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## E-BANKING:AN APPLICATION OF ICT

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## Introduction

e-Banking can be defined as "A system that allows an individual to perform banking transactions from home/office (virtually anywhere) It provides a 24x7 access to the bank at the ease of the customer. This is the most convenient way to make the financial and non-financial transaction without physically visiting the Bank. What attracts customers to internet banking is the round the clock availability and ease of transaction. Several Banks are offering the e-Banking services to attract the customers.

## History

Online banking has been around for quite a few years. In fact, it was introduced in the 1980s and has come a long way since then. The precursor for the modern home online banking services were the distance banking services over electronic media from the early 1980s. The term online became popular in the late 80s and referred to the use of a terminal, keyboard and TV (Or monitor) to access the banking system using a phone line. 'Home banking' can also refer to the use of a numeric keyboard to send tones down a phone line with instructions to the bank. Online services started in New York in 1981 when four of the city's major banks (Citibank, Chase Manhattan, Chemical and Manufacturers Hanover) offered home banking services using the videotex system. Because of the commercial failure of videotex these banking services never became popular except in France where the use of videotex (Minitel) was subsidized by the telecom provider and the UK, where the Prestel system was used. The UK's first home online banking services was set up by Bank Scotland for customers of the Nottingham Building Society (NBS) in 1983. The system used was based on the UK's prestel system and a computer, such as the BBC Micro, or keyboard (Tandata Td 1400) connected to the telephone system and television set. The system (known as 'Homelink') allowed on-line viewing of statements, bank transfers and bill payments. In order to make bank transfers and bill payments, a written instruction giving details of the intended recipient had to be sent to the NBS who set the details up on the Homelink system. Typical recipients were gas, electricity and telephone companies and accounts with other banks. Details of payments to be made were input into the NBS system by the account holder via prestel. A cheque was then sent by NBS to the payee and an advice giving details of the payment was sent to the account holder. BACS was later used to transfer the payment directly. Stanford federal credit union was the first financial institution to offer online internet banking services to all of its members in October 1994. (citation needed) Today many banks are internet only banks. Unlike their predecessors, these internet only banks do not maintain brick and mortar bank branches. Instead they typically differentiate themselves by offering better interest rates and online banking features. ICICI was the first bank to initiate the Internet banking revolution in India as early as 1997 under the brand name 'Infinity'

## Classification

e-Banking is broadly classified in several categories including

- i) Internet Banking (Online Banking / Netbanking)
- ii) Mobile Banking
- iii) Phone Banking
- iv) Others

## Internet Banking

Online banking (also called Internet Banking or simply Netbanking) allows customers to conduct financial transactions on a secure website operated by their retail or virtual credit union or building society

## • Advantages

- Provide up-to-date account information
- Netbanking lets you manage your account from the comfort of your mouse – anytime, anywhere.
- No queues to stand in, or turns to wait for
- Paperless
- Secure

## Features

The features of internet banking are broadly classified into two categories

**Transactional Features :** These include performing a financial transaction such as an account to account funds transfer, paying bill, drawing demand draft, Fixed deposit, apply for a loan, stop payment instructions etc.

**Non-Transactional Features :** These include viewing/downloading online statements, viewing recent transactions, balance, cheque status, Cheque book request, etc.

## Transactional Features

**Fund Transfer :** This allows online transfer to your own or third-party accounts. The funds can be transferred between two accounts, within the same bank. This is quite simple and is handled normally by the same bank. While the funds can be transferred between accounts from two different banks. This can be accomplished in two ways

**NEFT (National Electronic Funds Transfer):** NEFT is a nation-wide system that facilitates individuals, firms and corporate to electronically transfer funds from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country. This system operates on a Deferred Net Settlement (DNS) basis which settles transactions in batches. There is no limit-either minimum or maximum-on the amount of funds that could be transferred using NEFT.

**RTGS (Real Time Gross Settlement System):** RTGS can be defined as the continuous (real-time) settlement of funds transfers individually on an order by order basis (without netting). Considering that the funds settlement takes place in the books of the Reserve Bank of India, the payments are final and irrevocable. Real Time means the processing of instructions at the time they are received. Gross Settlement means the settlement of funds transfer instructions occurs individually (on an instruction by instruction basis). As per Reserve Bank of India guidelines, the Minimum amount of transaction using this system is Rs 2 Lakh.

## Bill Payment:

Banking online allows you to make instant payments of your electricity, telephone, gas, credit card and other bills. This facility can also be used to pay loan premiums, insurance premiums, etc. You can give standing instructions to the bank to pay your recurring bills automatically. All you need to do is complete a simple one-time registration for each biller. Besides being convenient it's a free service you can also check your transactions at any time of the day and as many times as you want. Thus there is no need to store the receipt of bill payment.

