THEORETICAL FRAMEWORK OF E-BANKING

This chapter deals with the various aspects related to emergence and evolution of e-banking with a major focus on the role electronic channels in banks, emerging technologies which are already in the adoption stream and the ones to be adapted. E-banking must have drivers which enable it to move faster to satisfy the demands of thousands of customers around the world. This chapter also looks at four dimensions from which e-banking developers must focus in order for them to become successful in implementing e-banking technology. These include developing capabilities, Customer value proposition, Business value proposition and e-banking environment. When trying to achieve the objective of this research growth and trends analysis of e-banking on the two country perspective was done and it was discovered that, both Indian and Kenyan banking industries have adopted a variety of technologies including plastic cards, internet banking, SWIFT, Core Banking Solution and it was revealed also that the trend is upwards which shows prospects of e-banking success in future.

4.1 The Electronic Revolution in the Banking

The electronic revolutions in the banking sector, basically, centers on changes in distribution channels of financial institution. The basis for the emergence of modern electronic distribution channel is the result of the evolution of the concept of money in the days of barter trade. The ability to pay for goods and services was reflected in the physical existence of goods which could be used for exchange (Santh et al., 2000). Electronic technology has proved to be a solution for banks to cope with the multiplicity of challenges before them. Everywhere in the world it has penetrated in a full swing to the financial sector as a whole. This is because of the changes in the advanced technology which has touched every sphere of life. E-banking made its debut in UK and USA in 1920. It became more popular during 1960s through electronic funds transfers and credit cards. The concept of web-based banking came into existence in Europe and use in the beginning of 1980s. It has been estimated that around 40 percent of banking transactions would be done through net (Gurusamy, 2001). After 1960, e-banking and its use recorded a quantum jump. In the year 1991, this form of banking took a great leap in which home,
office and telephone banking was made more effective as a means of selling and delivering products. At the same time, the rapid rising cost of operating a physical branch network, particularly in terms of staff and premises and making the traditional channel less attractive.

E-banking has not yet found clear definitions since it has not attained popularity in the legal sphere. Hence many researchers have defined it differently. Jones, (2004), defined e-banking to be the use of electronic methods to deliver traditional banking services using any kind of payment media. By traditional banking services here it means taking deposits, making loans and clearing payments. E-banking is generally, an extension of traditional banking, using the internet as an electronic delivery channel for banks products and services (Basel, 2003). Due to the competition arising amid financial institutions and the strong demand of customers to cope with the changing economic and life style, the traditional banking practices have been abandoned and people are turning to “clicks” and abandoning “mortar and bricks”. No-w-days, there is no need of buildings but there is a need of banking services as Bill Gates once said. Electronic banking is an umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick and mortar institution. Kaptan and Choubey have defined e-banking as “delivery of bank services to a customer at his/her office or home by using electronic technology”. The quality, range and price of this electronic service decide a banks competitive position in the industry.

The effect of e-banking is to argument or facilitate existing banking and payment mechanisms, primarily by making many transaction cheaper, faster, more service and more convenient. The definitions above imply that e-banking has been talking place in various forms for decades. Telephone banking, for example which enables account holders to conduct several kinds of transactions has been in use since the advent of touch-tone dialing. Similarly, Automatic Teller Machines (ATMs) are a form of retail e-banking in use since the mid 1970s and nearly on universal use since the late 1980s.

E-banking in the form of Micro Ink Character Recognition (MICR) technology for payment, clearing and setting has been in use even longer then the retail e-banking technologies. E-banking has proved to be cost effective and has generated many advantages to banking, customers and economy as a whole. This is proved with evidence
from many researches which have been conducted. According to ABC calculation data provided by Hansa-bank, the relative list of simple domestic payment through different bank distribution channels are as follows. Online payments are 12.5 times cheaper offline bank payment are 30 times cheaper, and direct debit is 50 times cheaper then traditional transactions conducted in the branch net work (Lustsik, 2004). According to a survey by Booz, Allen and Hamilton, an estimated cost providing the business of full service Branch in USA is $1.07 per transaction, as compared to 54 cents for telephone banking, 27 cents ATM banking and 1.5 cents for Internet banking. In Nordean Bank Finland, one online transaction cost the bank an average of just 11 cents, compared to $ 1 for a transaction in the branch. The difference in a net cost between the USA and Finish banks can be explained by smaller population in Finland and the scale effect in case of the USA (Lustsik, 2004).When comparing this information with price list fee, it allows us to assume the high profitability of e-channel banking services for banks. This preaches good news for financial institutions to invest in technology to reap more in future. On the other side adoption of this technology will benefit clientele in many ways including relief from constraint in bank halls, saving time and cost, convenience and creating comfortability.

To be sure, the most enthusiastic predictions of the diffusion of e-banking have been disappointed, as well as the predictions of the demise of traditional “dinosaur” banking organization commentators outside the banking tend to exaggerate the importance of new products and services and play down old practice. While future predictions have become more realistic, the importance of e-banking should not be underestimated because of the limited success of the pure Internet start-ups and the bursting of the “dotcom bubble”. Existing banks have been seemingly able to satisfy those customers who wish to use the internet and many start-ups as they have preferred trusted brand names and been concerned about the safety features (Quiros, 2002).

4.2 Role of e-channels in banking Services

Electronic banking is the newest delivery system of banking services. The definition varies amongst researchers partially because electronic banking refers to several types of channels through which a bank’s carry out most retail banking services via computer, television or mobile phone (Lustsik, 2004). Some researchers have
Chapter 4

described e-banking as an electronic connection between the bank and customer in order to prepare, manage and control finances and transaction. Electronic banking has changed the way the banking industry considers non-traditional channels of delivering services to customers (Ahmad, 2006). No doubt in the future banking environment will be more paperless and will overcome the traditional barriers of distance and geographic boundaries. ‘e’ channels promises to be more efficient by providing low cost operations and access, to financial services remotely.

E-banking can be defined as the deployment of banking services and products over electronic and communication networks directly to customers (Singh and Malhotra, 2004). These electronic and communication network includes Automated Teller Machines (ATMs), direct dial-up connects, private and public networks, the internet, televisions mobile devices and telephones (Boateng, 2006). Among these technologies, the increasing penetration of personal computers, relatively easier access to the Internet and particularly the wider diffusion of mobile phones has drawn the attention of most banks to e-banking. However, the continuing convergence of information, communications and media technologies is also opening up new electronic channels of delivering banking services. In relation to this, the best example is ‘M-Pesa’, which is a mobile enabled banking service which was launched in Kenya in the month of March 2007. This service enable users to send money to all mobile phones, borrow money, pay for shopping or other bills and even have their salary paid to their phones (Mogusu, 2007). In recent years it has been observed that ‘e’ channels are playing a greater role in attracting and retaining customers. Floh and Treiblmaier, (2006) in their study have tried to investigate the importance of antecedents of online loyalty such as trust and quality of the web site. The Result confirms that loyalty of e-banking is directly affected by satisfaction and trust in an online bank, which in turn are determined by website quality and service quality. The survey by Karjaluoto et al. (2002) showed that, prior experiences with computers and technology as well as people’s attitudes towards computers influences both their attitudes towards online banking and their actual behavior. In the study of Ahamad (2006), it is pointed out that e-banking and e-transactions channels are the backbones of e-economies which have proved to be a powerful instrument to increase productivity generate economic growth and which consequently improve the people’s
quality of living. To keep pace with the advancement in technology and to minimize the digital divide, developing countries need to put ICT on their priorities list, follow policies of creating conducive environment for technological innovation and its effective use in all sectors including the financial sector.

