CHAPTER II

ELECTRONIC BANKING – AN OVERVIEW

2.1 INTRODUCTION

The purpose of this chapter is to discuss various aspects of e-banking including the sequence of evolution of e-banking as well as other issues which this has brought with it. The chapter starts with the general model of e-commerce to set the scene for subsequent sections, including a brief overview of how e-banking evolved and where it is heading in near future.

2.2 ELECTRONIC SERVICES DELIVERY

E-commerce is about buying and selling information, products and services via computer networks such as the internet and Electronic Data Interchange (EDI). E-banking is one form of e-commerce. The term commerce is viewed rather narrowly by some as transactions conducted between business partners.
However, for the purpose of this research, a broad definition by Kalakota and Whinston (1997)\textsuperscript{48} will be used. They define e-commerce from the following perspective.

- **Communications**: e-commerce is the delivery of information, products/services, or payments over telephone lines, computer networks, or any other electronic means.

- **Business process**: e-commerce is the application of technology towards the automation of business transaction and workflow.

- **Service**: e-commerce is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

- **Online**: e-commerce provides the capability of buying and selling products and information on the internet and other electronic channels such as Electronic Data Interchange (EDI).

For firms e-commerce brings

- Different and arguably lower barriers to entry;

- Opportunities for significant cost reduction

The capacity to rapidly re-engineer business processes;

Greater opportunities to sell across borders.

Each and all of these potential benefits provides for increased competition and the ability to wrest market leadership from established players.

For consumers the potential benefits are:

- More Choice;
- Better value for money obtained through greater competition;
- More information;
- Better tools to manage and compare information;
- Faster service.

The revolutionary growth of network technologies and especially the internet has enabled us to conduct business electronically at a global level. For this reason, most of the literature in this field refers to technological issues and is mostly application driven. There is a significant stress on the technical infrastructure that supports e-commerce applications such as networks, multimedia contents, messaging and payments. E-Commerce allows new products to be created and/or for existing products to be customized in innovative ways. In the long term, competitive advantages may only be achieved
by providing innovative services, or services that are uniquely bundled using web capabilities. Banks should look beyond their own industry in benchmarking other facets of operations and examine other technologically advanced industries for innovative ideas. Successful web-based companies, such as eBay and Priceline.com, have established profitable business models that may include features that banks could adapt, such as mortgage applications and transactional processes.

Such changes may redefine organizations’ missions and the manners in which they operate.

e-commerce also allows suppliers to gather personalized data on customers. Building customers profiles, as well as data collection on certain groups of people can be used as a source of information of customizing existing products or designing new ones (Wind, 2001)\(^49\).

Mass customization enables manufacturers to create a specific product for each customer, based on his or her exact needs. For example, Motorola gathers customer needs for a pager or cellular phone, transmits them electronically to the manufacturing plant where they are manufactured, according to the customers’ specification. i.e, colours, features, and then sends the product to the customer within a day (Turban et.al., 2000). Similarly, Dell computers and Levi use this approach. Using online tools, customers can design or configure products for themselves. For example, customers can configure a PC to their exact needs (in case of Dell) or design their t-shirts, furniture, cars and even a Swatch watch.

In the service sector, e-commerce is playing major role and has changed organizations as varied as the travel industry and the banking industry. This covers some of the sectors, which have considerably changed as a result of the emergence of e-commerce, and helps our understanding of e-banking from these difference perspectives.

2.3 FROM E-COMMERCE TO E- BANKING

In its very basic form, e–banking can mean the provision of information about a bank and its services via a home page on the World Wide Web (www). A more sophisticated internet based service provides the customer with access to their accounts, the ability to move money between different accounts, make payment or apply for loans and other financial products. The term e–banking will be used in this book to describe the all types of provision of financial service by an organization to its customers. Such customer may be an individual or another business firm.

To understand the electronic distribution of goods and services, the work of Rayport and Sviokla (1995)\textsuperscript{51} is a good starting point. They highlight the differences between the physical market place and the virtual market place, which they describe as an information defined arena. In the context of e–banking, electronic delivery of services means a customer conducting his transactions from a remote location (e.g. home) rather than visiting a local branch.

Automated Teller Machines (ATMs) were the first means of providing electronic access to retail customers, made possible through the introduction of customer networks. Telephone banking arrived next, which was a revolutionary concept since it made banking possible from anywhere as long as telephones were available.

In the mid eighties, online banking arrived. In its early form, ‘online banking services’ requires a computer, modem and software provided by the financial services vendors. Generally, these services failed to get widespread acceptance due to high call costs and unfairly system interfaces, and were discontinued by most providers.

