic commerce is playing a critical role in addressing strategic, mission critical business needs of the companies and hence the companies are making it an integral part of their business strategies.

Globally, according to a survey conducted by IDC, currently the electronic commerce over the Internet is some \$26 billion, while it is expected to reach about \$1.5 trillion by 2008-09. These mind boggling, figures are sufficient for any sane individual, even vaguely connected to industry, trade or commerce, to understand the potentially radical influence that E-commerce is having on human society. All this is due to the Internet, a simple network of networks of computers across the globe, linked through various means: cable, satellite, telephone lines etc. based on the TCP/IP protocol. This network has not only altered the way we conduct trade and commerce, but also fundamentally altered the way we communicate, the way we live and to some extent, the way we think.

Simply, E-commerce is buying and selling on electronic networks, predominantly the Internet. This could involve trade of tangible goods/services similar to traditional commerce, or intangible items like music, information and involving digital transfer etc. The World Trade Organization (WTO) distinguishes six main instruments of electronic commerce: The Telephone, the fax, the television, Electronic payment and money transfer systems, Electronic Data Interchange, and The Internet.

Though the telephone, fax, TV and EDI have been in existence for some time, but when people talk of E-commerce, they usually refer to Internet Business, wherein goods or services are traded on the net.

Fundamentally, there are two types of electronic commerce –

1. Business to Business electronic commerce (B2B), and
2. Business to Consumer electronic commerce (B2C)

B2B E-commerce is today about 80% of total E-commerce in the world, due to its advantages like: reduced transaction costs, improved product quality, improved service, minimal investment for global reach, reduced inventory costs etc.

B2C or retail E-commerce is nowhere near B2B in terms of size but it is growing phenomenally as far as volumes are concerned. More and more people are taking to shopping on the Internet due to the following factors: Convenience, More choice, more range, Better prices, etc.

DRIVERS OF E-COMMERCE

The following broad themes have been identified as the driving forces for the phenomenal growth of E-commerce globally:

- (i) Electronic Commerce is easy and affordable
- (ii) Electronic Commerce transforms the market place
- (iii) Electronic Commerce has a catalytic effect
- (iv) Enhanced customer service
- (v) Electronic commerce over the Internet vastly increases interactivity in the economy
- (vi) Openness is the underlying technical and philosophical tenet of the expansion of Ecommerce

- (vii) Electronic commerce alters the relative importance of time

E-Money

E-money includes electronic debit and credit system, smart card. The smart card has been defined many ways, but is generally defined as “portable data storage device with intelligence (chip memory) and provision for identity and security.” In their simplest forms, these cards are small microcomputers—lacking only external power supply, displays, and keyboards. One of the most widely tested stored value cards offered by Mondex, has an electric wallet, available as an optional accessory, with both of these peripheral devices. The microprocessor chip in a stored –value card is specialized and custom-designed, generally with specific patented control and production circuits. Certain data, primarily related to the security of the card, can be entered only at the time of manufacture. In addition to a microprocessor each card generally has several kilobytes of permanent memory, both rewritable and non-rewriteable.

A new technology brings with it not only the potential for success. But also a never-ending series of questions regarding its design, its value to the user, its ultimate use and acceptability. In this paper the term smart cards, stored-value cards and electronic money will be used to denote money in the form of “value”, whether it is issued in card-based or network-based form. Although there are technical differences the term “smart card” is generally used interchangeably with stored-value card. There are many questions regarding these new payments devices that need to be answered by the designers, issuers, and regulators of these devices. This innovation has the potential of changing the retail payments arena in a way that has not happened since the advent of the credit card. But at this time it is only potential.

Although there has been significant effort made to eliminate paper-based payment transactions, the basic way of handling payments by consumers has not changed. Stored-value cards may help to make the transition from paper-based payments to electronically-based payments more likely as these cards incorporate familiar aspects of using money in a way that could prove to be both convenient and acceptable to the public.

As money technology has evolved, methods of payment have also changed, but cash still often remains a preferred method of payment by many people. Over the past few decades various media and industry experts have predicted the demise of cash and the advent of

the “cashless” society. However, recent survey results showed that the preferred form of payments by consumers and merchants was still cash. Table 1 presents the results of that survey

| Preferred Forms of Payments By Consumers | |
|---|-------|
| Cash | 54.2% |
| 3 rd Party Credit Cards (i.e., Visa) | 38.5% |
| Check | 23.4% |
| Store Credit Cards | 6.5% |
| Debit Cards | 1.0% |
| Others | 1.1% |

*Percentages will not add to 100%, due to format of questions asked.