Electronic banking can significantly increase the efficiency of transaction processing (Cracknell, 2004). It is also evident that banks have so far shown a clear preference for a “multi-channel” Strategy. In this strategy, banks offer customers the possibility to acquire banking product and services through abroad set of distribution channel. A customer may prefer to use a different channel depending on the type of service or time of the day, and the bank is expected to accommodate these preferences. The physical branch has so far continued to be the most important customer contact point and the most commonly used channel to purchase banking products. A multi-channel strategy may be an effective way to retain the customer on the other hand; it is clearly an expensive option in the long term, as it is necessary in all distribution channels and to keep up with all relevant technological developments. It may not therefore be a strategy suited to every bank, and especially for smaller institutions the cost can be prohibitively high. Moreover, such a strategy makes the banks vulnerable to inroads by more focused and lower-cost providers. In the future, these competitors could increasingly come also from outside the traditional banking sector e.g. from the technology sector (Quiros, 2002). The combination of e-channels and services can lead to four strategic options or positions if applied in the right way (Fig 4.1). We refer to them four positions/options as experimenters, channel innovators, service innovators and optimizers (Boateng, 2006).
Figure 4.1
Strategic options for e-banking channels

Source: Boateng (2006)
Banks in the experimental quadrant refer to those banks that provide information push to information download services through single or dual delivery channels. Experimenters may achieve the benefit of extending the marketing reach of their services and attracting potential customers as the public becomes more informed. Experimenters can decide to grow their e-banking either by adding more channels to render the same service or by adding more services with existing channels. Banks that focus on complementarities of services delivered through multiple channels may be characterized as channel-innovators. By increasing the accessibility of services provided through multiple-channels, channel-innovators have the potential of developing a unique value proposition to their customers.

The increase in sophistication of services requires moving from basic information-oriented services to full-transactional services. Service-innovators tend to specialize on one or two channels but increase the services that can be delivered over these channels. The choice of using a limited number of channels can be justified due to operational constraints, (like limited resources and capabilities, external constraints (such as market readiness) and value proposition to customers (core purpose). Service innovators need to expand the services through multiple channels existing and new, such banks move to the optimal level becoming optimizers. This position indicates banks whose processes are integrated and services are seamlessly provided through multiple channel. Thus banks become more visible and increase their market reach by attracting more new customers; improve their reputation and create a potential competitive advantage. Boateng (2006) argues that, the challenge for banks is moving through these strategic positions and is to define a strategy for enticing customers to migrate to e-banking services and for managing potential channel conflict as customers reach a critical mass (Boateng, 2006).

4.3 The Emerging E-Banking Technologies

The evolution of e-banking can be traced to the early 1970s. Banks began to look at e-banking as a means to replace some of their traditional branch functions, for two reasons. Firstly, branches were very expensive to be set up and maintain due to the large overheads associated with them. Second e-banking products/services like ATM and
electronic funds transfer were a source of differentiation for banks that utilized them. Being in a fiercely competitive industry, the ability of banks to differentiate themselves on the basis of price is limited. Technology has introduced new ways of delivering banking to the customer, such as ATMs and internet banking. Hence, banks have found themselves at the forefront of technology adoption in the past three decades. It is imperative for banks to align their strategies in response to changing customers’ needs and development in technology (Singh et al., 2002). Technology will allow banks to be closer to customers to deliver a wider range of services at lower costs, and to streamline interest systems so that all data is together in one place where it can be used to sport trends that can lead rapidly to new products (Sobti, 2003). Electronic delivery of banking services will allow data to be gathered and analyzed. Interactivity will give consumers an opportunity to register their preference, actually steering to development of new products. The following include some of the well-known technologies which have been developed to make the better utilization of opportunities driven by Information and Communication Technology in the banking industry. They are divided into two broad types according to this research. This includes Retail e-banking technologies and Wholesale e-banking technologies as it is well shown in Chapter 1 (fig.2)

4.3.1 Automated Teller Machine (ATM)

ATMs, may be considered to be product development or, perhaps more appropriately, as innovation in the delivery of financial services. ATMs have progressed from being merely cash dispensers to provide facilities for deposit, balance reporting and inter account transaction (Sobti, 2003). ATMs are cash dispensing machines which are frequently seen at banks and other locations such as shopping centers and building societies (Kaptan, 2002). An ATM card is issued to the customer by the bank in order to make cash withdrawals at cash machines (Gurusamy, 2001). It allows customers who are provided with ATM cards to do routine banking transactions without interacting with banking personnel, 24 hours a day, 7 days a week (Verma, 2006). The card has micro ink character recognizing (MICR) coding by which the computer can identify the customer. Once the card is accepted, the machine asks the personal identification number (PIN) on the visual display screen. The PIN is known only to customers who are intimated by the
computer at the time of opening of the account. Even the bank staff does not know this number. After the account holder punches the code number, the video screen asks how much is to be withdrawn, the balance, or is within the keyed in and if it is within the balance or within the overdraft limit, the money is spurted out along with the card (Sobti, 2003).

In India, Citi Bank for example, and other banks have developed a unique ATM feature which has the ability to combine their computers and vending machines. The machine dispenses cash, accepts cash, cheques for deposit and gives balance, registers requests for statements of account and cheque books. Citi Banks ATM in India is an on-line service. This means that the master computer which has overall control over ATMs, not only controls them, but also has a link to the main banking computers which has all relevant information. Because of this, ATM can tell the account balance and credit available to client/customers. The most advantageous features of ATMs are, the 24 hour availability, time saving convenience aspect, avoidance of queues and the perception that bank staff has more time to deal with counter customers. There are also other features which attract criticism which include, the breakdown, lack of cash, lack of certain facilities, personal safety when withdrawing of unauthorized use, mistakes, lack of privacy, impersonal nature (i.e. prefer counter service) and queues. Some of these criticisms are real and others are merely perceived deficiencies either way, they are of concern to the banks and in the long term will be reduced through further technological development, improved security and advertising and promotion.

The concept of consumer financial services delivery has changed. Besides quick and better service, the customer now demands the facility to withdraw the money all the twenty four hours. The trends of automatic consumer self-service terminals and the heightened public way of automated transaction have initiated a new era in banking. As a result, Automated teller machines (ATMs) are set to play an important role in banking. Banks should introduce this facility at a large scale in order to provide better services to customers. Most of Automated teller machines are offering the following services.

- Cash transaction (withdrawing)
- Extended hours service (24 hours)
- Across the bank payment (Funds transfers)
• Utility payments (Bills payment)
• Balance inquiry
• Printing of statement of account
• Cheque deposit
• Request for cheque books
• Standing instructions and statement of account

**Advantages of ATM to the ATMs card user**

- ATMs banking has an ability to draw cash outside normal banking hours
- It is cheaper where bank charges are incurred and often quicker than using normal cashier service
- ATMs give a limit of amount which one can withdraw per day which may be a good base for cash management.
- In case of a joint account two cards can be issued
- Although ATMs are primarily located on bank sites, some are available off sites to be used.
- Complete security feature is found in ATM card as only the card holder knows the PIN.
- ATM card is issued free of charge
- Point of sale facilities
- Mobile recharge and top ups
- Advertisement services
- Frequently asked questions facility

**4.3.2 Telephone Banking**

Tele banking is a system, through which a customer can do entire non cash related banking transaction over the telephone (Verma, 2006). It can be operated either through personal identification number (PIN) or by digitizing the voice of the customers to ensure genuineness of the enquiry. It results in improved customer satisfaction within available infrastructure facilities. Customer calls up his bank, utter his password and effect the transfer (Sobti, 2003). Tele banking came into operations in the 1970s in developed countries like USA (Gurusamy, 2001). Under this system data are exchanged either by
means of file transfers, credit transfers, direct debit orders and cheques or by means of online interactive input orders. Since telephone banking has widely been in use for quite sometime, it is illustrative to see its current usage. A survey conducted in USA in 1997 by PS Global, revealed that 100% of the respondents were using telephone banking to check their account balance. 67% were using it to review cleared cheques, 52% to transfer funds, 33% to check credit card balance, 18% to place stop payment, 14% to inquire trade investment, and 12% to open account. See below:

**Table 4.1: A survey on telephone banking usage in USA in 1997 by PSI global**

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check account balance</td>
<td>100%</td>
</tr>
<tr>
<td>Review cleared cheques</td>
<td>67%</td>
</tr>
<tr>
<td>Transfer funds</td>
<td>52%</td>
</tr>
<tr>
<td>Check credit card balance</td>
<td>33%</td>
</tr>
<tr>
<td>Place stop payment</td>
<td>18%</td>
</tr>
<tr>
<td>Trade investment</td>
<td>14%</td>
</tr>
<tr>
<td>Open account</td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: (Verma. 2006)