With the arrival and widespread adoption of The World Wide Web, banks renewed their interest in this area and started developing a web presence. The goal was for a bank’s website to provide many, if not all, of the services offered at a branch. This may include transactions as well as information, advice, administration, and even cross-selling. However, the interactive nature of the web not only allows banks to enhance these core services, but also enables banks to communicate more effectively and expand customer relationships. When combined with the improving analytical capabilities of data mining and related
technologies, the potential for enriching the relationship with customers is unlimited. The most common services in current e-banking offerings are described in Table 2.1

Most banks and other financial institutions in the developed world have established an internet presence with various objectives. Some banks are there because their competitors have done it. Others prefer a ‘wait and see’ practice. Some are using it as a banking channel being part of their distribution/delivery management.

e–banking largely came into being as a result of technological developments in the field of computing and communications but there have been a number of other factors or challenges which played an important part in its development. According to Jayawardhena and Foley (2000) the challenges for banks are fourfold. First, they need to satisfy customer requirements that are complex and ever changing. Second, they need to deal with increased competition from old as well as new entrants coming into the market. Third, they

---

need to address the pressures on the supply chain to deliver their services quickly. Finally, they must continually develop new and innovative services to differentiate themselves from the competition, as having a large branch network is no longer seen as a main source of competitive advantage. E – banking is seen by many banks as a key tool to address these challenges.

Other reasons for the adoption of e-banking by banks may include achieving competitive advantage (at least in short term), creating new distribution channels, improving image, and reducing costs. These issues are discussed in the previous chapter.

<table>
<thead>
<tr>
<th>Types of e-Banking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Account Access</td>
<td>Access online to all of one’s account information (usually checking, savings, and money market), which is either updated in real time or on a daily basis.</td>
</tr>
<tr>
<td>Fund Transfer</td>
<td>Transfer funds between accounts</td>
</tr>
<tr>
<td>Bill payment</td>
<td>Pay any designated bill based on instructions one proves including whether to pay automatically or manually each month.</td>
</tr>
<tr>
<td>Bill presentment</td>
<td>View billing statements as presented electronically, which allows inter-active capabilities such as sorting, drill – down details, or advertising, in addition to on – click payments.</td>
</tr>
<tr>
<td>Mortgage / credit card/ Misc. lending</td>
<td>Search, apply, and receive approval online for various types of loans and then review your statements using online bill presentation.</td>
</tr>
<tr>
<td>Business banking services</td>
<td>In addition to all of the basic payment and account access services, merchant can manage their electronic lock box for received payment, accounts receivable posing, as well as initiative payment via networks.</td>
</tr>
<tr>
<td>Customer service &amp; Administration</td>
<td>While the web will eventually enable live communication, it is most optimally designed to facilitate interaction with information so that customers can more easily service themselves. In the process, customers receive as good, if not better, service while the bank saves money with each additional transaction as it realizes the scale economics of its largely fixed online investment. Advanced e-mail systems with automated replies and intelligent routing are also helping to improve the online customer service experience.</td>
</tr>
<tr>
<td>Cross – selling</td>
<td>Just as visitors to a branch are being offered new products by tellers and simple signage, so can web bank customer. In most cases today, banks perform this function online with</td>
</tr>
</tbody>
</table>
standard, broadly targeted text offer or by just making their product literature available online. In the future, banks will be able to harness the true power of the internet by providing targeted offers to web customers based on a combination of their indicated interests and financial situation. Not only will banks be able to sell banks products, but non-financial products as well.

| Personalized content and tools | As one visits the web branch, one is instantly recognized and content displayed is oriented towards one’s interests including weather, investment, and hobbies. More important, by using the web, bank customers could use online financial planning tools to better manage their finances. |
| Accounts aggregation | Accounts aggregation enables a consumer to be presented with all his or her account details (current account, saving account, mortgage account etc.) on a single page. For access to external (to their first choice bank) financial data consumers to provide their account passwords to the aggregator (usually a bank). The aggregator uses the passwords to access automatically the consumers’ accounts. The information is then provided to the consumer on a consolidated basis on a single page so the customer has a full view of his/her financial portfolio. In most cases funds can be transferred from one account to another. |
| Electronic funds transfer | Electronic Funds Transfer (EFT) is a system of transferring money from one bank account directly to another without any paper money changing hands. One of the most widely used EFT programs in direct deposit, in which payroll is deposited straight into an employee’s bank account. This system may also be used for debit transfers, such as |
The widespread adoption of the internet during late 1990s and early 2000s promised a revolution in the way consumers worldwide accessed and managed their finances. Many analysts predicted that e-banks, having the advantage of a low cost base, would win deposits and loans by offering superior rates and that many existing providers of those products would be driven out of the market. In the US, large banks targeted affluent customers using this medium. For example, in 2000, HSBC and Merrill Lynch committed to spend $1bn on a joint venture that would combine online premium banking and share dealing. Within a few months, several other banks had followed suit (Larsen, 2004)\(^{53}\). But the response was generally disappointing. Banks found customers reluctant to give up their bricks and mortar branches, and the take up was much lower than expected.