Table-1: World-wide Preferred forms of Payments

The survey, conducted by Ernst & Young, showed also that 58% of retailers had a preference for cash transactions. The evidence from this survey is noteworthy, as it is easy to see the vast market potential for a product such as the smart card that is designed to be a replacement primarily for cash transactions.

The number of cash purchases far exceeded any other payment method, although their value accounts for less than 20 percent of the value of total consumer transactions on a monthly basis. Cash is used most often at food stores, for purchases at gasoline filling stations, and for dining out. The reasons given for using cash where that 1) it is convenient for small, inexpensive purchases, 2) force of habit, and 3) the recipient preferred or only accepted cash.

Even assuming that stored-value cards capture only a small fraction of their targeted markets, the potential of the market for stored-value cards has been estimated to be roughly the size of the market for traveler’s checks -\$20 billion transacted annually. Although most consumer transactions represent only a small share of the total expenditures. (Low income families are an exception to this statement).

Smart Cards

“Portable data Storage device with intelligence (Chip Memory) and provisions for identity and security” (Barbara A. Good, 1997) In their simplest forms, these cards are small microcomputers-lacking only external power supply, displays and keyboards. In 1974, a French journalist, Roland Moreno, filed his first patent on “an independent electronic object with memory” Moreno focused on the functional aspects of the card, including the use of secret keywords (PINs) for access to the card’s stored data.

Various Forms of E-Banking:

Automated Teller Machine (ATM)

An ATM is simply a data terminal with two input and four output devices. Like any other data terminal, the ATM has to connect to, and communicate through, a host processor. The host processor is analogous to an Internet Service Provider (ISP) in that it is the gateway through which all the various ATM networks become available to the cardholder (the person wanting the cash). ATM has two input devices- card reader and keypad. An ATM has four output devices- Speaker, Display screen, Receipt printer, cash dispenser.

SMS Banking

SMS Banking allows you to do some banking enquiries on your mobile phone. SMS-Banking is developed to provide transactions related to client’s card account via SMS. After having registered the service SMS-Banking, a (mobile Phone) subscriber should send an SMS to 611(say) with a request for appropriate transaction. The above SMS must contain (with space between commands):

- a type transaction
- individual access code for working with “SMS-Banking”
- a sum to be paid (if payment transaction)
- identifier of payment (debt)
- identifier of data.

In reply the subscriber will receive a message reporting the result of the transaction made. It is possible to use “SMS-Banking” abroad provided that international calls and roaming are activated. SMS must be written in Latin letters. There is no subscription fee for the service. The SMS-s to number 611 is charged in accordance with the company tariffs. The mobile company may charge for SMS and Bank may charge for service. It is option of Bank who provides this service. A type of request is: <transaction type> blank <access code>blank <the amount of payment>blank<payment identifier> blank<data identifier> The data of the request should not be put in brackets/ inverted commas.

Tele-banking

Tele-banking is a form of remote banking which is essentially the delivery of branch financial services via telecommunication devices where the bank customer can perform retail transactions by dialing a touch-tone telephone or mobile communication unit, which is connected to an automated system of the bank by utilizing Automated Voice Response (AVR) technology. Tele-banking has been in Bangladesh since 1990s. The use of Tele-banking is easy and confidential. All you need is a push button telephone, your account number, and your Personal Identification Number (PIN), which you select on your first call and can change at any time. Tele-banking will provide you the following services:

- Checking account balance
- Interest rates related information etc.

Online Banking

Banks are considering online banking as a powerful “value added” tool to attract and retain new customers while helping to eliminate costly paper handling and teller interactions in an increasingly competitive banking environment. Online banking (Internet banking) is a term used for performing transactions, payments etc. over the internet through a bank’s secure website. This is very useful especially outside banking hours. In most cases a web browser such as Internet explorer or Netscape Navigator is utilized and any normal internet connection is suitable. No special software or hardware is usually needed.