Tele banking is accessible by corporate customers which have large volumes of payment to effect and dispose off a fully automated accounting system. They can establish a computer – to – computer link with their bank and in this way exchange through paperless credit transfers i.e. transfers which are handled all the way from the originator to the beneficiary’s account without any paper involved. Telephone banking is only a relatively new electronic banking product. However, it is fast becoming one of the most popular products (Verma, 2006). Customers can perform a number of transactions from the convenience of their home or office; infant from anywhere they have access to a phone. Customers can check balances and statement information, transfers funds from one account to another, pay certain bills and orders, statements or cheque books. Many banks provide this facility to their customers to know their accounting information such as: account balance – clear balance and total balance and fate of issued cheque – en cashed, not presented, slip payment etc. This facility is available with the help of a Voice Response System (VRS). This system basically, accepts only TONE dialed input (i.e. from caller’s phone instruments for dialing necessary numbers) and suitable voice
response messages to the caller (i.e. Account holder to acquire the desired account detail). In other words, the input used is the remote phone TOUCH-TONE key inputs (i.e. customers phone buttons / keys and the device is caller telephone or cell-phone). Customers can perform a number of transactions from the convenience of their own home or office; infant from any where they have access to a phone. (Verma, 2006) Also the VRS systems provide the user with additional facilities such as:

- Online feature of changing existing customer password with a new desired one.
- Password for security and protection
- Speaking out past five transactions made in A/c
- Information about sanctioned limit and drawing limit of an advance account.
- Requisition of cheque books and statement of account by customers can be placed on phone.
- Telemarketing features like information about the latest rate of interest and information about various schemes in bank for deposit of advances
- Customers can inquire balances and statement information.
- Transfer funds from one account to another
- Pay certain bills, like insurance bill, utility bills, payment of salary or wage etc.

4.3.3 Personal Computer Banking (P.C Banking)

PC banking is also a fast growing area in electronic banking. It lets customer’s access information on their accounts through a dial-up connection with their bank (Kaptan et al., 2003). It is the facility of performing banking transaction from home or office with the help of a computer system. The client must have a personal computer. This technology offers a wide range of facilities using terminals in customers who are linked with the bank’s computer network. Customers can also perform basically all the transactions that are available with telephone banking. They also have some ability, in some cases to download information and process in their own financial management software (Verma, 2006). The first commercial in-home or PC banking in the UK was launched by a building society in 1983. (Sobti, 2003) offering a two way communication system to any subscriber. Two-thirds of European banks now offer home banking systems which provide account integration, payment of bills, inter-account transaction,
loan generation and other banking facilities (Kulkarni, 2004). The problem however lies in the communication link between the computer and the customer (Kaptan, 2003). While the telephone could be used, customers would be unwilling to pay trunk call charges to access their bank. The problem of improper network may affect this system but the current development in cabling several cities may well lead to a service such as this on a local basis in the future. Also this system is not mostly used in developing countries like India and Kenya because large masses of people cannot afford to own a computer in their home and since most of them do not have computer skills.

4.3.4 Cell Phone Banking

The phenomenal expansion of mobile phone networks in India, Kenya and other parts of the world, provides an opportunity to operate virtual bank accounts through mobile phones (Cracknell, 2004). Either through menu driven systems, SMS or text messaging technology, is already being used by millions of customers. The rapid spread of mobile phones means that the number of mobile users may already exceed the number of banked people in many countries (Porteous, 2006). Mobile phone banking may not only reduce the cost of financial transactions for provider and customers, but also allow new entrants to the financial sector and new relationships to be formed for distributing services. These changes hold the prospect of accelerating access to financial services on the back of the mobile infrastructure. Compagne, (2002) observed that, over the past few years there has been almost explosive growth of cellular telephony, first in the major urban areas and rapid penetration into all commercial centers.

In many countries mobile cell phone is in common use at all economic levels from business, taxi drivers, in rural towns and at the bus stops and market places where much of the business is conducted. This is creating a better base for financial institutions to reach a mass of customers to offer their technology driven products and services. In India it was revealed from IAMAI’s report online banking 2006 that, there were 38.5 million Internet users in India and the number is set to grow to 100 million by 2007-2008. Also an estimate of around 4.6 million Indian Internet users are banking online today and with the efforts of the government and the industry, the number is expected to grow to 16+ million by 2007-08 including both internet and mobile banking (IAMAI report,
ITU study reveals also that, mobile communications have grown at a fast rate than even the internet and mobile handset is now increasingly being used as means to access information networks. At the end of 2005, there was around one mobile phone for every three inhabitants on the planet, with the total number reaching 2.14 billion (ITU, 2006). Mobile banking has the potential to be transformational because it uses existing mobile communications infrastructure which already reaches unbanked people; it may be driven by new players, such as Telco’s, with different target market from traditional banks; it may harness the power of new distribution networks for cash transactions such as airtime merchants, beyond the conventional merchant POS or ATM networks; and it may be cheaper than conventional banking, if the offering is competitive (Porteous, 2006).

The extent, to which mobile banking will be transformational in a country, will depend in large measure on whether the environment is enabling. In Sub-Saharan Africa including Kenya, a number of banks have introduced M-banking products; however most of them are at an early stage. In Kenya with sufficiently large retail banking customer base, banks have added on mobile offering as additional channel for their existing products. Although accurate numbers do not yet exist at continental level, it is likely that there are more than a million M-banking users in early 2006 (Porteous 2006). But in Kenya the number is increasing exponentially due to the introduction of m-banking product called “m-pesa” which was launched in March 2007. A data quest survey (2003) on mobile banking in India, indicated that the number of people using mobile banking services has jumped from under 10,000 in 2000 to 120,000 in 2003 and the customer base is in an increasing trend which may be directly proportional to the growth of mobile banking users. Times of India (2007) estimated that by the end of 2007 subscribers will cross 220 million and 500 million by 2010 with addition of about six million subscribers every month. Mobile banking is a comprehensive integrated SMS solution for banking in the new millennium. The age of the consumer whether you want to know the latest transactions or balances on your accounts, a simple SMS from your mobile phone is all that is needed. Mobile banking gives individual small business and corporate customers instant financial institution any where and at any time. Customer can access their accounts, perform banking and bill payment transaction or receive information from different access devices such as mobile phones (Economic Focus, 2004).
offers banking services including transfer and balance inquiries as well as comprehensive notification services. Mobile banking provides guaranteed transaction delivery, security, data integrity and continuous availability, ability to quickly add new functionality in response to business requirements, superior performance and response time to ensure customer convenience.

4.3.5 Direct Debits

Direct debits are in use in countries all around the world and are fast becoming the preferred way of paying regular bills and making utility service related payments globally (NPSK report 2003). They are pre-authorized by the paying customer who gives permission for his/her bank to debit his/her account upon receipt of instructions initiated by the receiving customer e.g. insurance or mortgage companies. In Kenya, direct debit was introduced by the Kenya bankers association and became effective from 1st June 2003 (NPSK Report, 2003). Direct debits provide a simple safe and convenient banking service that enables one “debtor” to settle his or her bills as and when they fall due.

This is typically done by the service provider “Creditor”, who initiates the transfer of funds due from the debtor’s accounts in settlement of goods sold, or services rendered to him/her. The transfer is based on the direct debit authority signed by the debtor and the service provider, provided his or her account has adequate funds to pay. Some of the advantages of this system are; it saves the customer’s time in the sense that, he/she need not to go to the bank to withdraw cash and go to the utility office to pay. Instead it is paid by the bank on due date and on behalf of the client. It will enable a customer to avoid fines imposed by utility companies due to lateness. This system will help utility entities to receive payment in time and reduce cost of operation which in turn increases revenues.

4.3.6 Cards Banking

The business demands high level of automation even in the initial stages. Computerization of operations is a must as one of the main determinants of success in this business. There is a need of processing transactions and billing customers in time (Kulkarni, 2004). Payment through cards has become increasingly important as non cash payment instruments (NPSK, 2003). There are different types of cards used as a medium of payment. This includes credit cards, debit cards and smart cards or prepaid cards. The
credit card used to be most common of the category although debit cards and smart cards are becoming popular now days.