Low ROI from e-banking initially meant that some traditional retail banks which used e–banking as just another channel rather than replacing branches or

call centres benefited most. That early experience showed that even the most keen e–banking customers also wanted the convenience of branches and phone banking. This led to an argument that e-banking just adds another layer of complexity and unjustifiable costs. The growth of phishing’, where fraudsters use spam e-mails and bogus websites to encourage people to reveal their account details, together with other security concerns, were also used to argue against the very existence of e–banking.

2.4 FUTURE OF E-BANKING

E-banking has the potential to be a very rich and pleasant experience, and may provide more opportunities for banks to develop mutually satisfying, tailor made services to enrich relationship with customers. As technology evolves, the opportunities to extend the relationship beyond what is possible in the physical world continue to grow and will only be limited by a bank’s ability to innovate or commitment to e-banking.
Some companies such as IBM have expressed their vision of the future of financial services, complete with biometrics, state-of-the-art branch offices, enterprise risk management systems, and advanced customer interaction (Marlin, 2005). The use of financial decision-aid tools in e-banking is also set to grow. To date, the experiences of many e-banking users with these tools have proved unsatisfactory: with many firms do not even offering online advice tools, people often have little idea of the benefits such tools could bring. Banks need to promote the availability and use of these, and educate consumers about their benefits (Clarke, et.al 2008). One good example of a bank offering useful financial management tools is UBS which in addition to the usual e-banking functions, provides a number of such tools, for example (UBS, 2008):

➢ **UBS Pay**: this software allows entry and management of payments without connecting to the internet. UBS pay helps, for example, when entering payment aboard enabling selection of the most cost-efficient order type.

---

54 Marlin, S., IBM showcases tech Innovations for Financial Services, Information Week, August 17, 2005.


Payment orders are then sent collectively to UBS via UBS e-banking in just a fraction of the time it takes to enter them directly online. With a user-friendly graphical interface, archiving and analysis functions, all of a user’s executed payments and beneficiaries’ details may be accessed at any time. A number of export options also simplify the transferring of data to MS Excel and MS money.

➢ **UBS BESR e-list**: UBS BESR e-list is ideal for small and medium-sized enterprises or individuals who just need a simple accounts receivable system with integrated invoicing functions. It manages the collection of receivables, within Switzerland using banking payment slips with reference number (BESR). The new UBS BESR e-list software replaces the old paper accounts receivable list and makes a long process automatic and quick.

➢ **Web Calculator**: you can use the web calculator for stock exchange transactions to figure out quickly and easily the brokerage fees for transactions you are planning or you have already executed. Depending on the service package, it is available at a reduced price and includes the UBS investment advisory service, or may be purchased by professional investors at a price not including UBS advisory. In both cases your market orders can
be given using UBS e-banking via the internet or UBS e-banking using a mobile device.

- **Paypen**: Reads Swiss payment slips easily and quickly. With a quick brush of the hand payment slip may be imported into the e-banking system of the bank or payment software in seconds.

- **GIROMAT 130**: with GIROMAT 130 you can process all Swiss payment slips. It can read orange payment slips with the new or old dimensions. The special driver software means no tedious implementation of interfaces and protocols is necessary.

Smart cards are also beginning to make their mark in the e-banking field and are expected to play greater role in the future. A smart card is a credit card – sized plastic card with an embedded chip that provides power for multiple uses (I.D card, SIM cards for mobile phones, credit / debit cards, benefit claim, health cards, etc.). A smart cards is enhanced by PIN verification and cryptography, and
the size and power of the chip determine its storage and processing capacities (M’Chirgui & Channel, 2007)\textsuperscript{57}.