## Apply for Demand Draft

You can make an instant online request for Demand Draft. This demand draft can be sent your address or even be sent to some third-party also. Thus it reduces lots of overheads. The service is available at nominal charges applicable (Rs 30 in case of HDFC Bank)

## Apply for Fixed Deposit :

You can view several deposit schemes offered by your banks and make an instant online request/application for investing in the appropriate F D scheme.

## Credit card payments and management :

Credit card users can pay their credit card bills online and get a loan on their cards. They can also apply for an additional card, request a credit line increase and report lost cards online. Besides this the customers can view the latest unbilled transactions and download the statement.

## Trading in Stocks

Some banks even provide the facility for online sale and purchase transactions for various shares/mutual funds. For this purpose most of the lending banks generally offer banking, demat and trading accounts.

## Non-Transactional Features

These include transaction like check current balance. Get Account statement. Now cheque book request, apply for new account and more. Requesting the bank for a statement would not only cause to lose time but also money in the form of charges levied for the statement. Moreover the bank would take time (may be in few days) to deliver it at your doorstep. Using online banking the customer can get account statement for any period within seconds that too without paying any charges.

## Security threats

Most of the attacks are based on deceiving the user to steal login data and other account information. Though Internet banking provides so many advantages, some people do not prefer to use it for their banking



needs. This is because foremost reason on the mind of any account holder is the security concern. Most of the attacks are based on deceiving the user to steal login data and other account related information. Some of the well-known techniques used for these attacks include phishing, pharming, cross-site scripting, key logger, Trojan horses, etc.

**Phishing** : This is a way of attempting to acquire sensitive information such as usernames, passwords and credit card details by masquerading as a trustworthy entity in an electronic communication. phishing (also known as carding or spoofing) derives its name from the use of sophisticated lures (such as emails designed to look like they come a real company or institution) that are created by unsavory characters to "fish" for users' financial information, credit card details, and passwords phishing is a form of online identity theft that employs both social engineering and technical tactics to steal consumers personal identity data and financial account credentials.

**Pharming** : This is hackers attack aiming to redirect a websites traffic to another, bogus website. This automatically enables the hackers to get confidential and sensitive information. Pharming can be conducted either by changing the hosts file on a victims computer or by exploitation of a vulnerability in DNS server software. Compromised DNS servers are sometimes referred to as "poisoned".

**Cross-site scripting** : This enables attackers to inject client-side script into web pages viewed by other users. It may be used by attackers to bypass the access controls. Their effect may range from a petty nuisance to a significant security risk, depending on the sensitivity of the data handled by the vulnerable site and the nature of any security mitigation implemented by the sites owner cross-site scripting holes are web-application vulnerabilities which allow attackers to bypass client-side security mechanisms normally imposed on web content by modern browsers.

**Keylogger** : Key logging is the action of tracking (or logging) the keys struck on a keyboard, in a manner that the user is unaware of this. The user-id, password and other account related confidential information typed by the user is logged and can be used later for frauds. There are numerous keylogging methods ranging from hardware and software-based approaches to electro magnetic and acoustic analysis.

**Trojan horses**: A Trojan horse, or Trojan is a destructive program that masquerades as a benign application. The software initially appears to perform a desirable function for the user prior to installation and/or execution, but (perhaps in addition to the expected function) steals information or harms the system. Unlike viruses or worms, Trojan horses do not replicate themselves, but they can be just as destructive.

### Security in internet banking

The traditional method of protection through single password authentication is not secure enough in internet banking. There exist several countermeasures to avoid attacks mentioned earlier. Some of the well-known mechanisms for ensuring security include session expiry, TAN, Secure Access, SSL certificates, Advanced Encryption standard, etc. We need some additional security techniques that essentially provide solution to protect the bank account from hackers and fraudsters.

**Session expiry** : Just in case if the user leave computer idle/unattended during online banking session, somebody can access it. Hence usually the online banking session is closed if it remains inactive for a specific period of time. (e.g. 5 minutes). To continue, the user has to once again log-in.

**TAN (Transaction Authentication Number)** : TAN is used by some online banking services as a form of single use one-time passwords to authorize financial transactions. TANs are a second layer of security above and beyond the traditional single-password authentication. This even if the login data are obtained, no transactions can be performed without a valid TAN. There are several types of TANs like Classic TAN, Indexed TAN (ITAN), Indexed TAN with CAPTCHA (ITANplus) and Mobile TAN (mTAN)

**Secure Access** : This mechanism is followed by some of the banks online banking portals. It is a two-step login process.