(a) Debit Cards/ Magstrip Cards

Debit cards, often based on magnetic strip technology, allow customers online access to their accounts through a network of POS (point of sale device) and ATMs (Cracknell 2004). The principle advantages quoted by proponents of magstripe cards are low price and the requirement that transactions are performed online. Debit cards linked to a bank account, sometimes referred to as check cards, can be used at ATMs as well as points of sale and over the Internet. Anguelov (2003) argues that the multiple uses of debit cards have contributed to the technology’s increasing popularity. The study reveals that between 1995 and 2002, the number of debit card transaction in the US grew nearly 42 percent a year. By 2003, the number of POS debit transactions stood at 495 million a month up 21 percent from 2002 (Angualov, 2003). Debit card is simply a pay type of payment to be used in contribution with the card holders having savings or current accounts. Generally the issuers would develop its ATM cards into debit cards (NPSK 2003) Examples include visa electronic cards which are an international debit card. Cracknel (2003), points out those online transactions are required for visa election. Issuing and enable arrange of value added services such as airtime top up and allowing customers to access the total balance in their account. However, the requirement for online transactions means that geographic outreach is determined in part, by the availability of reliable and affordable communications and power.

(b) Smart cards/ pre-paid cards

Smart cards are cards on which value is stored. The stored value/balance available for use reduces with usage (NPSK, 2003). In Kenya, these cards are available especially for telephone services issued by telecom, mobile phone companies and for visiting of game parks issued by Kenya wildlife services (KWS). Smart cards have a machine readable chip embedded in these cards. This chip is able to store detailed transaction records offline and perform transactions without a link to the customers account. In order to do this, value is stored on the chip by the customer and is periodically reloaded, over the counter, through ATM machines or through POS devices (Cracknell, 2004). The principle advantages quoted by proponents of the smart card are security and offline
functionality. Biometric security allows a card holder’s picture and finger prints to be stored on the card and used to identify the user. Disadvantages include the cost of the card and the risk of loss of value on losing the card. Losing smart cards where all balance information is maintained on the card is equivalent to losing cash. Where information is maintained on a host computer there is a delay before the card can be reissued to allow for offline transactions to be uploaded onto the computer system. Cracknel pointed that Eurocard, Master card and visa are currently introducing a new standard (called EMV) where all visa master card and Eurocard provided cards will be issued with a magstile and a smart chip. With this offers security advantages, it could significantly increase the cost of any mass market advantages, it could significantly increase the cost of any mass-market solution that relies upon the visa or master card distribution network (Cracknell, 2004).

(c) Credit Cards

Another digital economy tool is use of credit cards for electronic commerce transactions (Bhasin, 2003). Credit cards enable the holders to make purchases and draw cash up to a pre-arranged ceiling. The credit granted can be settled in full by the end of a specified period (NPSK 2003). The development of credit cards is probably the most significant phenomenon of the modern banking scene. A card is a convenient method of payment as an alternative to cash or cheque. It is simple and reasonably immune to financial loss compared with losing card or a cheque book. In India for instance State Bank of India brought a State Bank Card, which can be used like any ordinary cheque, to withdraw cash at a moment’s notice from any of the branches of State Bank of India or its associate’s banks even in remotest of places. There are no limits to the number of withdrawals the card holder makes or the time in which they are made; depending on the category the card holder is eligible for overdraft. This facility is also given since the holder can spend Rs. 10,000 or 5,000 at a time.

The advantages to the card holder are obvious. It is indeed a good step in improving the services provided to customers (Sobti 2003). Gurusamy (2001) revealed that in India there were about three million credit cards in circulation and the number was moving towards a increasing trend due to awareness and high penetration of technology. In Kenya, banking industry is predicting a steady growth in credit card use to main
stream business transaction, almost two decades after the crash of the Diners card and in the face of increasing cases of fraud. This means the country’s financial sector has finally managed to overcome the misgivings and misconceptions surrounding credit card use and is also sophisticated enough to deal with security and fraud. By May 2006 there were 9, 00,000 debit card holders and in contrast there were 60,000 credit card holders (The East African 2006).

4.3.7. Internet/Web Banking

Internet banking refers to systems that enable bank customers to get access and general information on bank products and services through the use of the banks web site, without the intervention or inconvenience of sending letters, faxes, and original significance and telephone confirmations (Owen, 2000). Internet banking is defined to include the provision of retail and small value banking products and services through electronic channels as well as large value electronic payments and other wholesale banking services delivered electronically (Yibin, 2003).

Internet banking also means providing banking services and product through the World Wide Web. A forester study conducted in 1999 indicated that 64% of US banks have some form of transactional web capabilities, with 27% offering checking accounts, funds transfers and basic transactions and 19% allowing loan and credit card application online. Without any question, the survey would reflect a significantly different picture, if it were numbers would be higher if that report was done today. Internet banking is receiving a great attention in the banking industry and the regulating community. This is because; it reflects a greater interest in the role of internet as a vehicle for commercial activity. However, interest in internet banking may be particularly kept because a strong case can be made that banking along with other financial services, provides a particular fertile environment for the development of e-commerce (Furst, 2001).

Internet banking can be classified into three: informational, communicative and transactional internet banking:

- **Informational internet banking**: This is the basic level of internet banking typically, the bank has marketing information about the banks product and services on a stand alone server. This level of internet banking can be provided by the bank or outsource
of while the risk to a bank is relatively low, the server or website may be Vulnerable to alteration.

- **Communicative internet banking**: This type, allows some interaction between the banks system and customer. The interaction may be limited to electronic mail, account inquiry; loan applications or static file updates (name and address changes). This also allow customer to submit application but do not permit any account transfers.

- **Advanced transactional internet banking**: This level of internet banking allows customers to execute transactions. Customers are allowed to electronically transfer funds to and from their accounts, pay bills and conduct other banking transactions online. Since a path typically exists between the server and the banks or outsourcers’ internal network, this is the highest risk architecture and must have the strongest control.

A study by Sing and Malhotra (2004) revealed that only 17% of scheduled commercial banks in India offered internet banking in the first quarter of 2004. However, among the commercial banks 51.6% offered internet banking. In Kenya few banks are offering transactional internet banking however almost all banks have websites and offer one or more electronic banking services.

### 4.4 Driving Forces for E-Banking

Banks have a growing understanding of the power of technology and have begun leveraging advances in technology to improve operations and enhance customer service. However, technology is always changing and improving and banks typically use software solution provided by a variety of vendors. (Millan, 2003) Banking globally is in the throes of change; the transformation is both fundamental and all encompassing. Technology has emerged as the strategic differentiator both enabling and driving this transformation. Banks therefore have realized that flexible solutions powered by newer generations technologies, are key drivers to achieving business agility to innovate, agility to respond and agility to differentiate.

The advent of e-business, technological innovations and globalizations are increasingly driving business to change their business traditional modes of operations.
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The Internet offers many opportunities to financial services providers in terms of modified value chains and disinter mediation, which in term, is redefining the financial service market place. Globally, the financial sector is metamorphosing under the impact of competitive, regulations and technological forces. The banking sector is currently in a transitions phase and the re-alignment of banking and financial services on the World Wide Web is accelerating the pace of charge (Unnithan, 2001). The famous quote by Bill Gates that banking is vital to a healthy economy, but banks themselves are not, highlights the critical nature of the electronic forces that are affecting banks more then any other financial service provider. Hence the drivers for charge in the evolutions of the banking sector, which have become unceasingly important as a result of the wide spread acceptance of the internet by business and consumers will include, but limited to the ones discussed bellow.

4.4.1 Factors enhancing E-banking development:

- **Changing need and perception of customers.** Increasingly customers are expecting online services from their financial institutions and electronic delivery of service is becoming a necessity. Unnithan (2001) argues that consumers are demanding and expecting more than such one set of banking products from their forays online and off-line. Banks are using internet as a strategic weapon, leveraging it as a distributions channel to offer complex products at the same quality they can provide from their physical branches, at a lower cost, to more potential customers, without boundaries.

- **Barriers to entry on longer exist in the banking industry.** Studies have observed that competitors can come from any industry to “disinter mediate” banks (i.e. eliminate banks as the interface between customers and supplies). Product differentiation is very difficult for banks, since most of the products sold in retail banking are constrained by legal or industry regulations and in any case are imitated. For example Safaricom in Kenya, a telecom institution recently with collaboration with Vodafone of UK launched a mobile banking service in Kenya, which enables clients to transfer, send, receive funds and pay bill through a mobile device. Some case applies to other Non-banking financial institutions, which have entered to banking business using the new Internet economy.
• *De-regulated environment is also another driving factor to the adoption of e-banking and financial sectors.* Government policies no longer form an entry barrier to banks competitions. (Unnithan 2001) Technology know-how in banking also provides low protection to existing banks. The only significant entry barrier is likely to be the brand name of the service providers in retail banking. However non-banking, but identifiable, names such as Microsoft are entering the banking areas posing a major competitive threat.