It is clear that, some of the hardware and software associated with such a vision are already in use but their feasibility of industry-wide use is still questionable. Schneider (2005) predicated that in fifty years customers will carry a translucent plastic bank card displaying a talking head with artificial intelligence. Cash and checks will have been eliminated in favour of the new electronic currency of “credits”, which will be much easier to transfer, may be using mobile phones. The early signs are that it is already started to happen. For example, mobile technology, such as the Bluetooth proximity-based data transmission standard, may work with banking systems to enable touch points to react intelligently when a customer approaches. In this case, when a customer carrying a Bluetooth-enabled mobile device approaches a service desk, the bank employee should be able to have the customer information ready at hand and in order to suggest other relevant financial services (Schneider, 2005). Developments in biometric technologies may help to deal with the most

\textsuperscript{57} M’Chirgui, Z., & Channel O. The Adoption and use of smart carded Technology in Banking: An Empirical Evidence from the Moneo Electronic Purse in France, In V.Ravi (Ed.), Advances in Banking Technology and Management: Impact of ICT and CRM.IGI Global inc. USA.
persistent security issues as well as dealing with customer’s difficulties in remembering many different login keys.

Finally, Scheneider (2005)\textsuperscript{58} suggest that all of the infrastructure in the world cannot succeed without innovation and the willingness to take risks. The ATM is an example of technologies that consumers would never have requested, but nonetheless have been keen to embrace.

2.5 E–BANKING TECHNOLOGIES

e–Banking relies heavily on information and communication technologies (ICT) to achieve its promise of 24 hours availability, low error rates, and quicker delivery of financial services. When considering e–banking, bank websites usually come to mind first, but e–banking requires much more than just a good website. It needs back end applications such as account systems, support applications such as Customer Relationship Management (CRM systems), communication technologies to link e–banking to the payment systems such as

\textsuperscript{58} Schneider, I. Citibank daring to Dream of the year 2054, Warns of Lessons of History, Bank System & Technology. May 26, 2005.
LINK, and middleware to integrate all these often different type of systems. This chapter is an overview of most common technologies in use to support e-banking.

e-banking may be viewed as one branch of e-commerce, so it is useful to cover briefly the interlink between the two. e-Commerce is much more than just the use of the internet, or having a website and enabling customers to move their money around. The internet may be the most common and well known medium for e-commerce, but it is not the only one. Electronic Data Interchange (EDI) and similar systems have been in use since the mid-sixties. In a banking context, ATMs and credit cards are also classified as e-commerce.

2.5.1 The Internet

The emergence of the internet has posed a host of new organizational opportunities and challenges. Given the internet’s potential to revolutionize business operations, it is important to understand the implications of it on business in general. Although other e-channels such as Interactive Television
(ITV) and Wireless Application Protocol (WAP) technologies are available for services delivery, their use is still limited in the provision of financial services. Issues related to these technologies are also very similar to those of the internet.

The internet is a massive global network of interconnected packet-switched computer networks. Hoffman (2002) offers three (mutually consistent) definitions of the internet: a network of networks based on the TCP/IP protocols; a community of people who use and develop those networks; and a collection of resources that can be reached from those networks.

The internet has evolved over several decades with its growth accelerating exponentially during the 1990s. The most exciting commercial developments however, are occurring on that portion of the internet known as the world wide web (www). The www is a distributed hypermedia environment within the internet, which was originally developed by the European Particle Physics Laboratory (CERN). Global hypermedia allows multimedia information to be located on a network of servers around the world, which are interconnected, allowing navigation through the information by clicking on hyperlinks. Any
hyperlink (text, icon or image in a document) can point to any document anywhere on the internet.

The homepages of the www utilize the system of hyperlinks to simplify the task of navigating among the offerings on the internet. These attributes enable the web to be an efficient channel for advertising, marketing, and even direct distribution of certain goods and information services. A more recent development is web 2.0 which may be described as a newer version of web-based applications (such as wikis, social networking sites, and blogs) which aim to enhance creativity, collaboration, and interaction between internet users. These developments on the internet are expanding beyond the utilization of the internet as a communication medium to an important view of the internet as a new market place.

The internet influences the future services/products distribution channel structure in two ways. First, the costs of using it are different from those of other available distribution channels, and the service output it provides is often different from the service output provided by traditional distribution channels. Second, the internet influences consumers. Many of them invest time and resources into becoming computer-literate and in getting to know the internet.
Other consumers do not become computer – literate and do not gain familiarity with the internet. These two customer segments are likely to have similar needs. Therefore, the existing distribution channel also influences changes in overall distribution channel structure. The old distribution channels gradually give way to the new ones, but do not necessarily become redundant.

Consumers have benefited from the internet a great deal. They have access to greater amounts of dynamic information to support queries for consumer’s decision making. The interactive nature of the web and the hypertext environment allow for deep, non-linear searches initiated and controlled by customers. There is also the potential of wider availability of products and services, which were previously difficult to find. Increased competition between suppliers is also likely to result in lower prices for consumers.