Advantages:

Convenience, high transaction speed, efficient, and much more effective

Disadvantages:

Start-up may take time, learning curve effect, bank site changes, matter regarding trust.

Any Branch Banking:

“Any branch banking” is the service where an account is accessible from any branch of a particular bank. Now, it is widely known as On-line banking in Bangladesh.

Virtual Banks

Virtual banks are banks without bricks; from the customer perspective, they exist entirely on the Internet, where they offer the same range of services and adhere to same rules and regulations of central banks.

Factors to be considered in Virtual Banking

- The routine banking transaction was becoming both costly and time consuming. The banks resorted to computerization to cut cost and time overheads in handling routine transactions
- The introduction of automated teller machine (ATM) impart flexibility to bank customers and gave further boost to virtual banking

The introduction of credit cards and debit cards helps both the consumers and retailers to be free from cash handling

Remittance (Electronic Way)

Today's fast changing electronic banking channels have massively improved the flow of remittance across the world. In Bangladesh, Banks have grown up relations with many international financial agencies, or intermediaries to master the inflow of remittance into the country from the expatriates working in foreign countries. A few such operators working in Bangladesh are: Western Union Money Transfer, Money Gram, XPress Money.

Call Center

Call center is a streamlined customer interface and offers a range of banking services through its call center agents. Customers are now getting improved services at a reduced cost in an exciting manner. Available services at call center are:

Account related services:

Balance inquiry, transaction inquiry, duplicate statement, cheque book request, ATM/Debit card hot listing, and loan outstanding etc.

Product Information:

Deposit accounts, Personal loan, Savings and current accounts, Debit card, Rates and tariff Inquiry, exchange rates, lending rates, deposit rates, tariff etc.

Other Services:

Complaints handling, account opening procedure, Bank Information, change request etc.

Findings of the Study:

Present Status of Various forms of E-Banking in Bangladesh: Total 40 banks (both public and Pvt. Commercial banks) were surveyed and the results are summarized as below:

| Sl. | Various Forms of E-Banking Services | Number of Banks having on line modes of service delivery | % |
|-----|-------------------------------------|--|--------------|
| 01. | ATM | 30 | 30/40 = .75 |
| 02. | SMS Banking | 19 | 19/40 = .475 |
| 03. | Electronic Fund Transfer (EFT) | 22 | 22/ 40 = .55 |

| | | | |
|-----|------------------------------|----|---------------|
| 04. | Virtual Banking | 7 | 7/ 40 = .175 |
| 05. | Internet Banking and WAP | 21 | 21/ 40 = .525 |
| 06. | Any Branch Banking | 35 | 35/ 40 = .875 |
| 07. | Tele-banking | 21 | 21/40 = .525 |
| 08. | Point Of Sales (POS) Service | 21 | 35/ 40 = .875 |
| 09. | SWIFT Channel | 40 | 40/40 = 1.00 |
| 10. | Remittance (Electronic Way) | 31 | 31/ 40 = .775 |
| 11. | Call Center | 7 | 7/ 40 = .175 |

Table-2: Position of E-Banking in Bangladesh (As on May 31, 2009)

Choice of authentication technology:

Match authentication technology to the risk profile of the business process

Usually the cost as well as security of password, one-time password, and handheld token and digital certificate is lower than the cost and security of smart card and biometrics.

21st century online applications:

- | | |
|------------------------------------|--------------------------|
| (i) Access our bank accounts | (xix) Receive Healthcare |
| (ii) Transfer money | (xx) Order medicines |
| (iii) Make investment | |
| (iv) Pay Bills | |
| (v) Apply for loans and mortgages | |
| (vi) File tax returns | |
| (vii) Purchase goods and services | |
| (viii) Top-up mobile phones | |
| (ix) Sign contracts | |
| (x) Change addresses | |
| (xi) Track parcels and shipments | |
| (xii) Access governmental services | |
| (xiii) Collect dividend | |
| (xiv) Vote | |
| (xv) Play online games | |
| (xvi) Gamble | |
| (xvii) Bet | |
| (xviii) E-procurement | |

Physical Security

For ensuring physical security, the main focus should be given on temperature/humidity control, neat and orderly computing rooms, fire suppression equipment, uninterrupted power supply.