• **Mergers and acquisitions:** Mergers recently have general fame in the banking industry. Since the 1980s banks have been merging to remain significant in terms of assets, and to remain significant in terms of assets, and to ensure that there are a small number of significant player in the industry. Theoretically, the bargaining power of suppliers would be high in this industry, as there are a small number of fairly large players in the industry. However the tendency of banks to amalgamate, rationalizing operational list and thus diminishing the number of banking organizations in any country, is being off set by means of the development of online banks and financial intermediaries in areas such as home lending.

• **The rapid advancement of Internet technology.** The bargaining power of consumers is increasing, switching cost is becoming lower, and consumer loyalties are harder to retain. The threat of substitutes to banking in terms of competition from the non-banking financial institutions is increasing rapidly. Unnithan (2001) has quoted Viermetz (1998) who observed that the major credit card issuer in the US is not a bank but rather Dean Witler of Discover card fame. The same case applied to India and Kenya. Some of non-banking institutions are utilizing the advancement of the technology to offer banking services. Again customers have changed their attitude towards traditional provision of banking services. Extending the value chain and offering versatile services seem to be the key to retaining competitiveness in the sector.

• **Mass of PCs and computer literate customers.** Home banking is a comparatively recent concept, which is essentially, a ‘spin-off’ of the Web. Though many banks offered home banking services from a PC during the 1990s and 1990s, the concept was initially a failure due lack of a critical mass of PCs and computer literate
customers, as well as to the somewhat limited user interfaces initially available. Home or PC banking, however, is gaining in popularity with increasing literate consumer, a wide installed PC and more generic features together with the user-friendly interface the Web enables (Sathye, 1998).

- **Banking demonstrates the typical attributes of an oligopoly.** This is evidenced by risk avoidance and relatively undifferentiated customer service which have made it susceptible to encroachment by software giant such in Microsoft, who is attempting to replace banks as intermediaries (Kalakota, 1997).

- **Changing of consumer behavior.** The consumer behavior in banking changes partly as a result of changes in the amount of spare time available to individuals. Mobility, independence of time and place, and flexibility have become the words in consumer banking. The internet is increasingly considered a strategic weapon, banks which are leveraging it as a distribution channel to offer complex products at the same quality they can provide from their physical branches at a lower cost, to more potential customers, without boundaries (Unnithan, 2001).

- **Marketing strategy.** This is also another driving force, which has lead to the adoption of e-banking, in several economies including India and Kenya. Many financial institutions want a niche in the market, in order for them to remain competitive and profitable in the current Technology-driven market. In preparation for doing this, banks have restructured their normal marketing strategies, to develop a sound e-customer relationship management, to fit the dot com client. Bankers also have another objective of improving banking activities by providing technology-tailored banking services.

- **Government support.** This is also another force, which is driving banking to e-banking. Some governments have made computerization compulsory in public sector banks. Some have given incentives in support of computerization and adoption of new technology assimilation in the banking industry. The government too has made favorable environment by enacting laws regarding electronic related transaction. For example India passed Information Technology Act 2000 to regulate and legalize electronic transactions. In Kenya plans are under way to pass laws which will legalize
electronic transaction. For example Information and Communication Technology bill is in the process to be passed in parliament (Kenya’s ICT industry report, 2005).

4.4.2 Developing E-Banking Capabilities

Electronic banking promises to extend low cost virtual bank account to a large number of currently un-banked individual worldwide. Change is being driven by falling cost of technology, by competition and by the ability of electronic banking solutions to offer customers a enhanced range of services at a very low cost. (Cracknell, 2004). There are a number of options facing institutions thinking about investing in e-banking for the mass market. Whichever technical option chosen, the development of an electronic banking solution should consider the customer value proposition, business case perspectives and local environment for electronic banking.

The three perspectives form a base for proper development of e-banking capabilities in any financial institution planning to offer customer and profit-centric products and services in any economy. Financial institutions offering or planning to offer e-banking services should take a lot of care to the robust of technology. They must invest in a right technologies when they are needed while bearing in mind the value to be gained. For example some companies may invest in internet banking in places where internet connectivity is not available. Also they may invest in PC banking products and services in places where clients are computer illiterate and where PC penetration is too low this may cause embarrassment in terms of losses, which may discourage financial institutions when investing in proper technology. For example in India, if bankers or non-banking institutions wants to develop e-banking services to rural areas it must consider the technology literacy and cash culture of customers in rural places. Also in Kenya lack of infrastructure facilities like electricity and communication technologies may be proper considerations. Also cash culture of customers in rural Kenya is different to those in urban areas (Market Intelligence, 2003).

4.4.3 Customer Value Proposition

An electronic banking solution must provide sufficient value to persuade the customer to move transactions away from cash. However, cash is an incredibly versatile medium of exchange. It is universally recognized as a store of value, and it is accessible,
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portable and divisible. E-banking too must have such characteristic which will make a customer to be attracted to it. This may include the following:

- **Features:** Many early electronic banking initiatives were designed to reduce the cost of transaction for the financial institutions as much as to deliver value to the customer. However, an electronic banking solution can be designed as low cost bank account on a card or telephone, with a number of features valuable to customers, such as cash withdrawals and cash-back transactions, deposits payments and transfers. Added-value can be provided such as loyalty programmes, person to person transfer, airtime top up for mobile phones and government payments.

- **Acceptability:** Although there may be an age bias in the acceptability of e-banking solution, practical experience has demonstrated that the bias towards paper-based record keeping in developing markets is far lower than might be expected. The best example is quoted in micro save virtual conference by Waterfield, (2004) that, central Africa Building Society (CABS) in Zimbabwe was moving away from passbooks to a magstripe card solution and experienced initial resistance from customers. However, its banking halls were filled with long queues of customers waiting to transact on a passbook. When CABS introduced new teller counters that only serviced magstripe card users, and which had shorter queues, the customers voted with their feet and the building society eliminated passbook within nine months. This was for approximately 400,000 customers. A year later, customers did not even see it as an issue.

- **Accessibility:** Walking many kilometers to be able to access the service is inconvenient and costly for customer so saturations of an area with the service is preferable to a wider distribution. Cracknel argues that e-banking has the potential to provide accessible, convenient financial services because it is longer requires a bricks and mortar infrastructure operated by the permanent staff of a financial institution. E-banking uses an electronic infrastructure and in many cases relies upon third parties to originate transaction. However, parties in an e-banking initiative differ in nature, location, accessibility for the poor and in the functionality they are able to provide.

- **Affordability:** Charges need to be designed around a greater volume of low value transactions, probably charging customers a fee per transaction rather than a percentage per transaction, as in the case with visa and master card (Cracknell, 2004)
for certain value-added transactions, like person to person money transfers, where
alternatives are much more expensive should be possible to charge a premium.

- **Ease of use:** When providers develop e-banking capabilities, they have to consider
  simple systems to use, fast and user friendly. Service should be standardized so that
  wherever the solution is used the customer is familiar with the procedure followed.
  Customers should have ready sources to advice, whether this is through call centers,
  publicity or physical presence.

### 4.4.4 Business Value Preposition

From institutional perspective, electronic banking solution should increase
profitability. This means careful consideration of functionality, building volume through
segmentation, fee and charges, efficiency, controlling development costs, distribution
channels, partnerships and developing multiple business cases. Some of profit-centric
consideration which needs to be taken into account before developing any e-banking
product or service include but not limited to the following:

- **Functionality:** There is a continuing debate over the level of functionality that should
  be provided by electronic banking solution. Established commercial banks with a
  large brick and mortar infrastructure and expensive banking systems have an
  incentive to maintain the status quo. Although they have made large proprietary
  investment in electronic infrastructure, in back office systems and in ATMs and
  merchant networks, it is newer banks with a lower investment in physical
  infrastructure who stand to benefit more from falling development cost for back
  office systems and the rapidly reducing cost of communications, of ATMs and of
  POS devices. One debate is whether to provide to prevent cannibalization of services
  targeted to the high-value market, or whether to provide a feature rich product whose
  profits are driven by lower fees but relatively higher transaction volumes.