Internet technology can make a significant contribution to a company’s value chain. It can improve a company’s relationship with vendors and suppliers, its internal operations and its customer relations, and offers the prospect of reaching an expanding customer base. The internet also promises to dramatically
lower communications costs by eliminating obstacles created by geography, time zones, and locations.

The internet provides a powerful platform for corporations with home pages to market and advertise their products and services. It has proved an efficient and cost-effective way of distributing information almost instantaneously to millions of potential clients in global markets. Many companies use the internet to conduct market and scientific research, as well as to source business-related information to improve their products and services.

The rise of the internet has resulted in the formation of virtual organizations, which have virtually no physical presence in terms of retail outlets but enjoy access to national and international markets. One well-known example of such virtual organizations is www.amazon.com which is a virtual bookstore supplying books and other similar products such as music CDs and electronics to customers in many countries in the world. Some examples of virtual organizations in the financial services industry are Smile.co.uk, cahoots.co.uk and egg.
There is a scope for physical organizations to become virtual, as they can leverage their core competencies in primary activities. Physical companies often have a great deal more experience/knowledge of their products and how to sell them than new internet traders and they usually also have established brands and a large customer base. However, Owens and Robertson contend that it takes longer for physical organizations to develop an integrated e-commerce structure than it does for virtual traders to commence trading. This is due to the reduced, simple physical structure of the virtual organizations. They argue that a structure of similar efficiency must be adopted by physical organizations for the provision of internet services.

2.5.2 Mobile Banking Technologies

Some banks are making significant investments in mobile systems to deliver a range of types of business value, from increased efficiency and cost reduction, to improved operational effectiveness and customer service to provide a competitive advantage. A factor that has contributed to this development has been the extended availability and capacity of mobile communications
infrastructure around the world. The number of types of mobile devise has been increasing rapidly and the functionality available has also improved. The shrinking costs of data transmission and, due to the intense competition from suppliers, the reduced costs of devices have catalyzed the distribution of mobile technologies and amplified the growth of the worldwide mobile market. In those countries where traditional telecommunication infrastructure is not well developed, mobile technologies is transforming accessibly to the internet based services.

Mobile banking may be described as the newest channel in electronic banking to provide a convenient way of performing banking transaction using mobile phones or other mobile devices. The potential for mobile banking may be far greater than typical desk-top access, as there are several times more mobile phone users than online PC users. Increasingly “mobile life styles” may also fuel the growth of any where, anytime applications.

There are two main types of technologies available for use in mobile banking: Wireless Application Protocol (WAP) and Wireless Internet Gateway (WIG).
WAP is an application environment and set of communication protocols for wireless devices designed to enable manufacturer, vendor, and platform independent access to the internet and advanced telephony services. WIG is a Short Message Service (SMS) – based service, in which a menu of available banking options is initially downloaded from the bank to the phone device (Brown et.al., 2003)\textsuperscript{59}. This enables users to browse bank accounts and conduct other banking related tasks.

Mobile banking was offered in the UK by the banks such as the Woolwich during early 2000s, but it failed to achieve a critical mass of users. The same story has been repeated in many other countries with mixed results. The main hurdle in development of mobile banking is low consumer adoption due to a number of factors discussed below:

- **Internet Connectivity Costs**: Although a connection cost from mobile phones is steadily declining it is still high enough in many countries to deter customers from using their mobiles for applications such as e-banking.

Difficult user Interface: Human Computer Interface (HCI) issues are a key factor in mobile technology acceptance. HCI includes the use and context of computers, human characteristics, computer systems and interface architecture, and the development process. A general rule is that the easier and more adoptable the interface, the greater is the user acceptance. HCI issues in mobile working are different in the mobile working context than in the traditional office environment. An identifies three key elements that define mobile work contexts and explain how they differ from the office setting:

1. User’s hands are often used to manipulate physical objects, as opposed to users in the traditional office setting, whose hands are safely and ergonomically placed on the keyboard.

2. Users may be involved in tasks (“outside the computer”) that demand a high level of visual attention (to avoid danger as well as monitor progress), as opposed to the traditional office setting where a large degree of visual attention is usually directed at the computer.

3. Attention span of a mobile device user is much shorter than a desktop computer user so design of mobile systems interfaces need
to be much simpler with very limited amounts of text. Systems navigation needs to be very easy too.

4. Methods to ease the burden of input and spread the requirements of processing output, while still maintaining data integrity are of importance.

5. Speech and handwriting recognition are two growing forms of input. The benefits of speech recognition include minimal user attention input, direct system entry, remote microphone capabilities, and faster speed of operation compared to other competing input methods. These technologies need to be incorporated into mobile devices to improve the user’s interface.