**Screen-1** displays the user interface for entering the Customer ID while next screen i.e. **Screen-2** displays the user interface for entering the password.

**SSL (Secure Sockets Layer) Certificate** : Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), are cryptographic protocols that provide communication security over the Internet. TLS and SSL encrypt the segments of network connections above the Transport Layer, using asymmetric cryptography for privacy and a keyed message authentication code for message reliability.

**AES (Advanced Encryption Standard)** : This is a symmetric-key encryption standard comprising three block ciphers, AES-128, AES-192 and AES-256. Each of these ciphers has a 128-bit block size, with key sizes of 128, 192 and 256 bits, respectively. The AES ciphers have been analyzed extensively and are now used worldwide.

### Do's and Don't's in internet banking :

#### • Do's :

- Change your passwords at regular interval.
- Choose a password difficult for others to guess or crack but easy for you to remember.
- Destroy pin or password mailers immediately after memorizing them
- Ensure that you have typed the proper URL in the address bar Preferably, the netbanking site can be added to the favorites.
- Secure your PC with a legal, reputed anti-virus.
- Ensure that URL of the login page starts with https://. It indicates that the website is a secured one that follows various encryption standards.
- Look for the padlock sign at the right bottom of the browser and the security certificate.
- Logout properly.
- Clear your browser's history after each session, especially if you have used a shared computer.

#### • Don't's:

- Do not store passwords on your computer in any format.
- Don't use too small passwords and try to avoid repetition of characters.
- Never provide your password over the phone or any request over email.
- Do not click on any link which has come through email from an unexpected source. It may contain malicious code or could be an attempt to 'Phish'
- Avoid downloading program from unknown sources.
- Never open email attachment sent by unknown sender or are suspicious.
- Avoid using untrusted systems like internet café PC for internet banking. In case you use, change the passwords thereafter.

### Mobile Banking

Mobile Banking refers to provision and avallment of banking and financial services with the help of mobile telecommunication devices such as mobile phones, PDAs, It provides a 24x7 access to convenient, simple, secure, anytime and anywhere banking. Services are available through sms and custom mobile applications. This is also known as m-Banking or sms-Banking.

#### Services through sms :-

These services are available on all phones that may or may not support java. The mobile phones need not be equipped with GPRS. This type of services does not require any specialized mobile software. Hence there is no explicit need to download any application to your mobile. Usually the service are provided free of charge by most of the banks. The customer has to pay only the Ordinary SMS charges that are applicable to the mobile service provider.

#### • Typical Services available :

- Balance Enquiry/ Mini Statement.
- Mobile Top-up
- DTH Top up/recharge
- IMPS- Interbank Mobile Payment Service.
- Change MPIN

#### Services through application / WAP :

Since these services need some custom mobile applications, these are available on java enabled phones. The phone may or may not be equipped with GPRS. The user has to download the appropriate application to the mobile handset. This application contain interface for all required services. These services can also be availed via WAP on all phones (java/non java) provided the phone must be equipped with GPRS connection.

#### • Typical Services available :

- Balance Enquiry / Mini Statement
- Funds transfer (within and outside the bank)
- Interbank Mobile Payment Services (IMPS)



- Cheque book request
- Demat Enquiry Service
- Bill Payment (Utility bills, credit cards, Insurance premium)
- Mobile Top up
- M-Commerce (Top up of DTH connections, SBI life insurance premium)

### **Security**

Security of financial transaction, being executed from some remote location and transmission of financial information over the air, are the most complicated challenges. These need to be addressed jointly by mobile application developers, wireless network service providers and the banks IT departments.

The following aspects need to be addressed to offer a secure infrastructure for financial transaction over wireless network :

1. Physical part of the hand-held device. If the bank is offering smart-card based security, the physical security of the device is more important.
2. Security of any thick-client application running on the device. In case the device is stolen, the hacker should require at least an ID/Password to access the application.
3. Authentication of the device with service provider initiating a transaction. This would ensure that unauthorized devices are not connected to perform financial transactions.
4. User ID/Password authentication of banks customer.
5. Encryption of the data being transmitted over the air.
6. Encryption of the data that will be stored in device for later / off-line analysis by the customer.

One-time password (OTPs) are the latest tool used by financial and banking service provider in the fight against cyber fraud. Instead of relying on traditional memorized passwords, OTPs are requested by consumers each time they want to perform transaction using the online or mobile banking interface. When the request is received the password is expired once it has been used or once its scheduled life-cycle has expired.

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