- **Segmentation:** Segmentation within an e-banking initiative is one key to profitability.
  Segmentation implies using the e-banking platform to sell differentiated services to
different groups of customers. This allows financial institution to match customers
with optimal products and delivery channels. However, as the profit potential and the
cost of serving each segment differ, it may be necessary to serve several highly
profitable segments in order to build the infrastructure to support a mass market solution.

- **Fees and Charges**: Modeling the success of an e-banking product depends on accurately predicting the behaviors of customers towards the product. Assumption must be made by each segment for ATM usage, POS transactions, the percentage of transactions that are on our network, that are off our network etc. The challenge is that many variables are difficult to predict before the solution is in operation, at which time considerable such cost have been invested. In framing assumptions it is important to remember that, in many developing countries like India and Kenya cash is still king. This was clearly demonstrated in Zimbabwe, where electronic transaction mushroomed during a recent shortage of cash is circulation and fell back rapidly as money supply was increased. In one recently launched debit card in East Africa the number of ATM transaction was significantly underestimated and the number of point of sale transaction corresponding over estimated (Cracknell, 2004).

- **Increasing efficiency of operations**: Electronic banking can significantly increase the efficiency of transaction processing. In terms of usage of space, as fewer customers carry out their transactions in banking halls this enables more space to be devoted to generating sales and providing advice to customers. So in order to provide products and service with this value proposition, financial institutions interested in providing the same should be there as customers are looking for product and services with efficiency.

- **Controlling development costs**: Any technology based product is at risk of significant cost over runs and electronic banking is no exception. Fortunately, cost dynamics are changing in Africa and Asia with the introduction of low-cost ATMs. Cracknell (2004) for example quoted that ATMs were available at US$ 10,000 a machine, comparing with the earlier price of $ 35,000. Price of POS devices are also falling and they are increasing in function ability. Another factor is cost control is the nature of the relationship that a financial institution has with the developer of an e-banking solution.

- **Distribution**: Crafting a distribution strategy is at the heart of the any electronic banking solution. Developing a mass market distribution network means moving
beyond up market retailers, restaurant and hotels populated by credit card holders, reach less wealthy debit card holders Cracknell quoted Kotley and lischiltz (2004), that a number of factors are influencing the distribution strategies of the major South African banks. First as well as technology cost, communications costs are falling, the latest generation of POS devices can be battery operated and operation of Global system for mobile communication (GSM) net works. This allows POS devices to reach much more remote areas. Second more and major banks are upgrading their acquired infrastructure (ATMs and POS devices) to be EMV compliant and accept other banks chip-based card. Finally, it is increasingly possible to sell a range of products from a single POS device. This changes the economics of the merchant hosting the device and may increase the profitability for the bank providing the device.

- **Partnerships**: Except and perhaps for the larger banks or in the case of solutions with tightly defined functionality, e-banking solution requires a partnership approach to achieve scale. Partners in an e-banking solution include, application service providers, banks, communication providers, merchants, government department’s post offices and or post banks, micro finance institutions, petrol stations, transaction processors etc. A critical partnership is that between the IT system developer like I-flex in Kenya and the host bank. A vendor relationship with the vendor is transient, and the vendor and the host financial institution can have very different objectives. In partnership, a longer-term relationship is envisaged with both parties working towards common objectives. For example Teba bank in South Africa structured a partnership with it system developer, cell transact to create a joint venture in which both parties benefited from the success of the solution. As a consequence, it can be argued that the combined team has developed an extremely flexible, cheap-to-operate product at a practice of the cost of some competing solution. In Kenya, banks have developed partnership with I-flex, a technology provider to provide quality technology tailored internet banking services. Also group of banks have decided to form a consortium to provide banking services through shared ATM. (NPSK report 2003).
Developing multiple business cases: Each partner in an electronic banking solution has to have a firm business case in favor of the solution. While providing a service that the end user values, the financial institution must satisfy different benefits from the electronic banking solutions. For example when a merchant considers acquiring a post service, the potential benefits include fees payable for cash bank, the ability to top-up air time and increased sales. The cost may include transaction fees, the POS terminal rental and a higher tax bill resulting from the fact that business transactions are now recorded (Cracknell, 2004).

4.4.5 The Environment for Electronic Banking

The environment for e-banking is influenced by several factors like the evolution of the financial and retail sectors, levels of financial literacy and by the supportiveness of the regulatory and policy environment. This means developing and developed economies must have well-developed banking and retail sectors, a supportive central bank, good communications and a generally positive policy environment. For example in India, environment for Internet banking is favorable than in Kenya because Internet connectivity in most cities and towns has been effected unlike in Kenya. In most rural-urban centers customers do not know the meaning and viability of internet. Another example home banking environment is favorable in Nordic countries like in Finland with almost 80% of the population having a PC in the house (Mittila, 2003). Porteous, (2006) argues that Kenyan environment is less certain in that, a number of major pieces of relevant legislation are at various stages but have not yet been implicated, but this has not stopped certain models from starting up. However, wireless coverage has continued to rise. For example Mobile subscribers in Kenya apparently doubled in 2005 which shows that mobile penetration now substantially exceeds the percentage banked there.

4.5. Challenges and Issues in Electronic Banking.

E-Banking creates unprecedented opportunities for the banks in the ways they organize financial product development, delivery, and marketing via the internet and other electronic devices. While it offers new opportunities for banks, it also poses many challenges such as the innovative of IT applications, the blurring of market boundaries, the breaching of industrial barriers, the competitions and the emergence of new business
models (WU 2006). The speed and scale of the challenges are rapidly increasing with the pervasiveness of the internet and the extension of information economy. However, to successfully cope with the challenge of the e-banking innovations, the incumbent banks must understand the nature of the change and capability barriers that it presents. Without this understanding, attempts to migrate to e-banking may be doomed to failure. Banks that are equipped with a good grasp of the e-banking phenomenon will be more able to make informed decisions on how to transform them into e-banks and to exploit the e-banking to survive in the new economy. Nsouli, and Schaechter, (2002) argues that, electronic banking being the wave of the future, not only provides enormous benefits to customers in terms of the ease and cost of transaction, but poses new challenges for country authorities in regulating and supervising the financial system and in designing and implementing macro economic policies.

This has been supported by Sathye, (1998) that Regulating barriers in many countries are on the way, as the Internet gains momentum. Governments are under pressure to reduce the barriers to the competitive activity in the financial sector further to allow existing banks to remain competitive with their newer rivals. One major threat to banks is the Internet only or virtual banks. With US$ 2 million, one can get up a fully functional Internet only bank and provide payment services on the Internet. However, security first Net Bank (SFNB) which was formed in 1996 in the US and claims to be the first internet only banks was acquired by the Royal Bank of Canada in 1998 (Unnithab, 2001), suggesting that customers may still want the comfort of a physical presence of Banks, despite the plethora of opportunities available due to the introduction of e-banking.

The scattered data across the countries is also another challenge before banks trying to become e-enabled. Integrating of this data is necessary if the banks have to do so. Another issue worth mentioning is the move towards expanding the basket of financial products being offered by financial service providers in developed countries, financial service providers are using the internet as a media for expanding into new products. Banks are getting into mutual funds and vice-versa however, in India archaic regulations do not allow companies to have a close relationship with the banks owned by them or to offer products, like ICICI is forced to keep off its banking arms separate from
the main company. Such institutions are also prevented from offering products, which fall under the preview of Banks. This is a serious impediment for innovation in the financial service sector. Moreover it prevents financial service providers from exploiting the power of the web. Given these challenges, only banks which moves fast and tries to capture the first mover advantage can think of success in this sector. Another success factor will be the value, which the online operations of banks will be offering to the customers. This is what will differentiate between similar offering from many providers of financial products and services starting now, and will give the organization an advantage in terms of the networking it will be able to achieve. Banks should be ready to launch their operations within days of the liberalization of the sector. This will allow them to reach a critical mass and establish themselves in the e-world. E-banking is also posing some beneficial platforms to criminals due to technological loop holes.