- **Lack of awareness amongst customers:** Many banking customers are not even aware of availability of mobile banking or associated benefits. As with other technologies, awareness increase with time and needs considerable promotional efforts.

- **Limitations in functionality of mobile devices:** Mobile technologies are still dogged by limitations such as limited battery life, unreliable network connections, and volatile access points, risk of data loss, portability, and location discovery. Even in the developed world, until recently, wireless
communications were very limited with regards to functionality of devices and speed of communications. Constraints such as screen size, memory, and storage capabilities as well as data transfer rates averaging 14.4 Kilo Bytes Per Second (KBPS), limited the amount of data that could be both displayed and accessed. These limitations are still one of the biggest barrier to the adoption of mobile working in many countries.

- **Accessibility issues**: High speed public internet access is offering opportunities to get and stay connected in more locations. Today, hotels that cater to business travellers frequently offer inroom high speed internet access. As these high speed access networks ramp up, mobile applications are growing in popularly. It may take several years to reach that ‘always connected’ goal, and connectivity in less populous areas will lag behind high teach corridors.

- **Security Concerns**: Mobile technology still suffers from questionable security. So it may not be suitable for transfer of highly confidential financial information. Mobile devices are increasingly becoming a target for virus writers, hackers, and short message service (SMS) spammers. According to Tower Group’s research, over 200 mobile phone viruses have been identified since phones have been able to support PC – like
applications such as email, instant messaging and web browsing, and the number is doubling every six months (Balu, 2007). The resulting disruption of service and data theft can cause many problems for consumers, including lost revenues and customer dissatisfaction for mobile operators. However, the greatest loss may be absorbed by banks providing mobile access, as in almost all cases of fraud, banks suffer from the losses. This factor may be making many banks hesitant in providing mobile banking. To be successful in mobile banking the industry must develop an ability to effectively contain the malware problems to a level that is at least on part with that of the existing internet channels.

- **Organizational changes**: to offer mobile banking many organizations will need to change their business processes, ways in which information is provided and accessed, working practices and work relationships, working styles and most important of all, changes in roles, responsibilities and management structures. It may be a manageable task in some organizations but a very difficult one in others.

- **Small number of choices (only a few banks offer mobile banking)**: There are a bewildering number of options when it comes to providing mobile

---

banking. It is possible to spend anything from a few thousand to several millions of pounds on any combination of mobile hardware, software and networks without realizing many real benefits. With falling process of mobile technology one may perceive that mobile working is cheap to implement. However, it is important to remember that technology costs are only a small proportion of the likely total costs. As a rule of thumb, these costs accounts for 30 per cent of a typical mobile project, with the remaining 70 per cent including items such as training, maintenance, security, management and integration (Flood date?). This implies that the real cost of mobile working could be much greater than promised savings (York & Pendharkar, 2004).

➢ **Technology overload**: the proliferation of personal information devices such as home computers, mobile phones and digital organizers, coupled with the rise of new media such as e-mail and the World Wide Web, have forever altered the way in which information consumers work and play. These fragmented information channels often result in inefficient working patterns as users switch from device to device and between different media (Evans, 2004) which may result in mobile savvy customers unable to use their devices for day to day tasks such as e-banking.
2.6 BACKEND SYSTEMS

Banking is a complex business and the ICT systems supporting it are becoming increasingly complex. These backend or so called core systems can be divided into several sub-categories and this section will cover some of the most common banking related systems.

2.6.1 Product Applications

Most banks have several different computer applications for their products. In most cases these systems were developed decades ago so they are often labeled ‘legacy systems’. There are many problems associated with such systems such as difficulties in integrating them with each other and with newer systems, inflexibility in terms of expansion or scaling down, and rising costs of maintenance. These problems often prevent even strategic level decision making
such as forming partnerships with other banks or mergers, as integrating the legacy systems of two or more banks only multiplies the problem.

Legacy systems often fall short in provision of business intelligence for compliance, sales and management needs, or management decision making. This is mainly due to fact that the data formats used are often incompatible with modern data mining tools, and without data from these core systems the resulting business intelligence would often be incomplete or misleading. New product development can also be a problem, as the systems are very time consuming and costly. Good customer service for e- banking customers is also difficult to achieve because the systems do not offer a consistent look and feel to the customer.