Network Security

For ensuring data integrity, data confidentiality, data availability, proof of origin, peer entity authentication, non-repudiation, the main focus should be given on documentation of the network, IP addresses, routers, firewalls, virtual private networks (VPN), wireless, all other devices, creating and disabling accounts, passwords protocols, identification of redundant network connection.

Back-up

Databases back-ups should be performed approximately at the end of business day. Back-up media include hard disk, portable external hard disk, DVDs, data storage devices. All back-ups should be stored at the head office IT division for restoration.

Security Mechanisms

Encryption

Encryption is the usual way to meet the data confidentiality requirements and although using a symmetric algorithm (symmetric or asymmetric) could be used, there are good reasons for using symmetric (such as DES).

Message Authentication

A Message Authentication Code (MAC) is a cryptographic checksum, calculated using a symmetric algorithm, which is appended to a message and which can be verified by the recipient of the message. The use of MAC is one method of providing the integrity and authentication services, but it is not appropriate for meeting the requirements for non-repudiation.

Digital Signature

A digital signature is a checksum, calculated using the private key of an asymmetric key pair, which is appended to a message and which can be verified by anyone with access to the corresponding public key. The digital signature is dependent on the complete message, so any change to the message will be detected. The real difference between MAC and digital signature is that as well as providing integrity and authentication, the later also provide non-repudiation.

Algorithms and Cryptographic Mechanisms

The constraint linked with each cryptographic algorithm (computation resources, time to compute, key management, algorithm capability and design...) limits their use for only a given number of security services. The following table lists the main security services and states whether RSA or DES (Data Encryption Standard) can address them.

| Security Service | DES | RSA |
|-------------------------|------------|------------|
| Confidentiality | Yes | No |
| Integrity | Yes | Yes |
| Authentication | Yes | Yes |
| Non-Repudiation | No | Yes |

Three Factors Authentication

- (i) Something the user knows (e.g., password, PIN)
- (ii) Something the user has (e.g., ATM card, Smart Card) ; and
- (iii) Something the user Posses (e.g., Biometric characteristics, such as finger print)

Properly designed and implemented multifactor authentication method is more reliable and stronger fraud determinants. Today's ATM (Debit or Credit card) uses multifactor (as mentioned earlier) authentication system.

Operational Issues

The main operation issues with regard to cryptographic systems tend to relate either to initialization or investigation and recovery when things go wrong. Most financial institutions will have a security department with responsibilities which include: key management, physical and logical access control, security training and awareness, disaster recovery, security investigations/ audit, security procedures and standards, design and acceptance of security systems. The most important of these is the management of the keys.

Conclusion:

The present status of e-banking is not satisfactory in case of virtual banking, call center and SMS banking. But all banks under study have their connectivity with **SWIFT** channel. Major reason is that security concern. One study in Europe reported that there is 2.6% increase in establishment of Bank branches. That means that E-Banking is declining in Europe. The main concern is security. So, data confidentiality, integrity, proof of origin, peer entity authentication, non-repudiation must be ensured. A few problems have been experienced by the IT heads in the Banks such as withdrawal of money beyond the limit. This has taken place at ATM booths because there is agreement between Banks regarding networking sharing. Gigantic fraud does not take place because there is limit in ATM Debit and Credit card to withdraw money from the booths.

Recommendations for Ensuring Secure E-Banking in Bangladesh:

Requirements for Preventing Credit Card fraud:

- (A) Build and maintain A secure Network:
 - (i) Install and maintain a firewall configuration to protect cardholder data.
 - (ii) Do not use vendor-supplied defaults for system passwords and other security parameters

- (B) Protect Cardholder data:
 - (i) Protect stored cardholder data.
 - (ii) Encrypt transmission of cardholder data across open, public networks.

- (C) Maintain a Vulnerability Management Program
 - (i) Use and regularly update anti-virus software
 - (ii) Develop and maintain secure systems and applications.

- (C) Implement Strong Access Control Measures
 - (i) Restrict access to cardholder data by business need-to- know
 - (ii) Assign a unique ID to each person with computer access
 - (iii) Restrict physical access to cardholder data

- (D) Regularly Monitor and test Networks
 - (i) Track and Monitor all access to Network resources and cardholder data.
 - (ii) Regularly test security systems and processes

- (E) Maintain a policy that addresses information security.

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