Financial criminals are advancing and with the help of the advanced technology, they have developed new avenues to frauds, cheating and making banks clients uncomfortable in all aspects of banking. This is because, while customers’ comfort with technology is increasing, it is yet to reach a critical mass in developing countries with a large proportion of the population which does not understand technology at all and would get alienated if the human face of the bank goes totally away to be replaced by machine to which they can not relate easily. There are several major challenges and issues the e-banking industry. This study identified from the literature review some major challenges facing e-banking adoption and development which include security corporate, infrastructural, socio-economic, legal, employees’ and Risk management challenges (Figure 4.2)

4.6.1 Security and Privacy Challenges

Security is the first and foremost requirement of e-banking as the internet is inherently unsecured. Securing process in e-banking involves authenticating both customer and banks level protecting the information to be transmitted from interception. In addition a means must be provided that prevent repudiation both by the banks and clients once the e-banking process has taken place. E-banking systems have to take into account the need of multilateral security i.e. security needs of all participating parties in the e-banking system must be given due attention. An e-banking system that is not
secured may not get trust from its users. Trust is one of the crucial factors for the acceptance of e-banking system (Taddesse et al., 2005).

The ability of banks to rely on encryption of products is crucial to processing customers’ transaction safely. There are various products available, some offering a greater level of security than others. For example, the secure electronic transaction (SET) protocol offers a form of guarantee against credit card fraud. The protocol consist of a card holder interface resident on the customer’s P.C, on electronic device till at the retail level and a payment Mechanism located on the bankers’ server, which possesses the encrypted transaction messages.

In contrast to SET, secure sockets layer (SSL) technology, does not offer a guarantee against credit card fraud. However, the cost-benefits of this technology appear to outweigh the security risk and many banks are currently trailing this technology background, the uncertainty surrounding mandatory key escrow and the consequent perceived lack of security provides yet another challenge for banks to consider (Harpreet and Narinder 2007). There are several ways in which security has challenged e-banking, including but not limited to disclosure of private information, counterfeiting and illegal alteration of payment data.

**Figure 4.2:**
**Schematic Categorization of challenges facing E-banking**

There are many ways in which private information may be accessed by attackers. For instance, hackers may intercept network traffic to get confidential data. It is also possible to access private data shared on computers connected to the internet. This
data could be used to make fraudulent transactions that could lead to a loss of money. Counterfeiting is the creation of new data or duplication of existing data, which are technically valid but not legally admissible. Cloning of e-money for double spending and creation of fake accounts are example of counterfeiting. One popular form of counterfeiting attacks include duplication of electronic data from a payment cards (e.g. ATM card) which is used to create duplicate cards and withdraw money from bank accounts. Illegal attention of e-banking data may result in loss money. This may again result in the loss of customer confidence. Alterations could be made to the transaction account numbers, resulting in misdirected payments, to the payment amount or to account balances. The most common method of securing e-banking involve the use of technologies means such as information security functions (cryptographic–based technologies like encryption, digital signature etc.) (Tadesse et al., 2005). Since securing the payment system will reduce its efficiency by making it slower, compromise has to be made between security and efficiency.

**Secure Socket Layer (SSL)**

As the internet is an insecure communication channel, many attempts have been made to make it secure. SSL is one of them, it is a security service used to secure the internet mostly HTTP (Hyper Text Transfer protocol. SSL secure internet communication between network application, providing privacy, authentication and integrity. SSL employs encryption; digital signature and message digest to provide security. Most e-banking security strategies are based on SSL.

**Secure Electronic Transaction (SET)**

SET is an open standard developed by master card and visa in order to provide a solution for security problems for online credit card payment system. Unlike SSL, SET is a payment protocol that enables to authenticate both the merchant and the customer. This is done by providing a digital certificate both for the merchant and the customer. SET provide strong security as compared to SSL. For instance it is difficult to authenticate clients in SSL, but this could be done in SET. Despite its strong security features SET did not found acceptance. In addition the merchant users are expected to have digital signature by well known certified authority. But this does not seem feasible.
3D Secure

SET was too complicated and required the card holder and the merchant to download 5MB client software. 3D secure is visa alternative to SET. The main idea of 3D secure is to authenticate card holders without a certificate. When authentication is required, the merchant software redirects the user of the card to the issuer bank. The issuer bank will then pop up a window to the card holder indicating which merchant is asking for authentication and for what amount. The issuer bank authenticate the user by “shared secret” that is only known by the user and the issuer bank, in addition to the normal password and user name. Issuer bank may have the option of authenticating their clients by smart cards. If the authenticating is valid then bank sends a message to the merchant saying the transaction is approved.

Mobile 3D secure specification is Visa’s 3D specification for payment made over mobile phones and other mobile devices. According to Visa, Mobile 3D secure specification extends payment authentication initiatives into m-commerce, enabling visa card issuer to validate the identity of their card holders in real time. Merchants are also encouraged to accept this payment protocol as liability of charge backs (cases in which customers denies purchase billed to their credit card) is shifted to issuer bank. Since it gives card holder greater confidence and it does not require the customer to download special software, cardholder will benefit from it.

Smart card security

Smart cards provide a strong security means. Data stored on smart card is encrypted and cannot be accessed without the correct password/PIN. Some smart cards even have a cryptographic processor, which provides sophisticated security features. Nowadays magnetic strip cards i.e. credit cards etc, are being replaced by smart card. Technology without proper organization policy and procedure does not solve security problem associated with e-banking. Proper policy and procedure must be in place to ensure that technologies provide the maximum possible security. Government is also responsible to pass the required law, investigate and prosecute violators of the law.

Shetty (2006) opined that with the growth of electronic payment systems, e-cash, home, P.C. banking and stored value cards, the spread of crime is likely to accompany the vastly increased storage and transmission of customer financial information.
Computer systems today even in areas of non-financial data are increasingly vulnerable to unauthorized access, theft or tampering. Customers increasingly fall the risk of being subject to losses on account of breaches in computer security. Hence, banks will have to maintain stringent security policies in place to convince customers that their financial data is safe and secure. Banks will have to take decision regarding the technology to be used (private and public key encryptions biometrics, firewalls, digital and others) and where they will be used (messaging, payment systems, database access etc) laws will also need to be enacted for bidding unauthorized access to the records of financial institutions and computer frauds. Yibin, (2003) argues that, the internet is ubiquitous and global in nature.

It is an open network accessible from anywhere in the world by unknown parties, with routing of messages through unknown locations and via fast evolving wireless devices. Therefore, it raises significant challenges on security control, customer authentication techniques, data protection and audit trail procedures are customer privacy standards. While banks have been keen to entrance the potential offered by these technologies, few understand the internet value ability and risks associated with e-banking. Research conducted by Glaesner’s et al. (2003) shows that, since 1999 Brazil has seen a 932% increase and Japan has seen over 1000% increase in malicious electronic security incidents. In 2002, over 57% of all hack attacks were initiated against the financial sector. Identity theft has exploded and incidents are expected to reach almost 2 million per year by 2003 with a cost of almost US$ 10 billion.

4.6.3 Corporate Challenges

E-banking wave has come with several challenges which are shaking the corporate sector. there are so many questions which have been left unanswered and which needs immediate solutions like, who should be the target customers?, what should be the scale of operations, what should be the technology adopted? And what should be the marketing strategy? While the obvious answer to target customers may seem to be people living in metropolitan and urban areas who are desirous of using such services and are capable of paying for the some nationalized banks would do well to keep in mind that such target group would be the target of banks who are better equipped to deliver electronic products and services (Verma, 2006).
The places where can not extend their reach are the semi-urban areas and the vast hinterland of rural areas. These areas still contribute a substantial portion of bank’s resources and extending electronic banking to these areas beyond the competitions reach – could well result in a business bonanza. With government in developing countries like India and Kenya, planning to take telecommunications to the remotest corner of the country and technology is throwing up prospects of operating bank accounts through cell phones, costs should not be a mater concerns. In order for electronic fund transfers to take place smoothly, it is of paramount importance to bring in regulation to provide customers with specific rights and protection when utilizing electronic payments. Laws should also be in place outlining the detailed responsibilities of the financial institutions and other companies involved in these electronic transactions.