To improve customer service, the provision of information on timely bases, prevention of fraud, and to support new agile business models, banks need to deal with all the problematic issues associated with these legacy systems. One solution is, of course, replacement, but often high costs and unacceptable risks make this option unattractive. Another alternative is to reengineer these systems first and then wrap them with new technology, which can provide functionality as
a service to other systems and allow changes to the core systems without the
need to redevelop all systems. Later systems can be divided and replaced /
redeveloped on a piecemeal basis. This approach, if executed well, can help link a
bank’s infrastructure with modern business process driven applications. However,
to implement it organizations may have at least to partially implement the Service
Oriented Architecture (described later in this chapter). In addition, very good
project management and support from top management in terms of provisions of
required resources would be crucial.

Another solution is outsourcing, as there are standard software packages
available to manage most banking products. This option is often more risky and
usually small or medium sized organizations take it up because they may not have
enough resources to build these systems themselves. To mitigate the risk,
software packages and more importantly vendors have to be chosen carefully to
ensure best fit with the existing organization. Future changes in the organization
and systems architecture in particular must also be taken into account.
Whichever strategy is chosen, banks need to ensure that new systems are process and customer oriented rather than the transaction orientation more common with legacy systems. Integration with other systems which support different service delivery channels such as branches or the internet is also key to ensuring efficient enterprise-wide work flow information and to giving the bank a uniform look and feel. Security should always be a major priority when any changes in core systems are implemented. To this end, core systems may have to work with new biometric technologies, whether that takes the form of retinal scans, fingerprints or voice recognition.

Business continuity, that is implementation of disaster recovery systems, is another fast developing area and receiving much more attention now due to ever increasing risks from natural disasters and terrorism. In the US, for example, many financial institutions were directly affected by the destruction wrought by Hurricane Katrina in 2005. They learned the hard way how unprepared they really were. The damage was so severe in certain regions that some banks couldn’t bring up applications until six months after the hurricane. Likelihood of this kind of event means that many banks have renewed their focus on preparedness as they rethink their risk management strategies and bolster their business
continuity plans (Amato – McCoy, 2006). A cost of unplanned or even planned downtime is spiraling as 24 hours banking channels need to be available all the time.

Continuity plans need to be revisited and updated every three months as a minimum, as one or more components of the continuity systems may not work when needed. Regular testing and simulation of disasters and mock recovery exercises are often needed to uncover any weak links. Every scenario and every possibility needs to be accounted for and drills need to be exercised and recovery plans need to be put into action. This will ensure that banks can get back to business quickly in the event of a disaster.

2.6.2 Data Warehousing

Information has always been a cornerstone of good business decision making. Its importance however is growing all the time as the amount of data which can be collected from customers interaction is increasing at a faster pace

---

then ever. It is important for businesses to seek ways to access, store, maintain, and utilize the enormous data efficiently. This data, if collected and processed in the right way, can provide a meaningful insight into the purchasing behaviour and needs of individual customers. To do this organizations need modern technological tools such as data warehousing systems.

Data warehouse technology can be described as collecting data from several dispersed sources to build a central data storage, so that users can use appropriate data-analyzing tools to analyze it and convert this data into meaningful aids for decision making. Banking activities are highly information intensive, therefore the need for data warehousing is greater in this industry than most others. Data warehouse tools can collect daily transaction data both internally and externally, and then accumulate, categorize, and store data for further analysis.

From an implementation point of view, it is important to carefully evaluate and plan ahead before implementing data warehouse technology, owing to the large amount of investment and organizational effort required. The implementation process needs skilled personnel, proper project management,
and involvement of most stakeholders. Information consultants may be used to provide fresh ideas about the most suitable technologies and sources of information. Outsourcing may be an attractive option if an organization doesn’t have the necessary knowledge and skills in–house.

**Knowledge Management Systems**

A detailed review of Knowledge Management Systems (KMS) is beyond the scope of this chapter. Given the importance of this topic we have dedicated a whole chapter to discussing various aspects of Knowledge Management. However, a few KMS issues are included in this chapter.

The key to understanding KMS is that not all knowledge can be codified and maintained in data or information management systems. Much of the knowledge we use on a daily basis is part of what we do so social beings – in KM terms, it is implicit rather than explicit. As banks seek to move more towards e–banking solutions, the computerized information systems will perhaps be able to cope with explicit knowledge, but the incorporation of implicit knowledge requires
systems which combine technology with human expertise. Throughout this book, whilst technical systems have been presented as perhaps the catalyst for much of e-banking development, it has been made clear that this cannot be successfully implemented without recognition of the organizational and human change which will of necessity accompany this.

There are many sources to assist with this problem, and the reader might find initially referring to good starting point.

**Customer Relationship Management Systems (CRM)**

CRM systems are technology enabled management tools which help manage an organization’s relationship with its customers. CRM systems help gather store customer data, analyze this data to enable customized marketing, and are often used to semi-automate customer services. The main purpose of CRM is often stated as ‘enriching relationships’ with customers to gain greater loyalty, but at times they are used to cut the costs of customers to gain greater loyalty, but at times they are used to cut the costs of customer services processes.
In an e-banking context, CRM software can help move customers from expensive branch or phone–based services to self–help services over the internet.