The corporate sector needs to adopt the appropriate technology. This is imperative because the line of distinction between banking institutions and non-banking financial intermediaries becomes thinner, the farmer have to react through modernization by introducing new products with better services keeping in view the shape of things to come, if they are to keep hold of their existing customers and attract new ones. This is all the more tree in the case of order banks in view of the stiff competition which they will have to fall from the foreign banks and the new entrants in the private sector. This modernization of the banking system requires the adoption of appropriate technology which involves extensive computerization. It may be emphasized here that around the world, the present generation is witnessing revolution in technology particularly in information and emerging markets, banking institution are becoming the largest users of computers. They are increasingly transforming it from a support function into a driving force (Shekhar et al., 1998). It is true that as mentioned else where in detail, a modest beginning has already been made in the direction of modernization of the banking systems. The measures so for implemented are however, far from satisfactory. They are more of the nature of mechanization of manual system, the system in manual as well as computerized. Working has remained more or less the same and reengineering or work processes. Technology has not yet been exploited to full extent possible. For example, the mini-computers at controlling office and the mainframe at central offices have been used
for MIS applications in addition to some according work. Utilization of these systems should be improved.

It is important for the banking institution to realize that there is growing demand among the customers of the bank concerned to enquire and conduct banking transactions from any branch regardless of where the accounts have been set up. For all practical purposes, they will be customers of the bank and not isolated as customers also pay increasing attentions to the utilization of communication networks. Although massive investments have been made in computer equipment, its benefits have not been fully realized as a result of the neglect in providing communication and networking. It is imperative that utilization and exploration of existing facilities should be improved in order to increase customer convenience and satisfaction, reducing costs in relation to benefits and enhancing productively.

Technological advancement is certain to affect every aspect of banking business not only automation transactions but ultimately reaching into the very heart of the decision into making process, which could have the visions to grasp the opportunities technology can deliver and should thus reap the real benefit in terms of better service, greater profitability and easier access to information to be used as strategic business tool. Outsourcing is also another issue to be addressed in corporate challenges brought by e-banking wave. Yibin (2003) opined that e-banking increases bank’s dependence on information technology, thereby increasing the technical complexity of many operational and security issues and furthering trends towards more partnerships alliances and outsourcing arrangements with third parties, many of whom are unregulated. Such arrangements must be made with a lot of care to safeguard the bank’s business and avoid losses which may be caused either by substandard products and attacking financial transactions of banks due to improper security of network provided by the third parties or technology providing partners.

4.6.3 Infrastructural Challenges

The other challenge of e-banking is improper set up of infrastructure (Taddesse, 2005). For the effective deployment of e-payments, it is necessary to have available and cost effective infrastructure that can be accessible to the majority of the populations. The most common communication infrastructure for e-banking is computer network such as
internet. Most e-banking systems use internet to communicate with their customers. The other communication infrastructure available for e-payments users is the mobile network used for mobile phone. Automating the banking archives is another prerequisite for e-banking system, closed financial network that links banks and other financial institution for clearing banks and payment conformation. Both the mobile network and internet are readily available in developed countries. Users in these countries do not have a problem associated with communication infrastructure. In developing countries Internet networks are not easily accessible. Poor communication infrastructure is one of the reasons that hinder the e-banking systems in India and Kenya. User access devices such as PC and Mobile phone are not also readily available. According to Yang (2007), limited online payment options have resulted in many customers process due to dissatisfaction and inconvenience that is due to poorly developed infrastructural networks. But proper developed to customers and hence reduce a challenge from competitions with proper developed networks.

4.6.4 Socio–Cultural Challenges

Cultural and historical differences in attitudes and the use of different forms of money, for example use of credit card in North America and use debit cards in Europe, complicate the task of developing an electronic payment system that is applicable at international level. Difference in the degree of the required security and efficiency among peoples of different aggravates the problem. Consumer’s confidence and trust in the traditional banking systems has made customers less likely to adopt new technologies. New technologies will not dominate the market until customers one confident that their privacy will be protected and adequate assurance of security to guaranteed. New technology also requires the test of time in order to earn the confidence of the people, even if it is easier to use and cheaper than older methods (Teddesse, 2005) Though Brick and mortar branch would soon be the phenomenon of the past, with virtual branches taking over, Gurusamy (2001) was argued that the fear of technology puts the average customer away from electronic delivery channel.

Another issue to be addressed is privacy of customer’s transactions. In developing countries like Kenya an India cash transactions are popular because they leave no paper trial (CBK and RBI). Part of these economies is black where cash is the mode of
transaction and there are no audit trials. This will be a factor that will continue to hinder wider acceptance of electronic banking because e-banking always leave a paper trial. Again there are no proper laws, Rules and Regulation governing privacy issues and the data collection and maintenance agreements. Verma, (2006) has emphasized that, every time a consumer makes a telephone call, purchase goods using a credit card, subscribes to a magazine or pays his taxes, information goes into a database somewhere. All these records could be linked to create a single dossier on each person’s life, not only medical and financial history, but also what one buys where one travels and with who you communicate even today, it is almost impossible to learn the full extent of such files that various organizations keep, much less assume their accuracy or access to them, consumer may fear the use of their financial, credit card and spending information or stored value products could be used without their knowledge or permission. Unless rule/regulations, industry standards, best practices etc, dealing customers will be hesitant to commit their private information to their bankers/other data bases.

4.6.5 Challenges to Employees

E-banking has also posed other challenges to employees of institution engaged in technology adoption. Questions like what should be the code of conduct to be followed by employees and what should be the remuneration policy must be addressed in order to cope with internal forces which may affect the process of technology adoption. In the sphere of traditional banking, employees are required to sign a privacy and confidentiality agreement which forbids them from disclosing the state of customers accounts with the advent of electronic banking several other issues like, use of internet, security, email access, access to and control of web browsing and transmission of customer data to outside service etc will have to incorporated in the confidentiality agreement. Taking into account that electronic banking will use the latest technology and that staff operating the same should be people of integrity, possessing technical skills an motivation to some the institution, in times when their services are in tremendous demand else where, banks as perquisites, Bonuses, incentive compensation, stock option and health and welcome schemes as part of competition packages for employees (Verma, 2006).
4.6.6 Legal and Regulatory Challenges

National, regional, international set of law, rules and other regulatory issues are important prerequisites for successful implementation of e-banking schemes. Some of the elements include money laundering, supervision of commercial banks and e-money institutions by supervisory authorities, payment system oversight by central banks, consumer and data protection, cooperation and competition issues (Taddesse, 2005). The virtual and global nature of e-banking also raises legal questions such as competent and about applicable laws in disputed cases, validity of electronic signature. Moreover a legal and regulatory framework that builds trust and confidence supporting technical efforts to meet the same is another vital issue to be addressed.

The above and a host of other related issues like taxation, foreign exchange management of e-cash, control over supply of e-cash permissible e-banking activities etc, will have to be dealt with by the regulators to facilitate the assimilation and widespread use of electronic banking in the country (Verma, 2006). In many developed countries, necessary government regulators have been put in place to help the markets work efficiently, ensure safety and soundness, protect consumers and stem the risk of systemic threats to the payment system. Regulators will need to borrow from the experiences of their counterparts in developed countries to decide what to regulate, when, how much and how soon as they attempt to answer the maize of questions raised by electronic banking.

Taddesse emphasized that, national regulating and legal framework that is inline with required and international agreements is crucial in creating a certain and reliable environment. Adopting model laws at global level such as UNCITRAL model law on e-commerce (2001) and at regional level such as the SADC law on electronic transaction and data protections can help the purpose. In conclusion, it may be stated that it would be very hazardous to predict how soon electronic banking will take roots in the consumers will adopt and how regulators will move in guide its growth. India has gone a step ahead by enacting the IT Act 2000, which part of it can be refined in case of e-banking. But there is a need to exact separate laws giving guidelines for e-banking. This has proved confusing because e-banking includes business which is conducted cross-county where different laws apply. Apart from the above Indian step, the apex bank i.e. RBI has issued
guidelines to banks for conducting business through internet banking. There areas where the guidelines were focused are; technology and security issues, legal issues and regulatory and supervisory issues (Global Survey, 2002).

This chapter highlights different electronic channels available for conducting e-banking business. Banks have many options from ATM to cyber banking. The choice of the right channel lies on their hands of bankers, to make sure that they have fulfilled the demands of their customers. The identified challenges are impacting and hindering the fast developing technology in the banking industry. Social, legal, corporate and many more were model challenges identified to have slowed down the fast pace of e-banking tornado.