There have been numerous CRM successes and failures reported in the literature. As with other new technology and other type of change, success depends on how an organization manages the change process and implements the required processes. One example of successful implementation of CRM is Total Jobs Group. For the Totaljobs Group, a recruitment company, the decision to implement CRM throughout its workforce proved beneficial. The company originally introduced a hosted CRM system from Salesforce.com to its own sales force during 2001 – 2002. Two years later, it rolled the system out to the rest of the organization, and it is now used by 268 of its 285 employees. The system gives each employee a single view of the customer, so that before a call he/she is able to appraise customer information. Whereas it is impossible to pinpoint the role that CRM has played in the rapid growth of Totaljobs, one useful indicator is the customer satisfaction survey, which regularly shows a continuing increase in customer satisfaction. The ability of CRM systems to segment customers also enables businesses to identify most profitable customers so that marketing efforts can be efficiently targeted at that segment.
Failures in CRM can often be traced to rigid corporate structures and cultures rather than technology itself. Vendors can also over promise, so organizations planning to implement CRM systems need to be evaluate their own needs first and then conduct a detailed evaluation of how these systems can meet those needs rather than rely on the sales pitch of the vendors. A major reason why CRM systems may disappoint is that they do not overcome integration problems, as they often have to interface with problematic legacy systems.

One example of CRM related failures is DELL. Dell is well known for its “direct” business model that bypassed computer retailers and enables customers to customize the products they purchase using online tools. It has recently lost market share and damaged its stock market reputation, in part because its much–lauded technology enabled processes had a flaw. When a delivery goes wrong or a product is found to be faulty, customers will be left struggling as the human element in the customer–facing function has been cut to a minimum. The computer problems can often only be solved by humans with the necessary knowledge and authority. In Dell’s case, customer frustration with the attention
they received eventually found expression through a blog for the whole world to read. This case shows that technology itself cannot meet customer expectations. Only well motivated and trained staff, backed by the right business processes and technologies can do that (giving more support for the need to attend to knowledge management, as outlined in the previous section).

Another problem is that CRM can cost millions of dollars, and many of its benefits can be hard to quantify and justify in terms of return on investment. These figures are often calculated on a cost savings basis, with the possible enrichment of customer relationships, which is invisible, being easily ignored. It does not mean that CRM investment should not be evaluated at all, instead the evaluation should be done taking multiple dimensions into account. These dimensions may include customer retention rates, acquisition of new customers, effectiveness of marketing campaigns and so on. These success dimensions should be defined before the start of CRM implementation. This will provide a focus to the implementation effort as well as preventing CRM being labeled a failure if it fails to live up to one success criterion (such as cost savings).

2.7 E-BANKING SYSTEMS AS A WHOLE
The banking sector occupies an important position in the global economy. The sector has been subject to many external and internal forces. Of the external forces, technological change is likely to have the most far-reaching impact on the sector. Technology, in particular the internet, is a key driver of these changes. In this sector computer systems is general, both back end and front end systems have largely remained centralized owing to the nature of the business and high security requirements. This to some extent helped banks to automate key business processes by integrating their systems (Ayadi, 2006). Systems integration, as discussed above is essential to delivering the same information across all distribution channels such as e-banking, phone banking and branch banking.

Despite some successes in e-banking implementation, many technological problems remain, as some banks still lag behind others mainly due to their inability to deal with their legacy systems problems. Diniz (1998) preset two

---

different classifications of e-banking systems. These two classifications are based on the level of interactivity of the site (weak, average, strong) and on the type of opportunities pursued by the bank (informational, transactional, client relationship). They found that the type of technology to be used evolves with the interactivity and functionality of the web site of the bank. For example, an informational site is primarily based on a brochure ware model, while an e-banking web site which is oriented toward the management of client relationship requires more sophisticated technologies like Customer Relationship Management (CRM). Mizrahi (2000) proposed another model of e-banking systems evolution, in which, integration depends on two variables, adequacy of the customer–channel relationship and capacity of managing information across channels.

Availability of systems and security of data has always been an important issue, but is arguably even more critical in e-commerce, with 24 hours a day, seven days a week availability. Any unauthorized access to data or unplanned ‘downtime’ of systems can result in a public relations disaster. At the same time, threats from computer viruses, frauds and terrorism are increasing. This all means that a considerable IT budget is spent on fraud prevention and disaster recovery